



Green Facilities Training, Employee Performance, and Net Operating Income: Maximizing Profitability in Sustainable Estates

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Abstract

Sustainable estates need efficient technology and trained people who can operate, maintain and use building systems correctly. However, much research on real estate discusses staff training, employee performance and financial returns as separate issues. This article explains how green facilities training can improve employee performance and how better daily building operations can increase net operating income (NOI). A structured review of recent peer-reviewed research was carried out. The selected publications covered green training, green human resource management, employee environmental behaviour, building management, occupant involvement, energy use, green certification and the income and expenses of commercial properties. Each publication was checked for identifiable authors, publication details and a digital object identifier where available. The studies were grouped into four areas: how training affects workers' skills and behaviour; how workers' behaviour affects building operations; how building operations affect property income and costs; and whether training has a direct effect on NOI. The findings strongly support the first two relationships. Green training improves workers' environmental knowledge, commitment, motivation, creativity and ability to carry out green tasks. These benefits are greater when managers provide support, give workers some decision-making power and create an environmentally responsible workplace. Research on building operations also shows that trained operators, involved occupants, regular monitoring and properly managed building systems can improve energy use, comfort and maintenance. Commercial real estate research suggests that lower utility costs, better building control, healthier workspaces and reliable green performance can protect income. They may reduce operating expenses, improve tenants' experiences and support occupancy and rental value. However, very few researchers have directly connected green facilities training with NOI at the property level. The article therefore presents a practical Training-to-NOI Model and suggests estate-level measures for future long-term research. It concludes that owners should treat green training as an operating investment linked to clear building and financial results. This approach can support better budgeting, staff accountability and proper evaluation of training across sustainable property portfolios.

Keywords: *Green facilities training; employee green performance; sustainable facilities management; net operating income; commercial estates; green human resource management.*

1.0 Introduction

Commercial estates are under pressure to reduce energy use, control operating costs, maintain healthy indoor conditions and demonstrate credible environmental performance. New equipment and green certification can help, but neither guarantees good results after a building is occupied. Much of the final performance is determined in daily decisions: how technicians set HVAC schedules, how quickly faults are detected, how cleaning and waste procedures are followed, how occupants are guided, and whether energy or maintenance data are used in routine work. These are human and organisational questions as much as technical ones. Brackley et al. (2023) show that the efficient operation of commercial offices is shaped by socio-technical conditions inside facilities management organisations, while Hahn et al. (2022) identify gaps in information, skills and communication faced by building operators. In a Nigerian smart-building context, Faremi et al. (2021) similarly report that preventive maintenance and prompt corrective work are central sustainable facilities practices. Okoro (2023), in a wider review of sustainable facilities management, also shows that environmental performance depends on management practice as well as building technology.

Green facilities training can be understood as planned learning that equips facilities managers, technicians, cleaners, security staff, supervisors and other estate employees to perform their work with lower environmental impact and better resource discipline. It may cover energy management, building automation, preventive maintenance, water conservation, waste sorting, indoor environmental quality, green procurement, emergency response, data interpretation and communication with tenants. The wider green human resource management literature gives strong reasons to expect such training to matter. Pham et al. (2020) found that environmental training was positively related to employee in-role green performance, with environmental commitment acting as an important mechanism. Amrutha and Geetha (2021) also found that green training encouraged voluntary workplace green behaviour through a supportive green climate and employee green satisfaction. These findings suggest that knowledge alone is not enough; training works best when employees see environmental performance as part of the organisation's normal way of working.

For property owners and estate managers, the next question is financial. Net operating income is the property-level income remaining after normal operating expenses are deducted from effective gross income. In simplified form, $\text{NOI} = \text{Effective Gross Income} - \text{Operating Expenses}$. A training programme can therefore create financial value only when improved employee performance changes one or both sides of that equation. Better operating decisions may reduce electricity, water, waste, outsourced repair and avoidable maintenance costs. Better service quality and indoor conditions may support tenant satisfaction, renewal, occupancy and rent resilience. Research on green commercial property shows that environmental attributes and interventions can affect rental income, vacancy, expenses and risk, although results differ across markets and building types (Leskinen et al., 2020; Li et al., 2021). Clayton et al. (2021) add an important operational point: monitoring, tenant engagement and environmental capital expenditure can reduce electricity use beyond certification alone.

