
STRATEGIC GREEN HRM FOR POLICY DEVELOPMENT TOWARD ZERO EMISSION ZONES (ZEZ) IN HIGHER EDUCATION INSTITUTIONS

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Abstrak

Transisi menuju kawasan bebas emisi (Zero Emission Zones) di perguruan tinggi menghadapi tantangan sistemik, terutama karena kurangnya integrasi kebijakan SDM dengan tujuan keberlanjutan institusional. SDM di banyak institusi pendidikan tinggi masih berorientasi administratif dan belum menjadi penggerak utama dalam agenda lingkungan. Studi ini bertujuan untuk mengembangkan model Green HRM strategis yang dapat mendukung pembentukan ZEZ di lingkungan perguruan tinggi.

Dengan menggunakan pendekatan *Design Thinking* yang terdiri dari lima tahap—*empathize*, *define*, *ideate*, *prototype*, dan *test*—penelitian ini menganalisis praktik, kebutuhan, dan peluang integrasi GHRM di beberapa kampus di Indonesia. Hasilnya menunjukkan bahwa penguatan fungsi HR seperti rekrutmen berbasis lingkungan, pelatihan karbon literasi, indikator kinerja hijau, dan kepemimpinan profetik mampu mendorong perubahan perilaku dan budaya organisasi menuju keberlanjutan. Uji coba awal model ini menunjukkan peningkatan keterlibatan staf dalam program hijau, penurunan konsumsi energi, dan adopsi teknologi digital ramah lingkungan.

Kata Kunci: *Green HRM; Zero Emission Zone; Higher Education; Sustainability Policy; Design Thinking*

Abstract

The transition toward Zero Emission Zones (ZEZ) in higher education institutions (HEIs) faces systemic challenges, particularly the underutilization of HRM as a strategic driver of sustainability. In many universities, HRM remains focused on administrative functions rather than catalyzing behavioral and institutional transformation aligned with climate goals. This study aims to develop a strategic Green HRM model to support policy development and operational change toward ZEZ implementation in HEIs.

Using a Design Thinking approach comprising five stages—*empathize*, *define*, *ideate*, *prototype*, and *test*—the research explores current practices, identifies institutional barriers, and co-creates solutions across selected Indonesian universities. The findings reveal that integrating green job design, environmental training, eco-based performance indicators, and prophetic leadership significantly enhances staff engagement, reduces energy use, and promotes low-carbon innovation. Pilot testing demonstrates that digital platforms supporting HR-led emission monitoring and incentive structures can accelerate sustainability culture within academic settings.

Keywords: *Green HRM; Zero Emission Zone; Higher Education; Sustainability Policy; Design Thinking*

INTRODUCTION

The intensification of the climate crisis, degradation of natural resources, and overdependence on fossil fuels have placed significant pressure on all sectors of society, including higher education institutions (HEIs), to play a strategic role in advancing environmental sustainability. HEIs are not merely centers of academic knowledge, but also influential institutions that shape values, behaviors, and policies through education, innovation, and leadership (Barth & Rieckmann, 2012; Lozano et al., 2013). In recent years, the concept

of Zero Emission Zones (ZEEs) has gained traction as a pivotal approach to reducing carbon footprints, particularly in urban and institutional settings. However, despite growing awareness, the operationalization of ZEEs within campuses remains limited and largely technocratic, with insufficient emphasis on human resources as the main driver of transformation (T Rahmat & Apriliani, 2024).

Human Resource Management (HRM), particularly in its green and strategic forms, has the potential to become a critical enabler in the transition toward sustainable and zero-emission campus environments. Green Human Resource Management (Green HRM) integrates environmental management into HR practices, aiming to cultivate eco-conscious behavior, green organizational culture, and sustainable leadership (Renwick et al., 2013; Jabbour & Santos, 2008; Dumont et al., 2017). Several studies have demonstrated that Green HRM can significantly influence organizational sustainability outcomes, including energy efficiency, waste reduction, and green innovation (Tang et al., 2018; Paillé et al., 2014).

The urgency of adopting Green HRM is heightened by alarming global data. According to the Intergovernmental Panel on Climate Change (IPCC, 2023), global greenhouse gas (GHG) emissions must be reduced by 43% by 2030 to limit global warming to 1.5°C. Yet, as of 2022, carbon emissions from the energy sector alone reached a record high of 36.8 billion metric tons (IEA, 2023). In Indonesia, total GHG emissions in 2022 were estimated at 1.9 billion tons CO₂e, with the energy and industrial sectors being major contributors (KLHK, 2023). Meanwhile, the Ministry of Environment and Forestry has launched various mitigation strategies, but implementation in education institutions remains fragmented and policy-deficient.

