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Environmental Management Compliance in the University of the Cordilleras

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Abstract: This study investigates the environmental management compliance system of the University of the Cordilleras through a mixed-methods approach, critically evaluating institutional performance in energy conservation, waste management, and environmental reporting within the context of Philippine higher education. Employing a combination of quantitative survey data and qualitative interviews with administrators, faculty, and students, the research applies systems thinking and stakeholder theory as conceptual lenses to capture both operational outcomes and organizational culture. Findings demonstrate a high degree of compliance with energy and waste management standards, driven by best practices in resource efficiency, water recycling, waste segregation, and proactive stakeholder engagement. However, the analysis also exposes persistent challenges in internal and external reporting due to fragmented accountability structures and limitations in data integration and dissemination. The study advances a comprehensive environmental management compliance system (EMCS) model, recommending institutional investments in automated data systems, structured compliance oversight, and continuous stakeholder training aligned with international standards such as ISO 14001. By integrating empirical findings with global best practices and conceptual frameworks, this paper offers actionable insights for universities seeking to advance campus sustainability, regulatory compliance, and data-driven environmental governance in rapidly evolving educational landscapes.

Keywords: environmental management, compliance, higher education, energy conservation, waste management, sustainability reporting

I. INTRODUCTION

Environmental sustainability has become a defining priority in the 21st century, driven by the recognition of humanity's profound impact on ecosystems and the urgent need to secure resources for future generations [1];[2] The concept encompasses a delicate balance among economic growth, social equity, and ecological integrity, demanding not only the minimization of pollution and resource conservation but also responsible consumption and innovation in renewable energy [3];[4]. Growing environmental consciousness is catalyzed by widespread awareness of the harmful effects of climate change, deforestation, biodiversity loss, and the depletion of natural resources, reinforcing the imperative for individuals, organizations, and governments to prioritize sustainable practices [5].

Since the mid-20th century, rapid economic growth and technological advancement have stretched planetary boundaries, creating consequential challenges for current and future generations [6]. Contemporary models of sustainability have evolved against the backdrop of environmental degradation, prompting a global re-evaluation

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of traditional economic paradigms and a shift toward practices that prioritize both social responsibility and ecological preservation [7]. As organizations shift beyond profit maximization, sustainability is increasingly seen as a foundational element of strategic planning, integrating ESG considerations, driving innovation, and shaping business operations for long-term success [8].

The triple bottom line—encompassing people, planet, and profit—has emerged as a guiding ethos for sustainable business practice, challenging prior models focused exclusively on economic returns [9];[10]. This holistic approach requires an assessment of social and environmental impacts alongside financial outcomes, fostering transparency and accountability in organizational behavior [11]. Modern enterprises increasingly report on social and environmental performance, embracing practices such as resource conservation, recycling, and pollution reduction to create value for a diverse spectrum of stakeholders [12];[13].

Higher education institutions (HEIs) play a pivotal role in advancing environmental management compliance and shaping societal values, acting as knowledge disseminators and social actors responsible for embedding sustainability into future leadership [14]. These institutions function as microcosms of society, influencing not only academic scholarship and research but also operational and community engagement [15];[16]. Integrating sustainability into curricula, campus operations, and institutional strategy equips graduates with the skills to address complex sustainability challenges and positions universities as living laboratories for innovation and environmental stewardship.

In the Philippine context, the integration of sustainability within HEIs responds to national regulatory frameworks and growing environmental awareness, evidenced by varied compliance initiatives such as waste segregation, energy conservation, and sustainability education [17];[18] Institutions face significant challenges, including limited resources, infrastructural constraints, and gaps in comprehensive environmental management systems, yet they also possess unique opportunities to lead sustainability transformation through community partnerships, research, and inter-institutional collaboration. Despite ongoing regulatory efforts, there remains a need for standardized metrics, effective implementation, and research that bridges compliance with educational impacts and community outcomes.

The University of the Cordilleras (UC) in Baguio City offers a compelling case study, reflecting both achievements and areas for growth. Its initiatives in waste management, hazardous materials compliance, energy conservation, and regulatory alignment demonstrate institutional commitment while illuminating gaps in ISO certification, data transparency, and sustainability reporting [19]. Focusing on UC's practices reveals the broader potential and complexities faced by HEIs situated in ecologically sensitive regions, underscoring the strategic importance of environmental management compliance—not merely as a legal obligation but as a catalyst for ethical leadership, academic excellence, and community resilience [20].