The difficulty is that these streams of research seldom meet. Human-resource studies usually stop at employee green behaviour, environmental performance or broad firm performance. Facilities studies focus on energy, comfort, maintenance or user behaviour. Real-estate studies usually begin with building certification, retrofit performance, rent or value. As a result, property decision makers have limited evidence on how a specific people-management investment such as green facilities training travels through operational mechanisms to NOI. This matters because owners must choose between competing uses of capital and operating budgets. Training will receive sustained funding only when managers can connect it to service reliability, resource use, tenant outcomes and property cash flow. This article addresses that gap through a systematic evidence review rather than a structured integrative review.

1.1 Objectives of the study

Its objectives are to:

1. clarify the concepts of green facilities training, employee green performance and NOI in sustainable estates;
2. examine recent evidence on the mechanisms through which training influences employee behaviour and operational outcomes;
3. evaluate how sustainable facilities performance can influence property income and operating expenses; and
4. develop a testable Training-to-NOI model for estate owners and facilities managers.

The contribution is not a claim that training automatically raises NOI. Instead, the article identifies the conditions under which that result is plausible, the indicators that should be measured, and the point at which the existing literature becomes thin.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Green Facilities Training

Green facilities training is narrower and more operational than general sustainability awareness. It deals with the competencies employees need to run buildings in ways that meet environmental and service targets. In practice, this includes correct operation of building management systems, energy-efficient start-up and shutdown routines, fault reporting, preventive maintenance, water-loss control, waste handling, indoor air-quality practices, sustainable purchasing and occupant communication. Yafi et al. (2021) found that green training improves environmental performance through competencies and motivation, while Gadomska-Lila et al. (2024) describe green competencies as a combination of awareness, knowledge and behaviour that can support organisational sustainability. These studies make training relevant to estates because facilities work requires employees to translate environmental goals into repeated operational actions.

Training also has a cultural function. Hameed et al. (2020) show that green human resource practices can encourage organisational citizenship behaviour toward the environment through empowerment. Zhang and Sun (2021) caution that the design of green incentives and training matters because employees interpret organisational signals and may respond differently when practices conflict with personal standards. Green facilities training should therefore include clear expectations, opportunities to apply new skills and feedback on outcomes. A technician who learns an efficient HVAC

sequence but is rewarded only for avoiding complaints may return to energy-intensive settings. A cleaner trained in waste separation will struggle if bins, collection contracts and supervisor expectations do not support the practice. Training is most useful when the operating system reinforces the behaviour being taught.

The content and delivery method also matter. Facilities employees often learn best when instruction is tied to the exact systems, recurring faults and decisions they face on site. Classroom explanations of energy conservation can be useful for basic awareness, but practical exercises using trend logs, work orders, meter data and actual plant sequences are more likely to build usable capability. Xie and Zhu (2020) show that green training can support wider sustainability performance, suggesting that the benefit grows when learning is connected to organisational innovation. Saeed et al. (2022) also show that green HRM works through operational practices rather than in isolation. For sustainable estates, this means training plans should begin with a building-performance diagnosis. Managers can identify the largest sources of avoidable cost or environmental loss, map the staff decisions that influence those sources, and then design training around those decisions. This creates a stronger line of sight between learning objectives and estate performance.

2.1.2 Employee Performance in Sustainable Estates

Employee performance in a sustainable estate has at least three dimensions. The first is core task performance: doing assigned work accurately, safely and on time. The second is green in-role performance: carrying out normal duties in a way that reduces energy, water, material use or environmental risk. The third is discretionary green behaviour, such as suggesting an efficiency improvement, reminding occupants about waste practices or voluntarily reporting wasteful equipment. Pham et al. (2020) focus on in-role green performance, whereas Amrutha and Geetha (2021) examine voluntary behaviour. Tang et al. (2023) show why this distinction matters: employee green behaviour is not one uniform construct, and different forms can have different drivers and organisational consequences. Zacher et al. (2023) likewise place employee green behaviour at the centre of environmentally sustainable organisations.

In facilities work, employee performance is visible in operational indicators. Examples include adherence to preventive-maintenance schedules, time to identify and close faults, repeat work orders, energy use outside occupied hours, water-loss response, waste contamination rates, equipment downtime, indoor comfort complaints and accuracy of meter or building-management-system records. The connection between human action and building performance is supported by facilities research. Weerasinghe et al. (2022) found that organisational energy culture can improve when managers increase occupant knowledge, provide feedback and give people responsibility for energy targets. Hahn et al. (2022) found that communication between operators and occupants remains central to managing comfort and energy. Brackley et al. (2023) likewise show that operational energy performance depends on organisational priorities, documentation, incentives and the practical use of technical tools.