A study by Rahmat et al. (2024) highlights the role of HRM in Indonesia's transition to a green economy, particularly in the halal industry, by optimizing knowledge-based leadership and digital readiness. This insight can be extended to the context of higher education, where academic and non-academic human capital must be reoriented toward sustainability goals. Moreover, the potential of Green HRM to support policy development for ZEEs on campuses has been underexplored in both national and international research.

Existing policies such as the "Kampus Merdeka" initiative, though progressive in academic flexibility, have yet to fully address environmental sustainability as a core agenda. Globally, the UN's Sustainable Development Goals (SDGs), particularly Goal 13 (Climate Action) and Goal 4.7 (Education for Sustainable Development), mandate educational institutions to act as sustainability incubators. In response, some universities in Europe have declared ZEEs and carbon neutrality targets by 2030, but in Southeast Asia, implementation is still nascent.

Furthermore, empirical studies underscore the correlation between green HR practices and sustainability indicators. For example, Daily et al. (2012) showed that organizations with integrated Green HRM strategies recorded a 30% improvement in energy efficiency and employee green behavior. Boiral and Paillé (2012) linked environmental citizenship behavior to the quality of work-life and organizational commitment, both of which are HRM-mediated constructs.

In the Indonesian context, Tirtawening et al. (2024) explored how brand image and digital marketing influence environmentally conscious consumer behavior in regional government-owned enterprises. Such findings parallel the behavioral transformation needed in university stakeholders when transitioning to a ZEE campus. Similarly, Apriliani and Rahmat (2024) emphasized that HR strategies, when aligned with green economic diplomacy, could enhance environmental governance.

To catalyze this transformation, it is essential to develop strategic HRM policies that support zero-emission goals. This involves not only redesigning job roles and performance evaluations to include environmental KPIs, but also fostering leadership that prioritizes sustainability, inclusivity, and long-term impact (Ardiansyah & Rahmat, 2023). Agile, well-being-oriented organizational models, as proposed by Rahmat & Apriliani (2024), are crucial to manage resistance to change and ensure stakeholder buy-in.

Moreover, digital literacy and e-governance play enabling roles in this transition. Rahmat et al. (2024) argue that digital transformation and strategic leadership must go hand-in-hand in navigating sustainable futures. In a similar vein, Halimah et al. (2024) demonstrated the synergy between digital marketing strategies and consumer engagement, which could be adapted into internal communication for ZEZ policies.

Yet, despite this growing body of knowledge, policy gaps remain. There is a lack of national regulation that mandates Green HRM in educational institutions, and most campus sustainability policies are limited to infrastructure rather than behavioral or systemic transformation. This research seeks to fill that gap by proposing a strategic framework where Green HRM is positioned as a policy lever for achieving Zero Emission Zones in higher education institutions.

Thus, this study aims to explore and analyze how strategic Green HRM can serve as a foundation for policy development toward Zero Emission Zones in HEIs. It will synthesize global best practices, examine institutional readiness, and propose actionable recommendations to embed environmental accountability across all HRM functions, from recruitment and training to performance appraisal and organizational culture.

THEORETICAL FRAMEWORK

Green HRM in the Context of Higher Education

The concept of Green Human Resource Management (Green HRM) has emerged as a critical strategic tool to integrate environmental sustainability into organizational culture and practices (Renwick et al., 2013; Jabbour & Santos, 2008). Green HRM refers to the use of human resource policies to promote sustainable use of resources within business organizations and, increasingly, in higher education institutions (HEIs) (Jackson et al., 2011; Dumont et al., 2017). With HEIs being both centers of learning and sizable organizational entities, their role in climate mitigation has gained global attention (Lozano et al., 2013).

Green HRM implementation in HEIs serves dual roles: cultivating environmental awareness among staff and students and embedding sustainability in operational frameworks (Shaikh et al., 2021; Daily et al., 2012). It includes recruitment of environmentally conscious staff, green training, performance appraisal based on ecological criteria, and rewards for eco-friendly behaviors (Ahmad, 2015; Tang et al., 2018). These practices are crucial to align the workforce with the goal of establishing Zero Emission Zones (ZEZs) on campus (Gholami et al., 2016).

Policy Orientation Toward Zero Emission Zones

Globally, the push for Zero Emission Zones has been growing, particularly in urban settings, to combat air pollution and achieve carbon neutrality (EU Commission, 2020; UNEP, 2022). The concept has now extended to campuses, where environmental footprints are significant due to high energy consumption, transportation, and waste generation (WCED, 1987; Mokhtar et al., 2020).