Theoretical and Conceptual Framework

An extensive theoretical and conceptual framework for environmental management compliance within higher education institutions draws upon interconnected foundations of systems thinking, stakeholder theory, and organizational behavior models. Systems thinking compels universities to examine their operations and impacts holistically, revealing key leverage points for intervention and enabling comprehensive solutions to environmental challenges [21]. Stakeholder theory, meanwhile, underscores the significance of inclusive engagement—ranging from students, faculty, and staff, to surrounding communities—ensuring that institutional environmental policies align with diverse expectations and foster shared responsibility and stewardship [15]. Organizational behavior models add depth by emphasizing processes for continuous improvement, performance monitoring, and institutional learning, thereby enhancing the capacity of universities to adapt and advance sustainable practices in response to evolving environmental pressures [22];[23].

Conceptually, these pillars coalesce into an actionable framework grounded in policy development, risk assessment, management systems, reporting, and stakeholder engagement. Universities chart their sustainability trajectory by crafting comprehensive policies that embody institutional commitments to ecological goals and responsible campus management [24]. Environmental risk assessments guide the prioritization of mitigation actions, while management systems provide the structure for compliance and iterative enhancement. Integrated monitoring and transparent reporting—both internal and external—support accountability, benchmarking, and knowledge transfer, reinforcing the institution's credibility and commitment to environmental stewardship. Stakeholder involvement initiatives, such as education campaigns and community-based recycling, engender a campus-wide culture of ownership and cooperation, further supported by circular economy principles that promote closed-loop resource use [25].

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Operationalizing environmental management in higher education demands practical strategies that span energy efficiency, waste reduction, and community engagement. Transitioning to smart building technologies, implementing water conservation practices and renewable energy sources, and designing comprehensive waste management systems are pivotal for minimizing the ecological footprint of campus operations [26];[27]. These operational strategies, intertwined with curriculum design and experiential learning, prepare graduates not only as stewards but as innovators capable of leading sustainability transformations in broader society [28]. Through this multidimensional framework, universities move beyond compliance to embody ethical leadership—demonstrating how rigorous theoretical underpinnings directly inform pragmatic, impactful solutions to contemporary environmental challenges in academic communities.

Statement of the Problem

This study is designed to assess the level of compliance of the University of the Cordilleras with environmental management regulations as an integral component of their business management framework. Specifically, it aims to evaluate the university's environmental management compliance in three key domains: energy conservation—encompassing both water and electricity usage—waste management for both solid and liquid materials, and the effectiveness of internal and external reporting assistance mechanisms. The focus extends to identifying and documenting best practices that the university has instituted in these areas, examining how energy conservation, waste management, and reporting procedures are implemented to support sustainable operations. Furthermore, the research addresses the pressing challenges faced by the University of the Cordilleras management in meeting environmental compliance obligations, again within the context of energy, waste, and reporting systems. Through this systematic investigation, the study seeks to provide a nuanced understanding of compliance status, highlight model practices, and illuminate persistent operational barriers, thereby contributing valuable insights for advancing environmental stewardship in Philippine higher education institutions.

II. Design and Methodology

This section presents the research design and methodology, the study's population and locale, the data gathering instrument, the data gathering procedure, and the treatment of data.

A. Research Design and Methodology

This study employed a mixed methods approach to determine the University of the Cordilleras (UC)'s environmental management (EMA) compliance as an aspect of its business management, integrating both quantitative and qualitative data at various stages of the research process as advocated by Tashakkori and Teddlie [29]. Mixed methods enable a holistic understanding of the research problem, as outlined by Creswell [30], by combining statistical measures with contextual insights. Specifically, quantitative methods addressed the level of EMA compliance in terms of energy conservation—covering water and electricity consumption—waste management for both solid and liquid materials, and the efficacy of internal and external reporting assistance, while qualitative techniques were utilized to capture detailed data for the subsequent analysis of best practices and the challenges experienced by the university in maintaining environmental management compliance [29];[30].