Green training may also improve wider job performance through motivation and creativity. Wu et al. (2021) found that green training supported employee green creativity through green values and intrinsic motivation. Xie, Zhu, and Qi (2020) reported that green training can promote employee career growth through employee performance, indicating that the learning can have consequences beyond environmental compliance. Liaquat et al. (2024) found that task-related green behaviour was more consistently connected to employee environmental performance than voluntary behaviour in their banking-sector sample. For estate management, this suggests that measurable improvements are more likely when environmental responsibility is built into routine job tasks rather than left entirely to goodwill.

2.1.3 Net Operating Income and Sustainable Property Performance

NOI is a useful bridge between sustainability and property management because it brings income and controllable operating costs into one measure. For a multi-tenant commercial estate, effective gross income is influenced by rent, occupancy, concessions, recoveries and other property income. Operating expenses include utilities, routine repairs and maintenance, cleaning, security, waste, landscaping, management and other recurring property costs, depending on the reporting convention. A green initiative improves NOI when it lowers recurring expenses without harming income, or when it strengthens income more than it increases operating cost.

Evidence from commercial property research supports several parts of this logic. Leskinen et al. (2020), reviewing green certification studies, found that certification can be associated with higher rental income and lower vacancy, expenses and risk, although the size and consistency of effects vary. Li et al. (2021) reported rental premiums for LEED-certified office buildings in China. Clayton et al. (2021) moved beyond certification and found that monitoring, tenant engagement and environmental capital expenditure were associated with reduced electricity consumption in commercial real estate. Seeley and Dhakal (2021) showed through commercial-building cases that energy-efficiency retrofits can be evaluated jointly on environmental, technical and financial grounds. Sherman et al. (2021) also documented energy savings from small commercial building retrofits.

The financial case should not be reduced to energy alone. Healthy and well-managed buildings can affect the people who occupy them. Palacios et al. (2020) found improvements in perceived environmental conditions, health and job satisfaction following relocation to a healthier building, alongside reduced sick leave. Alazazmeh and Asif (2021)

reported that a commercial-building retrofit improved energy performance and indoor environmental quality. These outcomes can matter to property income because comfort, reliability and workplace quality influence tenant experience. Still, a building can possess efficient equipment and perform poorly when controls are badly set, faults are ignored or staff and occupants work around the system. This is why the human capability layer is necessary in any NOI model.

NOI is also sensitive to timing and lease structure. Some efficiency gains appear quickly in landlord-paid utility accounts, while other benefits pass through to tenants or are captured only at renewal. In triple-net leases, for example, direct utility savings may not immediately raise landlord NOI, although lower occupancy cost can support tenant retention and asset competitiveness. In gross or service-charge arrangements, improved operating efficiency may be more visible in property accounts. Leskinen et al. (2020) emphasise that green property value works through several cash-flow channels rather than one universal premium. This means a Training-to-NOI study must identify who pays each operating cost, how recoveries are calculated, and whether savings are retained by the owner, passed to tenants or shared. Without this accounting step, even genuine operational improvements can be misread as having no financial value.

2.1.4 The Training-to-NOI Logic

The proposed logic has four stages. First, training raises relevant knowledge, skill, self-efficacy and environmental commitment. Second, those capabilities change task behaviour, such as correct equipment scheduling, faster fault response, accurate data use and better tenant guidance. Third, behaviour changes building outcomes, including resource consumption, downtime, maintenance quality, comfort and waste performance. Fourth, those operational outcomes influence NOI through lower expenses and, in some cases, more stable property income. Ren et al. (2022) provide firm-level evidence that green HRM can be linked to both environmental and financial performance through employee environmental commitment. Mehrajunnisa et al. (2023) similarly show that employee green behaviour shapes the relationship between green HRM practices and business performance. These studies do not measure property NOI, but they support the human-capability and performance steps of the chain.

The model also contains moderators. Leadership and culture determine whether employees are allowed and encouraged to use new skills. Chen and Wu (2022) show that green transformational leadership works jointly with green HRM to facilitate employee green behaviour. Al-Swidi et al. (2021) similarly report that green HRM, leadership and organisational culture jointly influence employee green behaviour and environmental performance. Technology is another moderator: training has greater practical value when employees have meters, automation systems, fault-detection tools and usable records. Loeh et al. (2021) demonstrate the importance of linking building information with sustainable facilities management data. Finally, tenant cooperation matters because energy and comfort outcomes are co-produced by operators and occupants. The model therefore treats training as necessary in many settings, but not sufficient on its own.