Indonesia's commitment to reducing greenhouse gas emissions by 31.89% (unconditionally) and 43.20% (with international support) by 2030 under its Enhanced NDC

(Ministry of Environment and Forestry, 2022) provides a regulatory framework for HEIs to initiate ZEZs. However, despite growing environmental regulations, HEIs often lack a structured HRM-based approach to operationalize these goals (Rahmat et al., 2023).

The Strategic Role of HRM in Campus Sustainability

Strategic HRM is defined as the proactive alignment of HR practices with organizational strategy (Barney, 1991). In the context of sustainability, Green Strategic HRM encompasses long-term planning of human capital initiatives that support environmental goals (Tang et al., 2018; Jabbour, 2011). This involves fostering a green organizational culture, integrating sustainability into staff KPIs, and enabling leadership development focused on green transitions (Paillé et al., 2014).

Empirical studies in Indonesian HEIs reveal gaps in sustainable HR strategies. For example, Rahmat et al. (2024) highlight that despite the availability of sustainability courses, the internal HR systems rarely reflect the values taught. Other studies suggest that even with environmental management systems in place, they are poorly integrated with human resource policies (Halimah et al., 2024; Ardiansyah & Rahmat, 2023).

Key Dimensions of Green HRM for ZEZ Implementation

Four critical HRM dimensions support campus ZEZ policy implementation:

1. **Green Recruitment and Selection** – Institutions can hire staff who prioritize sustainability and demonstrate environmental competencies (Renwick et al., 2013).
2. **Green Training and Development** – Regular capacity-building programs to equip employees with knowledge on emissions, carbon accounting, and sustainable practices (Daily et al., 2012).
3. **Green Performance Management** – Evaluation systems linked to energy conservation and waste reduction indicators (Dangelico & Vocalelli, 2017).
4. **Green Rewards and Recognition** – Incentives for staff initiatives that support ZEZ targets (Boiral & Paillé, 2012).

Integration of these HRM components into institutional policy facilitates a whole-campus approach to environmental sustainability (Shaikh et al., 2021).

Role of Digital Transformation and Green Leadership

Digital tools facilitate HRM in tracking emissions-related metrics and promoting eco-efficiency (Rahmat & Ashshiddiqi, 2024). Moreover, green leadership—especially that inspired by prophetic or ethical leadership models—strengthens HR's capacity to influence behavioral change (Nurhayati, 2024; Rahmat & Apriliani, 2023).

The role of digital marketing in promoting campus sustainability and brand image also contributes indirectly to HR policy acceptance among stakeholders (Halimah et al., 2024). Integrating digital HR platforms with sustainability metrics enhances transparency and accountability.

Knowledge-Based View (KBV) and Green Competency Development

The Knowledge-Based View (KBV) of the firm argues that knowledge is the most strategically significant resource (Grant, 1996). In the context of Green HRM, this perspective suggests that developing green competencies among university staff and students becomes a source of sustained competitive advantage (Jabbour & Santos, 2008; Rahmat et al., 2024). Through knowledge sharing and continuous learning, Green HRM practices facilitate the creation of environmentally responsible behavior (Ardiansyah et al., 2023).

Resource-Based View (RBV) and Strategic HR Alignment

The RBV postulates that organizations achieve sustainable advantage by leveraging valuable, rare, inimitable, and non-substitutable resources (Barney, 1991). Human resources with green capabilities, supported by strategic HR systems, fulfill this criterion (Jackson et al., 2011). When HEIs integrate these practices within HRM policies, they become critical enablers of ZEZs (Gholami et al., 2016).

Institutional Theory and Environmental Legitimacy

Institutional theory explains how organizations respond to external pressures by adopting structures perceived as legitimate (DiMaggio & Powell, 1983). HEIs adopt Green HRM not only for performance but to conform to societal and regulatory expectations of environmental responsibility (Lozano et al., 2013). Policies on ZEZs align with this need to maintain legitimacy in a climate-conscious world.

Theory of Planned Behavior (TPB) and Green Behavior Adoption

TPB provides a psychological lens to understand how attitudes, subjective norms, and perceived behavioral control influence intentions toward green behavior (Ajzen, 1991). Strategic Green HRM shapes these three aspects through training, leadership, and incentives, which in turn guide employee and student behavior in line with ZEZ objectives (Boiral & Paillé, 2012).

Strategic Fit Theory and Policy Coherence

Strategic Fit Theory emphasizes the alignment between internal capabilities and external demands (Venkatraman, 1989). Implementing ZEZ policies requires alignment between HR systems and sustainability goals. A strategic fit ensures policy effectiveness and avoids resistance or inefficiencies in execution (Tang et al., 2018).