B. Population and Locale of the Study

The quantitative component of this study focused on a stratified random sampling of University of the Cordilleras (UC) employees—including faculty, non-teaching staff, and administrators—as well as student respondents, resulting in a total of 647 participants: 533 students, 106 employees, and eight administrators. This design ensured the inclusion of permanent, probationary, and contractual personnel from all academic and non-academic units, while qualitative data were obtained from key informants comprising management personnel from the Facilities and Management Office and relevant government experts. The research exclusively examined UC's environmental compliance practices as a higher education institution in Baguio City, targeting its adherence to national environmental laws, internal management systems, and sustainability initiatives.

The scope of the investigation was limited to the current policies and practices of UC, and did not include other higher education institutions in Baguio City or the Cordillera Administrative Region, thereby constraining the generalizability of the findings. Data sources were restricted to campus documents, interviews, and observations, with no external audits or independent environmental assessments performed by outside agencies. Moreover, broader environmental policies and community-wide issues, as well as historical and future

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compliance trends, were not addressed within this research, ensuring a focus solely on university-controlled and present campus operations.

C. *Data Gathering Instruments*

The data gathering instruments in this research consisted primarily of a questionnaire and an interview guide. To address the first research problem on environmental management compliance within the University of the Cordilleras' business management, a self-constructed questionnaire using a 4-point Likert scale was designed, validated by a panel, and pretested with 10 respondents to determine reliability using Cronbach's Alpha, resulting in a high reliability coefficient of 0.895. The questionnaire items were anchored on the research paradigm, focusing sequentially on energy conservation (water and electricity), waste management (solid and liquid), and internal as well as external reporting assistance.

For problems two and three, formal and informal interviews were conducted with personnel from the Facilities and Management Office utilizing guide questions specifically developed to capture best practices and the challenges faced in environmental management compliance. The interview questions were informed by the specific hurdles encountered by UC management. Additionally, observational methods and documentation review were employed to further reinforce and contextualize the data generated regarding the university's environmental management compliance practices.

D. *Data Gathering Procedure*

Permission was obtained from the Vice Presidents for Academic and Research and Academic Services at the University of the Cordilleras to distribute questionnaires to faculty members, non-teaching staff, and students for the purpose of addressing the study's first research problem. Formal and informal interviews with selected personnel and government experts were conducted at their convenience, often after office hours. Over the data collection period from September to November 2024, a total of 647 responses were gathered, including 533 from students, 106 from employees, and eight from administrators.

E. *Treatment of Data*

Data coding for this research was accomplished using the Statistical Package for the Social Sciences (SPSS), providing advanced statistical tools to facilitate accurate data conversion, organization, and decision-making throughout the quantitative analysis [31]. The researcher assigned numerical values to responses from the self-constructed survey questionnaires and checklists, defined key variables in SPSS, and performed data entry and cleaning to ensure reliability. Variables related to compliance were statistically treated using the general weighted mean, which allowed qualitative descriptions to be derived from quantitative values via a validated four-point Likert scale ranging from very low to high compliance.

For data analysis, descriptive statistics including mean score calculations were applied to summarize responses and present results concisely [32]. Thematic analysis was used for qualitative data, with the researcher immersing in the details to identify significant points, establish data categories through cool analysis, and develop overarching themes via warm analysis. This methodology provided a detailed interpretation and ensured both quantitative and qualitative findings were robustly classified and clearly described.

III. Presentation, Analysis And Interpretation Of Data

This section presents, analyzes, and interprets the study's findings on the University of the Cordilleras Environmental Management Compliance.

A. *The Level of Environmental Management Compliance of the University of the Cordilleras along Energy and Water Conservation*

The University of the Cordilleras demonstrates a high level of environmental management compliance in energy and water conservation, evidenced by an overall weighted mean of 3.27, signaling total implementation of guidelines and mechanics across surveyed groups (see Table 1). Key indicators such as energy-saving policies, stakeholder awareness, and infrastructure support all scored highly, and specific behavioral practices like unplugging devices attained the highest weighted mean of 3.42, reflecting not only compliance but the internalization of sustainable habits. This finding embodies systems thinking theory by showing how individuals recognize the broader impact of routine actions on university-wide energy systems and ecological outcomes [21]. Recent literature corroborates the effectiveness of combining behavioral change with technological upgrades and feedback mechanisms in energy efficiency programs [34];[35].