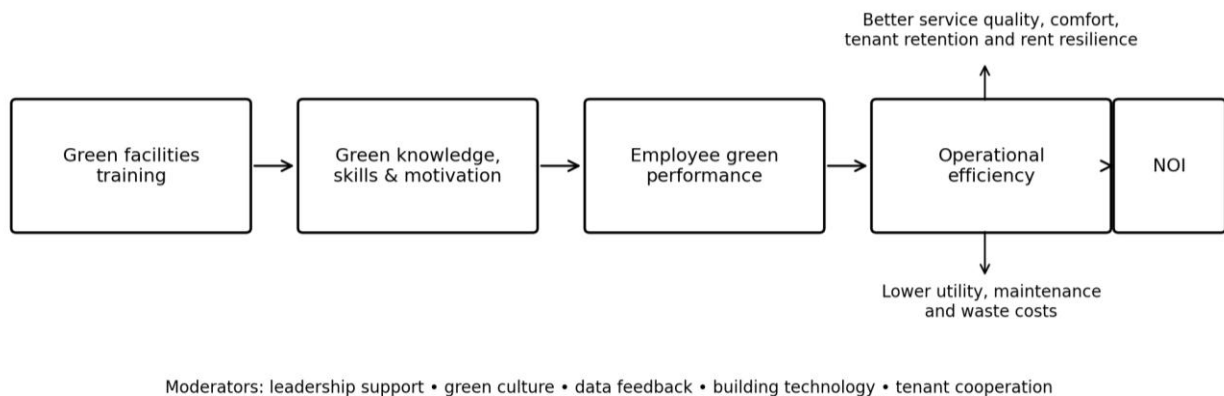


Figure 1. Proposed Training-to-NOI conceptual model.

2.2 Theoretical Framework

The article combines three recent lines of theoretical reasoning that are widely used in green management research. The first is the Ability-Motivation-Opportunity (AMO) perspective. In simple terms, employees are more likely to produce desired green outcomes when they have the ability to act, the motivation to act and an organisational opportunity to apply what they know. Yafi et al. (2021) directly connect green training with competencies and motivation, while Ali et al. (2023) use an AMO-based model to explain how green competencies contribute to corporate sustainability performance under supportive organisational conditions. In an estate setting, ability is created through technical and environmental knowledge; motivation comes from leadership, feedback, recognition and meaningful targets; opportunity comes from job authority, procedures, technology and access to operating data.

The second line is social exchange reasoning. Employees interpret training, support and empowerment as signals about what the organisation values. Where workers believe the organisation invests in them and takes environmental commitments seriously, they may respond with stronger commitment and extra effort. This reasoning is visible in Pham et al. (2020), who found environmental commitment to mediate the training–green-performance link, and in Hameed et al. (2020), who identified empowerment as a mechanism between green HRM and environmental citizenship behaviour. For facilities teams, the practical lesson is that mandatory classroom instruction without organisational support may produce compliance but not ownership.

The third line is the resource-and-capability view reflected in recent green competence research. Green competencies become valuable when they are organised into routines that competitors or poorly managed properties cannot easily copy. Gadowska-Lila et al. (2024) link individual green competencies with economic, environmental and social benefits, while Ali et al. (2023) show that top-management support and green culture shape the contribution of competencies to sustainability performance. Applied to property operations, the relevant capability is not simply owning an efficient chiller or building-management system; it is the repeated organisational ability to operate, diagnose, maintain and improve the asset. The Training-to-NOI model therefore treats trained employees and operating routines as complementary resources.

2.3 Empirical Review

Recent empirical work is consistent on the importance of human factors, but it is spread across several disciplines. Studies of hotels, manufacturing, banking, universities and public organisations commonly report positive relationships between green training or broader green HRM and employee green outcomes. Facilities and building-operation studies, on the other hand, show how operator capability, occupant communication, monitoring and maintenance practices affect energy and service performance. Real-estate studies then document the possible cash-flow consequences of green building quality, interventions and certification. Table 2.1 brings representative studies together in one portrait-format summary so that the missing cross-disciplinary link is visible.