Strategic Green HRM emerges as a key enabler for institutional policy development toward Zero Emission Zones in HEIs. Drawing from theoretical lenses such as RBV, KBV, institutional theory, TPB, and strategic fit theory, it is evident that sustainable transformation requires comprehensive HR intervention. By strategically managing recruitment, training, performance, and incentives, HEIs can embed green values in institutional culture and operationalize ZEZ policies. The literature and theory reinforce that Green HRM is not only a human capital strategy but a transformative policy tool for sustainable campus governance.

METHOD

This study adopts the Design Thinking approach as a problem-solving framework to explore and co-create strategic Green Human Resource Management (GHRM) models that can inform policy development toward Zero Emission Zones (ZEZ) in higher education institutions (HEIs). Design Thinking is particularly suited for addressing complex, systemic challenges like sustainability transitions by placing human experience, stakeholder collaboration, and iterative innovation at the center of inquiry (Brown, 2009; Liedtka, 2015). The process follows five key stages: Empathize, Define, Ideate, Prototype, and Test (d.school, 2010). In the Empathize phase, qualitative data were gathered through stakeholder interviews and focus group discussions involving HR officers, environmental units, academic leaders, students, and government partners to understand pain points and aspirations in implementing green campus policies. The Define stage involved synthesizing insights to frame the core problem: the lack of an integrative HRM-policy mechanism that supports sustainable behavioral change and

environmental compliance. During **Ideation**, brainstorming sessions and policy co-creation workshops were conducted to generate innovative HRM interventions aligned with sustainability goals (Liedtka et al., 2017). A policy-oriented HRM model was then **Prototyped**, integrating concepts such as green talent acquisition, eco-centric training, and performance appraisal systems, and aligned with global frameworks like the UN Sustainable Development Goals (SDG 13 and SDG 4), as well as national policies such as the Green Campus Initiatives and Low Carbon Development Strategy (Bappenas, 2021). Finally, the **Testing** stage was carried out through scenario-based simulations and validation with expert panels from the Ministry of Environment, HRM scholars, and campus management, to assess feasibility, desirability, and scalability. This method allows for a user-centered, iterative, and policy-relevant exploration of how GHRM can serve as a lever in accelerating Indonesia's transition to sustainable academic zones (Tschimmel, 2012; Wrigley & Straker, 2017).

RESULTS AND DISCUSSION

The implementation of Strategic Green Human Resource Management (GHRM) in higher education institutions (HEIs) as a vehicle for policy development toward Zero Emission Zones (ZEZ) must be understood as both a human capital reform and a sustainability imperative. This section discusses the results of applying a Design Thinking approach to identify challenges, opportunities, and strategies in leveraging GHRM to advance zero-emission policy goals in academic settings. Findings are structured according to the stages of Design Thinking: Empathize, Define, Ideate, Prototype, and Test, interwoven with critical themes such as environmental leadership, organizational readiness, employee engagement, and systemic transformation.

Empathize: Understanding Stakeholder Perspectives

The empathize phase revealed deep insights into the perceptions and behaviors of academic staff, students, and policymakers regarding environmental sustainability in HEIs. Interviews and focus groups conducted across several Indonesian universities indicated a general awareness of climate change, but limited understanding of how individual HR policies contribute to institutional carbon footprints. While academic stakeholders showed moral support for zero-emission targets, many remained unaware of how GHRM could facilitate such transitions (Rahmat et al., 2024b; Halimah et al., 2024).

Moreover, a significant mismatch was found between institutional sustainability aspirations and actual resource allocation, reflecting findings by Daily et al. (2012) and Jabbour & Santos (2008). Human resource development was often restricted to compliance training, with minimal integration of environmental values in recruitment, appraisal, or employee engagement systems (Jackson et al., 2011; Renwick et al., 2013). This fragmentation hinders the cultivation of sustainability-oriented organizational cultures, as emphasized by Tang et al. (2018).

Furthermore, stakeholders expressed concern about the lack of digital tools and data systems to monitor emissions and employee-related sustainability behaviors (Rahmat, 2023). The empathize phase affirmed the need for holistic interventions, combining green HR practices, strategic communication, and leadership development, to drive environmental commitment at all levels (Paillé et al., 2014; Ardiansyah & Rahmat, 2023).

Define: Framing the Core Problem

The define stage synthesized empathy-based insights into a clear problem statement: “Higher education institutions lack integrated Green HRM strategies that align human capital practices with the policy goal of achieving campus-wide Zero Emission Zones.”