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TABLE 1
THE LEVEL OF ENVIRONMENTAL MANAGEMENT COMPLIANCE OF THE UNIVERSITY OF THE CORDILLERAS ALONG ENERGY AND WATER CONSERVATION

Indicators	Weighted Mean	Descriptive Equivalent
The university's policies on energy conservation are communicated to its stakeholders.	3.27	High Compliance
The stakeholders understand the importance of energy saving (water and electricity) for the university.	3.27	High Compliance
Lights are always switched off when not in use.	3.34	High Compliance
When not in use, the equipment/ device is always unplugged.	3.42	High Compliance
The university uses water-saving fixtures (e.g., low-flow taps and toilets) on the entire campus.	3.32	High Compliance
The university has clear policies in place for energy conservation.	3.28	High Compliance
The current infrastructure (lighting, water fixtures, electrical appliances) at the university supports energy conservation effectively.	3.28	High Compliance
The university regularly monitors its energy consumption (water and electricity).	3.30	High Compliance
There is a system in place to provide feedback on energy conservation efforts to students and staff.	3.00	Moderate Compliance
The university's energy conservation measures have been effective in reducing energy consumption.	3.24	Moderate Compliance
The university's stakeholders feel the impact of its energy conservation efforts.	3.22	Moderate Compliance
Overall Weighted Mean	**3.27**	**High Compliance**

Stakeholder theory is clearly relevant, as stakeholder understanding of energy and water conservation's importance scored a mean of 3.37, pointing to broad awareness but also underscoring challenges in translating knowledge to continuous practice [36];[37]. Moderate compliance levels in areas such as perceived impact (mean 3.22) and effectiveness of energy conservation measures (mean 3.24) suggest that while infrastructure and education efforts exist, stakeholders may not fully perceive the direct outcomes of initiatives. This gap highlights the need to sustain engagement and demonstrate tangible benefits, as studies show that Integrating stakeholder feedback and ongoing monitoring are necessary for closing the loop between policy and effect [39].

Water conservation efforts at UC mirror best practices found globally, including the use of low-flow fixtures, regular maintenance, and leak detection systems, which have proven effective in academic settings [40]. The university's high compliance in the adoption of water-saving infrastructure (mean 3.32) reflects efficient implementation, yet moderate scores in stakeholder impact and effectiveness indicate that ongoing education, transparent reporting, and visible results are crucial for consolidating gains [41];[42]. Applying organizational behavior theory, continual improvement and adaptive management, including investment in new technologies and strengthened feedback channels, are essential for maintaining high compliance and adapting to emerging resource challenges [22].

The University of the Cordilleras illustrates an advanced state of compliance shaped by interconnected theoretical foundations, but sustained progress will depend on leveraging behavioral insights, stakeholder engagement, and adaptive management. As recent research in higher education emphasizes, the synergy of policy, education, technology, and continuous feedback is critical for robust environmental performance and effective resource stewardship [43];[44];[39].

B. The Level of Environmental Management Compliance of the University of the Cordilleras along Solid and Liquid Waste Management

The University of the Cordilleras exhibits a high level of compliance with solid and liquid waste management guidelines, reflected in an overall weighted mean of 3.30 (see Table 2), which denotes robust institutional implementation of waste management systems and practices. Indicators such as clear communication of waste management policies and infrastructure received some of the highest scores (e.g., infrastructure support scored 3.41), signifying strategic investments in bins, disposal facilities, and signage that actively guide stakeholders to proper segregation and disposal [36];[37]. This aligns with systems thinking theory, as effective physical arrangements not only facilitate but also reinforce correct waste management behaviors and institutional sustainability, empowering the university community to translate intent into positive environmental outcomes [21]; [22].