Table 2.1. Selected empirical studies linking training, employee behaviour, facilities performance and financial outcomes

Study	Context / method	Main finding	Relevance to this article
Pham et al. (2020)	Hotels; 301 employees; survey	Environmental training → in-role green performance through environmental commitment.	Shows training can change task-related green performance.
Amrutha & Geetha (2021)	Employees; quantitative model	Green training → voluntary green behaviour through green climate and satisfaction.	Highlights climate and satisfaction as enabling conditions.
Yafi et al. (2021)	Universities; survey/PLS-SEM	Green training improved environmental performance through competencies and motivation.	Supports ability and motivation pathway.
Hameed et al. (2020)	365 employees/supervisors; Pakistan	Green HRM → green citizenship behaviour through empowerment.	Shows employees need authority as well as knowledge.
Ren et al. (2022)	101 companies; multi-source, multiwave	Green HRM → environmental and financial performance through environmental commitment.	Provides one of the strongest financial links.
Mehrajunnisa et al. (2023)	184 employees; UAE	Employee green behaviour shaped green HRM → business performance links.	Shows behaviour converts HR practices into performance.
Hahn et al. (2022)	10 building operators; Germany	Operator information and communication gaps affect occupant-centric operations.	Directly relevant to facilities capability.
Weerasinghe et al. (2022)	25 FM/occupant participants; New Zealand	Knowledge, feedback and responsibility improve organisational energy culture.	Connects human factors to building energy behaviour.
Brackley et al. (2023)	11 building professionals; 2 FM firms	Operational efficiency constrained by organisational, contractual and technical issues.	Training must be supported by systems and incentives.
Faremi et al. (2021)	Lagos smart building; FM staff/users	Preventive HVAC maintenance and prompt corrective work were prominent practices.	Local evidence on operational routines in a sustainable estate.
Clayton et al. (2021)	Commercial real estate intervention data	Monitoring, tenant engagement and environmental capex reduced electricity use.	Shows active management can lower operating consumption.

Leskinen et al. (2020)	Review of 70+ property studies	Green certification may affect rent, vacancy, expenses and risk.	Provides cash-flow channels relevant to NOI.
Li et al. (2021)	100 Chinese office buildings	LEED certification was associated with rental premiums.	Supports potential income-side benefit of credible green performance.
Palacios et al. (2020)	Natural experiment; municipal workforce	Healthier building improved well-being/job satisfaction and reduced sick leave.	Shows occupant conditions can affect productivity-related outcomes.
Seeley & Dhakal (2021)	Commercial retrofit cases; Thailand	Retrofits assessed on energy, technical and financial outcomes.	Connects efficiency measures to financial evaluation.
Gadomska-Lila et al. (2024)	Manager interviews	Green competencies linked with economic, environmental and social benefits.	Supports competence as a strategic organisational resource.

2.4 Gap in Literature

The reviewed studies leave a clear cross-level gap. Pham et al. (2020), Amrutha and Geetha (2021), Yafi et al. (2021), Ren et al. (2022) and Mehrajunnisa et al. (2023) show that green training or wider green HRM can improve employee behaviour, environmental performance and, in some cases, broad financial performance. Facilities studies by Hahn et al. (2022), Weerasinghe et al. (2022) and Brackley et al. (2023) show that operator knowledge, communication and organisational routines affect building efficiency. Property research by Leskinen et al. (2020), Clayton et al. (2021) and Li et al. (2021) links environmental building performance with operating cost, rent or cash-flow value. However, these literatures rarely test one continuous pathway from facilities training to employee performance, measured building outcomes and property-level NOI. Longitudinal estate studies using training records, work-order data, utility data, tenant indicators and audited property accounts are therefore urgently needed across different lease structures and building types.

3.0 Methodology

3.1 Research Design

The study used a systematic evidence-review design guided by the reporting logic of PRISMA 2020 (Page et al., 2021), but it was not a structured integrative review. The purpose was to connect three evidence areas that are normally examined separately: green training and employee performance; sustainable facilities and building operations; and commercial property financial performance. The design was appropriate because a direct meta-analysis was not possible: the retained studies used different constructs, units of analysis and outcome measures, and only a small number reported property-level financial metrics. A deliberately conservative approach was taken to numerical evidence. No effect sizes were pooled across studies that measured different constructs, and no property income or cost figures were invented. Instead, each study was coded for its primary contribution to the proposed pathway: (a) training/green HRM to competence or behaviour; (b) employee or occupant behaviour to environmental or operational performance; (c) building operations or green quality to cost, rent, occupancy or value; and (d) direct evidence linking training to property NOI. The counts shown in the results indicate coverage of a relationship, not the magnitude of an effect.