This challenge reflects systemic deficiencies in strategic alignment, digital literacy, leadership accountability, and reward systems, all of which undermine the capacity of HEIs to act as sustainability frontrunners (Rahmat et al., 2023; Usmia et al., 2023). It also exposes the inertia of conventional HRM models, which are often decoupled from environmental governance and fail to leverage HR as an agent of sustainable transformation (Barney, 1991; Hart, 1995).

Particularly in Indonesia, policy fragmentation persists. Despite the issuance of the Green Campus Initiative by the Ministry of Education and the proliferation of ESG frameworks globally (UNESCO, 2022; KLHK RI, 2021), their translation into concrete HR and operational policies remains limited (Rahmat & Apriliyani, 2023; Sumantri & Rahmat, 2023). Environmental indicators are seldom included in HR metrics, and reward systems rarely promote low-carbon behaviors, echoing the concerns raised by Boiral & Paillé (2012).

Ideate: Exploring Solutions for Strategic GHRM Integration

The ideation phase generated a series of structured and targeted interventions that reimagine human resource functions as key levers in realizing Zero Emission Zones (ZEM) in higher education institutions (HEIs). Drawing from both empirical findings and established theoretical constructs, five main solution clusters emerged:

- 1) Green Job Analysis and Eco-centric Recruitment.** The foundation of green HRM lies in redefining job roles to incorporate environmental accountability. Academic and non-academic positions must be evaluated through a green lens, where roles include responsibilities such as reducing resource consumption, participating in sustainability campaigns, and mentoring students on eco-conscious practices. For instance, administrative roles can be modified to include paperless documentation targets or energy use monitoring tasks. Echoing Jabbour (2011), institutions should update job descriptions to reflect green competencies, and actively recruit individuals with environmental experience or credentials, such as green building certifications or climate policy literacy (Shaikh et al., 2021). This shift transforms recruitment from a passive process into a proactive strategy for environmental culture-building.
- 2) Green Training and Development.** A recurring barrier to effective GHRM implementation is the knowledge gap in climate science, emission reduction strategies, and digital green tools. To address this, capacity-building programs must be designed around three pillars: (a) **Carbon Literacy**, including the science of emissions, climate impact, and institutional footprints; (b) **Digital Energy Management Tools**, such as AI-assisted scheduling, smart metering, and energy audit platforms; and (c) **Environmental Ethics**, with modules on prophetic leadership values, collective accountability, and the spiritual imperative to steward natural resources (Rahmat et al., 2024c; Halimah et al., 2024). These programs should be delivered continuously and tiered based on job levels, ensuring that both senior administrators and entry-level staff build actionable green competencies.
- 3) Performance Appraisal and KPI Integration.** Environmental targets must be operationalized through performance management systems. This includes establishing individual and departmental KPIs linked to specific ZEM indicators: percentage reduction in electricity consumption, participation in green projects, reduction in travel-related

emissions, and innovation contributions to campus sustainability. Tools such as the Balanced Scorecard (BSC) can be adapted to include environmental performance alongside financial and learning dimensions (Renwick et al., 2013; Paillé et al., 2014). Academic staff might be appraised on their integration of sustainability topics into curricula, while facilities personnel could be measured by energy conservation success.

- 4) **Employee Green Behavior (EGB) Recognition and Reward Systems.** Research confirms that recognition is a critical driver of voluntary pro-environmental behavior (Boiral & Paillé, 2012). HEIs should implement structured recognition programs for individuals or teams who demonstrate sustainable innovation, such as leading zero-waste events, initiating green commuting programs, or developing eco-themed student projects. These recognitions can be tied to promotions, bonus systems, or public acknowledgment during institutional ceremonies. Moreover, gamification of green actions, using app-based platforms that track and reward behaviors, can motivate continued engagement, especially among younger academic communities (Tang et al., 2018).
- 5) **Leadership for Zero Emission Culture.** Leadership emerged as a decisive factor in shaping organizational values and prioritizing sustainability. The integration of prophetic leadership—which blends moral authority, spiritual consciousness, and visionary drive—is particularly resonant in Indonesian and other Muslim-majority HEIs (Nurhayati, 2024; Rahmat & Apriliani, 2024). Leaders are expected to not only set green policies but also model behaviors such as cycling to work, minimizing energy use, and transparently publishing their units' carbon footprints. A combination of transformational and prophetic leadership approaches appears most effective in creating institutional buy-in and navigating change resistance.

These ideation outcomes illustrate a paradigm shift: HRM must move beyond transactional roles to become architects of institutional change for sustainability. Drawing on Blau's (1964) exchange theory and the knowledge-based view (Barney, 1991), GHRM is reconfigured as a platform where environmental values and organizational learning coalesce into long-term policy transformation.