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TABLE 2
THE LEVEL OF ENVIRONMENTAL MANAGEMENT COMPLIANCE OF THE UNIVERSITY OF THE CORDILLERAS ALONG SOLID AND LIQUID WASTE MANAGEMENT

Indicators	Weighted Mean	Descriptive Equivalent
The university's policies on waste management (solid and liquid) are communicated to its stakeholders.	3.40	High Compliance
The stakeholders understand the importance of proper waste management (solid and liquid) for the university.	3.41	High Compliance
Wastes are always segregated into the appropriate bins (e.g., recycling, compost, landfill).	3.18	Moderate Compliance
Liquid waste (such as chemicals and oils) is always disposed of in accordance with university guidelines.	3.37	High Compliance
The university's stakeholders actively participate in its waste reduction programs (e.g., recycling drives, composting).	3.31	High Compliance
Employees and students use reusable items (e.g., water bottles, bags) instead of disposable ones whenever possible.	3.15	Moderate Compliance
The university has clear policies in place for waste management (solid and liquid).	3.38	High Compliance
The current infrastructure (bins, disposal facilities, signage) at the university supports effective waste management.	3.41	High Compliance
The university regularly monitors its waste disposal practices (solid and liquid).	3.29	High Compliance
There is a system in place to provide feedback on waste management efforts to students and staff.	3.07	Moderate Compliance
The university's waste management measures have been effective in reducing waste and promoting recycling.	3.24	Moderate Compliance
The university's stakeholders feel the impact of its waste management activities.	3.30	High Compliance
Overall Weighted Mean	**3.30**	**High Compliance**

Stakeholder understanding and active participation in waste reduction programs also achieved high ratings, with stakeholders' appreciation for the importance of proper waste management scoring 3.41. These findings support stakeholder theory, spotlighting how shared responsibility and engagement foster a campus culture oriented toward sustainability [38];[16]. However, some measures—such as perceived effectiveness of waste reduction initiatives and recycling—were rated moderately at 3.24, indicating opportunities for improvement in the visibility and impact of waste management programs among students, staff, and faculty [45];[46]. Recent scholarship underscores the importance of transparent reporting, ongoing education, and visible feedback mechanisms to strengthen participation and amplify outcomes [39];[44].

Analysis of the university's strategic approach indicates that deliberate investments in infrastructure have addressed major behavioral and logistical barriers to compliance, with clear signage and accessible bins significantly reducing confusion and contamination of recyclable materials. This strong organizational foundation enables more effective monitoring and data collection for continual improvement, consistent with organizational behavior theory [22];[23]. The moderate compliance scores for program effectiveness suggest that distinct enhancement is warranted in communication about results, targeted interventions in less-engaged locations, and comprehensive stakeholder training—a multifaceted strategy evidenced in recent studies of campus waste management optimization [43].

The University of the Cordilleras' strengths lie in its comprehensive infrastructure and stakeholder engagement; yet to achieve exemplary sustainability outcomes, the institution must focus on bridging the gap between policy and perceived impact. This entails rigorous program monitoring, transparent student and staff feedback systems, and adaptive management—an approach strongly supported by contemporary best practices in higher education environmental stewardship [46];[39];[47].

C. The Level of Environmental Management Compliance of the University of the Cordilleras along Internal and External Reporting Assistance.

The University of the Cordilleras demonstrates moderate compliance in internal and external environmental management reporting, as indicated by an overall weighted mean score of 3.22 (see Table 3), suggesting that while formal guidelines, policies, and reporting mechanisms are present, their execution and perceived effectiveness are not yet optimal. Communication of reporting policies to stakeholders received a high mark of

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3.29, reflecting effective dissemination and stakeholder awareness [38]. However, the transparency and accessibility of reports scored only 3.17, highlighting ongoing challenges in making environmental data fully available and comprehensible, especially to broader constituencies within and beyond the campus [39].

TABLE 3
THE LEVEL OF ENVIRONMENTAL MANAGEMENT COMPLIANCE OF THE UNIVERSITY OF THE CORDILLERAS ALONG INTERNAL AND EXTERNAL REPORTING ASSISTANCE

Indicators	Weighted Mean	Descriptive Equivalent
The university's policies on internal and external environmental reporting are communicated to its stakeholders.	3.23	Moderate Compliance
The stakeholders understand the importance of internal and external environmental reporting for the university.	3.29	High Compliance
The university accurately reports internal environmental data (e.g., energy use, waste management).	3.22	Moderate Compliance
The university accurately reports environmental data to external entities (e.g., government agencies, accreditation bodies).	3.24	Moderate Compliance
The university's internal and external environmental reports are submitted on time.	3.22	Moderate Compliance
The university's environmental reports are transparent and accessible to stakeholders.	3.17	Moderate Compliance
The university has clear policies in place for internal and external environmental reporting.	3.24	Moderate Compliance
The current infrastructure supports effective environmental reporting (e.g., data collection systems, reporting software).	3.23	Moderate Compliance
The university regularly monitors the quality of its internal and external environmental reports.	3.24	Moderate Compliance
There is a system in place to provide feedback on the university's environmental reporting efforts to students and staff.	3.11	Moderate Compliance
The university's environmental reporting measures have been effective in improving environmental management practices.	3.22	Moderate Compliance
The university's stakeholder can feel the impact of its internal and external environmental reporting efforts.	3.19	Moderate Compliance
Overall Weighted Mean	**3.22**	**Moderate Compliance**