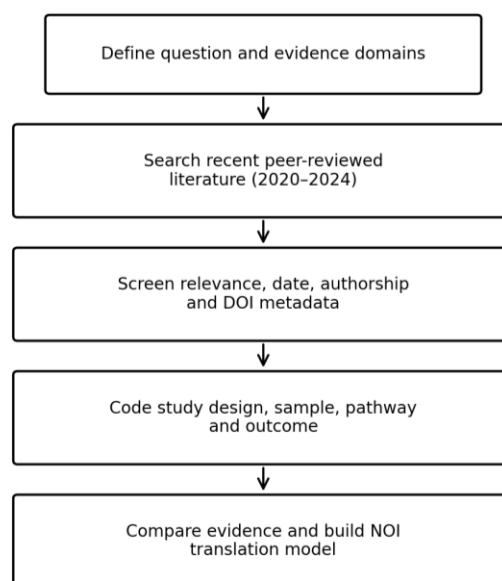


Figure 2. Evidence-review and coding workflow used in the article.

3.2 Eligibility and Quality Checks

Studies were retained when they met four conditions: publication from 2020 onward; identifiable scholarly authors; direct relevance to at least one element of the Training-to-NOI pathway; and traceable publication metadata. Studies were excluded when they were purely promotional reports, lacked identifiable authorship, duplicated another publication, or dealt with environmental topics without an employee, facilities or property-performance connection. Greater weight was given to multi-source studies, longitudinal or multiwave designs, clear case evidence, established journal outlets and studies that reported transparent samples and methods. Review articles were used mainly to map the field and check consistency rather than to replace primary evidence.

The analysis proceeded in three steps. First, study characteristics were recorded, including year, sector, sample or case context, method and key outcome. Second, findings were compared for direction and mechanism. Third, the evidence was translated into a property-operating model by asking which observable estate KPI would change if the reported relationship occurred in practice. Because the literature combines surveys, case studies, interviews, natural experiments and property-market analyses, the review did not rank studies with a single numerical quality score. Instead, methodological strength was considered in context: multi-source and longitudinal evidence was treated as stronger for behavioural mechanisms; building cases were treated as stronger for operational feasibility; and market or cash-flow studies were treated as stronger for property-finance implications. This approach prevented a large employee survey from being treated as automatically more informative about NOI than a smaller but directly measured building study. For example, improved operator capability was mapped to after-hours energy use, fault closure time and preventive-maintenance compliance; improved tenant or occupant engagement was mapped to comfort complaints and avoidable energy demand; and stronger green property performance was mapped to utility cost, occupancy, rental resilience and NOI margin.

Table 3.1. Eligibility and evidence-quality rules

Criterion	Included	Excluded / lower priority
Publication date	2020 onward	Pre-2020 except no exceptions used in the final reference list
Authorship	Identifiable scholarly authors	Anonymous/promotional company-only material
Relevance	Direct link to training, employee behaviour, facilities operations or property financial outcomes	General sustainability without a pathway variable
Traceability	Journal and DOI/metadata traceable	Unverifiable bibliographic details
Evidence use	Primary studies prioritised; reviews used for field mapping	Unsupported claims or duplicated publications

4.0 Results

4.1 Profile of the Evidence

The retained literature is concentrated in 2021–2023, reflecting the rapid growth of green human-resource and operational sustainability research during that period. The largest group examines green training, green HRM, environmental commitment, motivation, empowerment and employee green behaviour. A smaller but important group studies facilities operations, occupants, building data and energy management. The property-finance group is smaller again and focuses mainly on certification, rent, cash flow and efficiency interventions. This distribution already explains why a direct training-to-NOI estimate is difficult to find: most studies stop before the property accounts, while real-estate studies often begin after the human-resource process. The evidence base is also geographically broad but sectorally uneven. Hospitality, manufacturing and public organisations dominate the green-HRM studies, whereas commercial offices and institutional buildings are more common in facilities research. This matters because work routines, lease arrangements and cost responsibility differ across sectors. The transfer to sustainable estates is strongest where the mechanism is operationally similar, such as training that improves maintenance, controls, waste handling, occupant communication or energy decision-making.