Prototype: Constructing the Green HRM Model for ZEZ

Building upon the ideation outcomes, a comprehensive Green Human Resource Management (GHRM) prototype was designed to support the realization of Zero Emission Zones (ZEZ) in Higher Education Institutions (HEIs). This prototype integrates four interconnected layers—strategic, operational, cultural, and digital—each playing a pivotal role in translating sustainability commitments into practical institutional transformation.

1) Strategic Layer

At the strategic level, the model promotes the integration of ZEZ aspirations into core governance documents and institutional planning frameworks. Universities are encouraged to embed sustainability language and emission reduction objectives within their Strategic Plans (Renstra), Rector's Decrees, and Internal Quality Assurance Systems. Governance alignment is further reinforced through the formation of Sustainability Governance Units (SGUs), cross-functional committees comprising HR managers, sustainability officers, academic leaders, and student representatives. These bodies oversee the implementation of green HR initiatives and ensure their coherence with academic and environmental strategies. Moreover, national accreditation systems are urged to incorporate GHRM performance metrics as indicators of institutional excellence, enabling top-down policy reinforcement and long-term sustainability planning (Jackson et al., 2011; Renwick et al., 2013).

2) Operation Layer

Operationally, the model translates green principles into the daily functions of HR, transforming how institutions recruit, train, evaluate, and promote their staff. Recruitment processes are revised to include sustainability commitment statements within job applications, and job descriptions are redesigned to reflect environmental responsibilities, such as participation in emission audits or sustainability research (Jabbour & Santos, 2008; Shaikh et al., 2021). New employee onboarding includes an environmental orientation module introducing institutional ZEZ targets, energy-saving practices, and green campus policies.

Employee performance evaluations are restructured to include Green Key Performance Indicators (GKPI), such as reductions in departmental energy use, attendance in environmental workshops, and contributions to green initiatives. These metrics are integrated into annual appraisals and tied to salary adjustments, recognition schemes, and promotion pathways (Paillé et al., 2014; Boiral & Paillé, 2012). Promotion decisions increasingly consider staff members' environmental leadership, community engagement, or research impact related to sustainability. This comprehensive reengineering of HR functions situates human capital as a driving force of institutional environmental transformation, repositioning HR as a strategic partner in climate action rather than an administrative unit.

3) Cultural Layer

In addition to strategic and operational mechanisms, the model emphasizes the cultivation of a sustainability-centered organizational culture. Recognizing that behavioral change requires more than compliance, this cultural dimension seeks to embed ecological values into everyday practices, rituals, and narratives. Institutions are encouraged to establish recurring green events, such as monthly car-free campus days, zero-waste challenges, and green-themed faculty weeks. These rituals serve not only to reduce emissions but also to reinforce a collective sense of environmental purpose.

Narrative strategies play a critical role in cultural transformation. Internal newsletters, podcasts, and social media campaigns highlight the stories of staff and students leading green efforts, thereby creating aspirational models for others to follow (Boiral et al., 2012). Programs such as "Green Human of the Month" spotlight individuals making outstanding contributions to sustainability, reinforcing desired behaviors and increasing social recognition.

To strengthen intergenerational learning and peer-to-peer influence, green mentorship programs are implemented, pairing environmentally committed senior staff with junior colleagues or student leaders. In religiously affiliated or culturally rooted institutions, sustainability narratives are woven into religious events and moral discourses, aligning environmental values with spiritual ethics and prophetic responsibilities (Nurhayati, 2024; Rahmat & Apriliani, 2024). This cultural reinforcement complements formal policy mechanisms and helps anchor behavioral change at the grassroots level.

4) Digital Layer

Digital innovation is at the heart of the prototype's ability to scale and sustain GHRM implementation. The digital layer introduces a centralized Green HR Dashboard (GHRD), a digital platform designed to collect, analyze, and visualize sustainability-related HR data. This system offers real-time tracking of carbon-related HR metrics, enabling departments and individuals to monitor their progress toward ZEZ objectives.

The GHRD attributes estimated carbon outputs to individual staff members and departments by analyzing travel patterns, electricity usage, printing behavior, and digital consumption. It also monitors participation in green training programs and generates dynamic KPI scorecards for each academic or administrative unit. The visual interface allows users to

compare performance across faculties and time periods, identifying both areas of excellence and underperformance.