Reporting practices within UC are partially aligned with theoretical models advocating for a systems-thinking approach and robust stakeholder engagement [21];[22]. Effective environmental reporting requires accurate internal data tracking (e.g., on energy and waste) and comprehensive external disclosures to regulatory agencies and accreditation bodies. The moderate scores in report timeliness and infrastructure (3.19 and 3.22, respectively) emphasize the need for continual investment in modern data collection, reporting technologies, and feedback systems to enable regular, actionable monitoring [43]. Feedback channels for reporting efforts—crucial for accountability—were rated lowest at 3.11, pinpointing a gap in organizational learning and adaptive improvement [23].

From a conceptual perspective, environmental reporting forms the backbone of both compliance and organizational excellence. Accurate and transparent reporting not only builds regulatory trust but also empowers stakeholders to contribute meaningfully to sustainability initiatives [46];[47]. The current moderate compliance may signal underlying system or resource limitations, such as insufficient baseline data, fragmented information flow, or lack of integrated planning. This strategic vulnerability can inhibit the university's ability to capitalize on its environmental strengths for institutional branding, resource efficiency, and deeper stakeholder trust [44].

Enhancing reporting systems and stakeholder engagement is essential to move beyond compliance and foster a culture of continuous improvement. Investments in digital solutions, rigorous monitoring, and open feedback will address inconsistencies and help position UC as a regional leader in environmental management transparency. As environmental reporting grows as a global standard, especially from 2020 to 2024, competitive institutions leverage detailed reports to attract partners, secure funding, and build reputational capital, underscoring the strategic imperative for UC to close its remaining gaps [39];[43].

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D. Best Practices of the University of the Cordilleras in Environmental Management Compliance along Energy Conservation (Water and Electricity)

The University of the Cordilleras stands as a noteworthy example of best practices in environmental management compliance, not merely adhering to regulations but fostering a broad culture of sustainability within its academic community. Comprehensive programs that promote energy conservation, waste minimization, and the greening of campus operations have led to high compliance—which, in turn, reinforces both social responsibility and ecological care [48]. These initiatives illustrate a strong commitment to systems thinking, demonstrating how targeted interventions—from policy creation to infrastructure upgrades—enable educational institutions to galvanize collective effort among administrators, faculty, and students to achieve lasting positive outcomes [21];[22].

A specific hallmark is UC's advanced approach to water conservation, evidenced by its systematic wastewater recycling scheme. The university's Sewerage Treatment Plant processes roughly 1,200 cubic meters daily, with approximately 25 cubic meters of treated wastewater being repurposed each day for non-potable uses such as plant watering and restroom flushing, leading to direct reductions in the campus's environmental footprint and significant monthly water savings. Continuous monitoring—via daily logs and effluent quality testing—corroborates UC's internal compliance and supports adaptive improvement. Energy conservation measures, meanwhile, are maintained through rigorous reporting and equipment management protocols, ensuring faulty devices are swiftly repaired and resource usage is optimized. These operational best practices not only lower the institution's operating costs, but also increase its attractiveness to environmentally conscious students, faculty, and outside collaborators [48];[43].

UC's success rests on its ability to mobilize stakeholders toward collective responsibility: students are actively engaged in programs, faculty endorse green practices in classrooms, and the administration invests strategically in sustainability projects. The results codified in compliance tables and validated by consistent policy infrastructure reflect an integrated framework—one rooted in stakeholder engagement, systems thinking, and organizational behavior theory [37];[38];[23]. As contemporary literature asserts, creating meaningful impact in environmental stewardship requires not only institutional commitment but collaborative action and transparency [39];[44].