Across the training literature, the direction of evidence is mainly positive. Pham et al. (2020) report a positive training-in-role green performance relationship; Amrutha and Geetha (2021) identify green climate and satisfaction as mediating mechanisms; Yafi et al. (2021) find a role for competencies and motivation; and Wu et al. (2021) show a pathway from training through green values and intrinsic motivation to creativity. Broader green HRM studies reach similar conclusions. Ansari and Farrukh (2021) connect green HRM with pro-environmental behaviour, Hameed et al. (2020) emphasise empowerment, and Tuan (2022) demonstrates a multi-stage pathway involving responsible leadership and felt environmental responsibility. Elshaer et al. (2021) also found that pro-environmental behaviour helps carry the effect of green HRM into environmental performance in small tourism enterprises.

The evidence is more qualified when financial performance is introduced. Mensah et al. (2021) found that green HRM was associated with business performance, but Afum et al. (2021) found that green HRM alone did not directly improve

financial performance; stronger effects appeared when it was implemented together with internal environmental management. Ren et al. (2022) provide stronger multi-source evidence that green HRM can influence both environmental and financial performance through employee environmental commitment. Mehrajunnisa et al. (2023) likewise show that employee green behaviour is important in converting green HRM practices into business performance. The shared message is that training or HR practices do not create profit in isolation; operational and organisational mechanisms carry the effect.

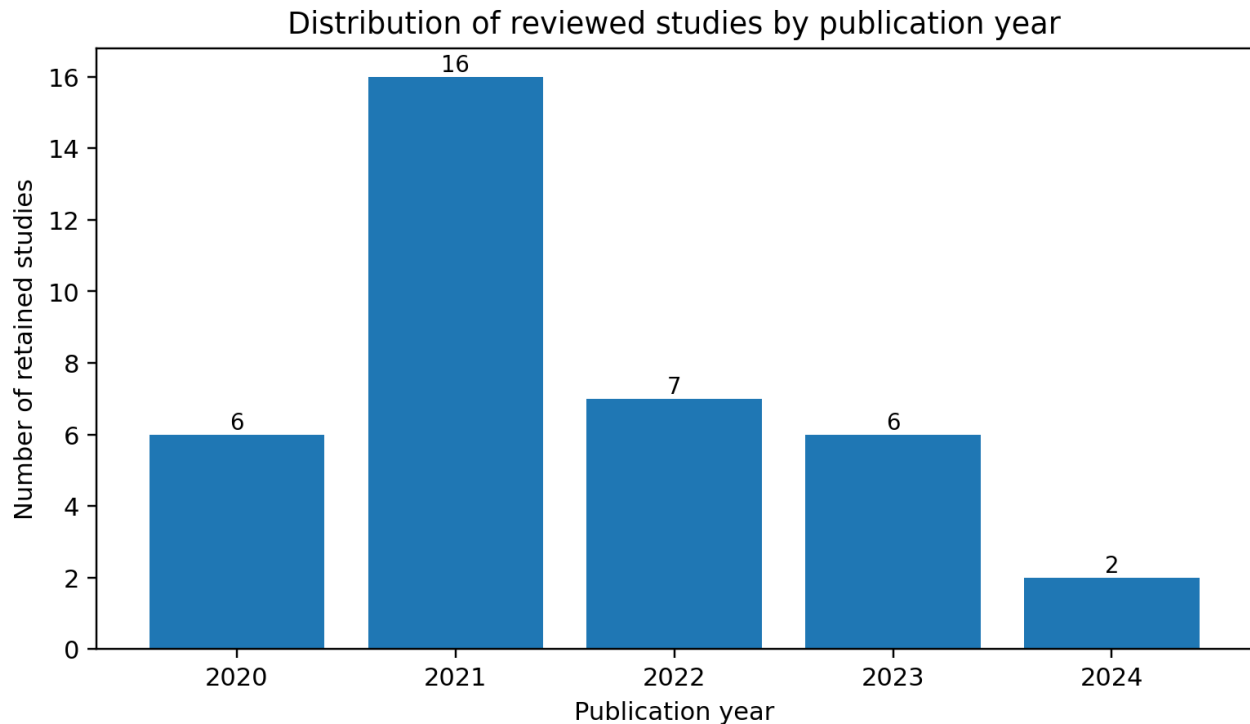


Figure 3. Publication-year distribution of the coded evidence set.