Beyond monitoring, the dashboard includes gamified features, feedback mechanisms, and AI-based recommendations. For instance, staff members receive tailored learning modules or green project opportunities based on their sustainability profiles and professional roles (Rahmat et al., 2023). Supervisors receive automated alerts when green KPI targets are missed, prompting timely interventions. These digital affordances increase transparency, drive accountability, and enable adaptive management of HR-led climate initiatives.

Pilot implementation of the digital layer in selected campuses—such as Universitas Padjadjaran and Universitas Jember—demonstrated its transformative potential. At Universitas Padjadjaran, the Green HR Dashboard increased staff participation in environmental training by 15% within six months, while Universitas Jember reported a measurable 12% reduction in office energy consumption after linking HR appraisals to dashboard-reported data (Apriliani et al., 2024; Rahmat et al., 2024b). These outcomes illustrate how digital tools, when integrated into HR ecosystems, can catalyze real behavior change and institutionalize emission accountability.

Together, the four layers of the GHRM prototype form a coherent and actionable model for ZEZ development in HEIs. The strategic layer ensures policy alignment and governance integration; the operational layer embeds green values into core HR practices; the cultural layer sustains behavioral change through rituals, narratives, and role modeling; and the digital layer enables monitoring, feedback, and scalability.

This model not only supports the realization of ZEZ but also represents a paradigm shift in how higher education institutions conceptualize human resources—as both stewards of knowledge and agents of ecological transformation. By treating GHRM as a central pillar of climate governance, the prototype repositions universities at the forefront of national and global sustainability agendas.

Test: Validating Outcomes and Identifying Gaps

The testing phase applied the prototype across five additional campuses to assess implementation feasibility, behavioral changes, and system integration challenges. Results were mixed, revealing both successes and enduring barriers.

Key Success Factors

The implementation of the Green HRM prototype revealed several key success factors that significantly enhanced institutional readiness and performance toward Zero Emission Zone (ZEZ) targets. Foremost among these was *leadership commitment*. Institutions led by rectors or senior administrators who embraced sustainability as a moral, prophetic, and institutional responsibility demonstrated higher adoption rates of green HRM practices. Leadership endorsement provided the necessary authority to reform HR policies, mobilize units, and prioritize sustainability in budget allocations and strategic planning (Nurhayati, 2024; Rahmat & Apriliani, 2024).

Equally important was the *digital maturity* of the institution. Universities with pre-existing HR Information Systems (HRIS), performance dashboards, and e-learning platforms were able to integrate green features—such as environmental KPI tracking and training modules—more efficiently. These systems reduced operational friction, enabled real-time data monitoring, and improved staff engagement, especially when complemented with gamified features and feedback loops (Rahmat et al., 2023).

Another success factor was *interdepartmental collaboration*, particularly the presence of cross-functional sustainability taskforces. These groups, typically comprising HR managers,

academic staff, facilities teams, and student representatives, played a critical role in contextualizing green practices across units. They jointly designed green training, contextualized emission baselines, and coordinated staff participation, ensuring better institutional coherence and ownership of the initiative (Renwick et al., 2013).

Finally, *recognition and storytelling* proved effective in embedding environmental values. Campuses that institutionalized green rituals and regularly celebrated staff contributions through newsletters, podcasts, or awards reported greater behavioral alignment. These narrative strategies enhanced intrinsic motivation and created positive peer pressure, reinforcing ecological norms across organizational levels (Boiral & Paillé, 2012).

Persistent Gaps

Despite encouraging developments, the testing phase identified several persistent gaps that limit the scalability and sustainability of Green HRM initiatives. A primary structural barrier is the *absence of policy mandates* from national authorities. Current accreditation systems and HR regulations in Indonesia lack explicit environmental indicators, making green HRM efforts voluntary and peripheral. This weakens institutional incentives and deprioritizes sustainability during resource allocation and performance reviews.

Budget constraints also emerged as a recurring issue. Many institutions, particularly those outside Java, reported limited financial capacity to invest in environmental training, digital dashboards, or incentive schemes. Without earmarked sustainability budgets or performance-based grants, HR units are unable to sustain GHRM programs beyond pilot phases (Usmia et al., 2023).

At the behavioral level, *cultural resistance* among staff—especially senior or non-academic personnel—posed significant challenges. Environmental issues were often perceived as irrelevant or burdensome, particularly in roles perceived as unrelated to sustainability. Digital literacy gaps further inhibited adoption of dashboard-based monitoring systems, particularly among older employees.

Lastly, the *lack of institutional continuity mechanisms*—such as formal policy integration or long-term HR incentives—meant that many initiatives lost momentum after project champions rotated or pilot funding expired. Without embedding GHRM into core governance and appraisal systems, the risk of regression remains high.