E. Best Practices of the University of the Cordilleras in Environmental Management Compliance along Waste Management (Solid and Liquid)

The University of the Cordilleras has institutionalized best practices in solid and liquid waste management that include systematic approaches for the collection, transport, processing, recycling, and disposal of waste materials. These practices, as discussed in interviews and confirmed by multiple campus initiatives, serve to minimize negative impacts on human health and local aesthetics by reducing the risk of waterborne diseases linked to poor waste disposal. The university's comprehensive waste management system embodies resource conservation, adherence to long-term standards, and equitable access to sanitation for all stakeholders—consistent with the "Think Green Campus Model" and similarly benchmarked frameworks in higher education [49].

By adopting sustainable waste management principles, UC demonstrates institutional leadership in environmental responsibility within the city of Baguio. The university's effective waste segregation, regular provision of well-placed containers, and promotion of recycling efforts all contribute to pollution reduction, preservation of campus aesthetics, and broader alignment with the Sustainable Development Goals. These efforts not only promote ecological stewardship but also position UC as a replicable model for peer institutions, showing that effective waste management is foundational to long-term sustainability and community health [49];[38].

F. Best Practices of the University of the Cordilleras in Environmental Management Compliance along Internal and External Reporting

The University of the Cordilleras' best practices regarding internal and external reporting assistance for environmental management compliance center on identifying material sustainability issues and integrating systematic data for robust, comprehensive reporting. Such practices enhance transparency and accountability, supporting the university's goals of timely performance tracking and early identification of areas needing improvement. Theoretical models recommend that effective environmental reporting processes should be multifaceted—combining policy, infrastructure, and human factors to ensure consistency and accuracy [46];[22].

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Although specific protocols are not detailed in the available documentation, the implications of strong reporting mechanisms are evident in improved institutional governance and knowledge transfer, which fuel continuous management improvements [23];[39].

Externally, comprehensive environmental disclosures demonstrate UC's compliance with regulatory standards and its commitment to sustainability, helping to build trust with governmental bodies and the public. This transparency mitigates reputational risks and strengthens relationships with outside stakeholders by communicating the university's actions and achievements clearly. Efficient and well-structured reporting assistance also supports data-driven decision-making and fosters a culture of ongoing learning and improvement, ensuring UC not only upholds its compliance responsibilities but also acts as a responsible and forward-thinking contributor to environmental stewardship [43];[47].

G. The Challenges Encountered by the University of the Cordilleras in Environmental Management Compliance

The University of the Cordilleras (UC) encounters substantial challenges in environmental management compliance, particularly in the realms of internal and external reporting processes. Internally, the absence of robust systems and standardized procedures impedes the accurate and timely identification, reporting, and resolution of environmental incidents. Fragmented integration of environmental and security data further delays corrective action and creates weak accountability structures, hindering effective interdepartmental communication and complicating both daily management and regulatory reviews. As a result, the institution finds it difficult to produce consistent, high-quality internal reports, amplifying risk during external audits and compliance checks, where transparency and data integrity are paramount [50].

These deficits in reporting infrastructure extend beyond administrative inconvenience, undermining UC's ability to track, monitor, and enhance its environmental performance across key compliance dimensions. Challenges manifest as incomplete disclosure of important issues and a lack of comprehensive, automated systems to aggregate environmental data, such as utility usage, waste generation, and transportation impacts for meaningful internal and external analysis. As confirmed through stakeholder interviews, these internal shortcomings create barriers to swift governance responses and foster regulatory and reputational risk if left unaddressed. The difficulty of implementing an institution-wide environmental management system is exacerbated by the complexity and heterogeneity of data and operational contexts across departments [50].

External reporting presents its own set of difficulties. Complexities in data gathering, coupled with the legal mandate for integrating environmental and social sustainability reporting, make compliance with regulations resource-intensive and challenging to execute. Delays in reporting or the incomplete dissemination of findings compromise the university's ability to demonstrate compliance, potentially attracting greater scrutiny and penalties from regulatory agencies. Stakeholders, both internal and external, may struggle to appreciate the tangible impacts of programs like energy conservation and waste management due to inconsistent communication and the delayed realization of benefits. This highlights the necessity of adopting advanced reporting technologies and feedback mechanisms to enhance accuracy, accessibility, and accountability [23];[43].