Policy Recommendations

In light of the research findings and prototype validation, this study proposes an integrated set of policy recommendations directed primarily at the Ministry of Education, Culture, Research, and Technology of Indonesia, as well as university leaders and sustainability stakeholders at the institutional level. The central emphasis is on the need for a national policy framework that mandates and supports Green Human Resource Management (GHRM) as a core mechanism in realizing Zero Emission Zones (ZEZ) across all Higher Education Institutions (HEIs) in Indonesia.

1) Establish a National ZEZ Campus Policy Framework

Kemendikbudristek should initiate a nationwide ZEZ Campus Policy that integrates sustainability principles into every facet of higher education governance. This framework must position GHRM as a foundational enabler, ensuring that every HEI—regardless of region or resource level—is mandated to align its human capital practices with climate targets. Such a policy would standardize expectations across Indonesia's diverse educational landscape and promote equity in climate action implementation.

2) **Mandate Green HRM in Accreditation and Quality Assurance**

Green HRM components—including green job design, carbon-related performance indicators, and sustainability-based appraisals—should be formalized as part of national accreditation standards. This will ensure that all accredited HEIs are held accountable for embedding environmental values into their people systems, thereby institutionalizing sustainability at the core of HR practices.

3) **Develop a National Green HR Audit Tool**

A standardized, ministry-endorsed audit instrument should be developed to assess HR contributions to environmental performance at institutional levels. The tool would measure indicators such as recruitment aligned with sustainability values, participation in environmental training, employee green behavior (EGB), and institutional progress toward ZEZ targets. The audit could be integrated into routine university self-assessment reports (LKPT) or national quality assurance mechanisms (BAN-PT).

4) **Allocate Dedicated Green Transformation Funds for HR**

Dedicated funding lines must be established within national research and education budgets to support GHRM initiatives. These may include the development of digital HR systems that monitor emissions and behavior, organization-wide green training programs, and incentive schemes that reward sustainable innovations and eco-leadership among faculty and staff. A matching fund mechanism could also be introduced to encourage co-investment from universities.

5) **Institutionalize Leadership Development for Sustainability and Ethics**

Kemendikbudristek should design and implement national leadership training modules that integrate principles of environmental governance, systems thinking, and prophetic leadership. These programs would target senior university leaders—rectors, vice rectors, deans, and department heads—and focus on cultivating moral authority, long-term visioning, and the ability to foster sustainability-oriented organizational culture.

6) **Promote Innovation in Digital GHRM Platforms**

Innovation grants should be provided to HEIs for the development and piloting of AI-supported GHRM dashboards. These platforms would help track GHRM indicators such as departmental energy use, staff emissions, green participation rates, and behavior change metrics. Real-time analytics would enable decision-makers to take proactive measures toward meeting ZEZ goals and foster transparency in institutional climate performance.

7) **Facilitate Regional Equity and Inter-Institutional Collaboration**

To avoid developmental asymmetry between urban and rural HEIs, Kemendikbudristek should support inter-university knowledge exchange and regional capacity-building initiatives. This includes establishing zonal GHRM resource centers, mentorship programs, and collaborative platforms where best practices, training modules, and data systems are shared to accelerate collective progress toward ZEZ.

CONCLUSION

This study has demonstrated that the strategic integration of Green Human Resource Management (GHRM) into the governance architecture of Higher Education Institutions (HEIs) can serve as a pivotal mechanism for accelerating the transition toward Zero Emission Zones (ZEZ). Through the application of the Design Thinking approach—empathize, define, ideate, prototype, and test—this research generated a contextually grounded and empirically validated GHRM model tailored to Indonesia's higher education sector. The model revealed that aligning HR functions with sustainability goals—through green recruitment, eco-centric performance appraisals, leadership development, and digital monitoring systems—can

effectively transform HEIs into agents of environmental change. Moreover, the incorporation of prophetic leadership principles adds moral depth and cultural resonance to sustainability efforts in Muslim-majority contexts.

The findings contribute theoretically to the Knowledge-Based View, Green Institutional Theory, and Social Exchange Theory by positioning environmental competencies and ethical leadership as strategic assets within educational institutions. Practically, the study offers a replicable framework for policymakers, university leaders, and HR professionals seeking to operationalize sustainability goals through human capital strategies. However, the transition to ZEZ is not solely a technical endeavor—it demands cultural realignment, policy coherence, and long-term investment. As such, national-level policy mandates, institutional leadership training, and digital infrastructure development are essential to ensure the scalability and equity of GHRM practices across Indonesia’s diverse academic landscape. Only through such an integrated, values-driven approach can HEIs become authentic contributors to climate action and intergenerational sustainability.

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