Beyond reporting, the university faces operational challenges in waste management that further complicate compliance efforts. Issues such as poor waste segregation among students, ineffective educational campaigns, and insufficient awareness about waste classification hinder the success of waste minimization programs. Managing hazardous liquid waste, particularly from laboratories, and ensuring proper disposal to protect human health and the environment, demand greater investment in awareness campaigns, infrastructure, and regulatory adaptation. Additionally, the lack of optimized collection systems, ongoing monitoring, and provision for dynamic scheduling increases the risk of contamination, environmental pollution, and inefficiencies in resource allocation. Addressing these obstacles necessitates a holistic approach—integrating systems thinking, continual education, and investment in advanced technologies—to strengthen compliance and foster a culture of sustainability throughout the institution [49];[39];[44].

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IV. CONCLUSIONS

This section presents the conclusions and recommendations derived from the findings and statistical analysis of the study.

Conclusions

The findings of this study reveal that the University of the Cordilleras exhibits a commendable level of environmental compliance in both energy conservation and waste management, underscoring its proactive stance toward sustainability and responsible environmental stewardship. These achievements demonstrate that UC's commitment goes beyond mere regulatory adherence by embedding sustainability in institutional practices and stakeholder culture, thereby blending academic excellence with long-term ecological accountability. However, persistent challenges remain, particularly in the realms of internal and external reporting assistance, indicating areas where systemic improvements are necessary for advancing comprehensive environmental management compliance.

Recommendations

Given these insights, it is recommended that the University intensify its focus on capacity-building through ongoing education, training, and awareness programs for all employees regarding compliance obligations, legal mandates, and environmental responsibilities. The creation of a dedicated office for environmental compliance is advised to ensure institutional oversight, strengthen policy implementation, and support ongoing improvements in sustainability initiatives. Additionally, the University should modernize and fortify its compliance management system by adopting automated technologies, aligning with recognized standards such as ISO 14001, and instituting regular internal and external audits to ensure dynamic, transparent, and accountable environmental management.

Expected Outcome

The implementation of the University of the Cordilleras Environmental Management Compliance System (EMCS) is expected to fundamentally transform the university's operational culture and elevate its environmental stewardship performance across all domains. With clearly articulated objectives—such as reducing electricity intensity by 15% and diverting at least 70% of solid waste from landfill—the EMCS sets ambitious, quantifiable targets that are both outcome-oriented and aligned with the principles of continuous improvement and regulatory compliance. The system's scope, encompassing all facilities and a range of stakeholders including students, faculty, contractors, and partners, ensures that the approach is institution-wide and holistic, leaving little room for gaps or silos in environmental performance [46].

The establishment of a dedicated Environmental Management Compliance Office (ECO), supported by a cross-functional steering committee and clear policy direction from university leadership, guarantees strong governance and coordination. These mechanisms will institutionalize environmental best practices, ensure accountability, and support consistent progress monitoring. As a result, stakeholders are expected to experience improved clarity in compliance roles, faster response times for incident management, and greater integration of environmental metrics into daily decision-making [23];[47]. The regular provision of internal dashboards and compliance reports, supplemented by third-party audits, will further enhance transparency, support adaptive management, and help sustain high compliance standards in line with international best practices such as ISO 14001.

Comprehensive activity plans for energy, water, and waste management—including LED lighting retrofits, smart metering, rainwater harvesting, greywater recycling, behavioral campaigns, and detailed waste segregation—are designed to foster a culture of environmental responsibility and cost efficiency throughout the university. Coupled with equipped training programs, regular audits, and stakeholder-driven awareness initiatives, these interventions are expected to embed sustainability deeply in campus life, driving positive behavioral change and technological innovation. Furthermore, the integration of digitized, centralized data management and reporting platforms through an Environmental Management Information System (EMIS) will provide for real-time data accuracy, streamlined compliance documentation, and timely corrective responses.

The successful rollout of the EMCS will position the University of the Cordilleras as a regional leader in environmental compliance and sustainable campus management. Its visible leadership commitment, strategic stakeholder partnership, and evidence-based sustainability reporting will enhance institutional reputation, attract external funding and recognition, and nurture a campus community that internalizes sustainability as both a

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professional and civic value [39];[44]. As a result, the university will be well-placed to fulfill its educational and social mission while meeting and exceeding the evolving expectations of regulators, accreditors, and the broader public.

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