4.2 Operational Pathways Relevant to NOI

Three operational pathways appear most relevant to NOI. The first is resource efficiency. Facilities staff influence schedules, set points, fault response, equipment sequencing, meter interpretation and maintenance quality. Clayton et al. (2021) show that monitoring and tenant engagement can reduce commercial-property electricity use, while Seeley and Dhakal (2021) and Sherman et al. (2021) demonstrate the financial relevance of efficiency improvements and retrofits. Training that improves the quality of these daily decisions can therefore reduce utility and avoidable repair costs, provided that building systems and management authority allow the new practices to be used.

The second pathway is reliability and preventive maintenance. Faremi et al. (2021) found strong emphasis on preventive HVAC maintenance and prompt corrective work in a Lagos smart-building case. Brackley et al. (2023) show that inefficient operation often reflects poor documentation, organisational priorities and limitations in the use of analytical tools rather than technology alone. Green training that includes preventive maintenance, fault detection and data-based diagnosis can improve first-time resolution, reduce repeat failures and protect equipment life. The NOI effect comes through lower reactive-maintenance cost, less downtime and fewer service failures that can damage tenant satisfaction.

The third pathway is tenant and occupant experience. Hahn et al. (2022) and Weerasinghe et al. (2022) both stress the importance of communication between operators and occupants. Palacios et al. (2020) show that healthier building conditions can improve job satisfaction and reduce sick leave. For landlords, the direct financial translation depends on lease structure and market conditions, but consistently better comfort, cleanliness, responsiveness and environmental credibility can support tenant retention and leasing strength. Li et al. (2021) provide market evidence that LEED-certified offices in China achieved rental premiums, while Leskinen et al. (2020) conclude that green certification may influence rental income, vacancy, expenses and risk. Training is not the same as certification, but it can help preserve the operational performance on which a credible green value proposition depends.

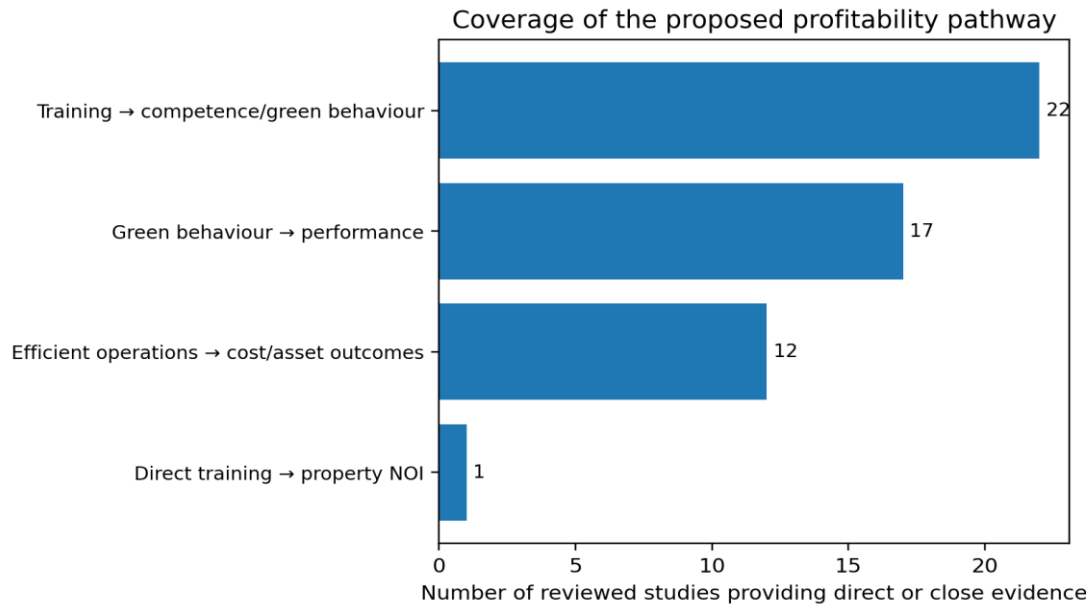


Figure 4. Evidence coverage across the proposed profitability pathway. Counts show study coverage, not effect size.

4.3 Proposed Training-to-NOI Measurement Model

The proposed model converts training into a chain of measurable indicators rather than treating NOI as an immediate outcome. At the input level, managers record training hours, competency assessment, certification or module completion and refresher frequency. At the employee-performance level, the estate measures preventive-maintenance compliance, work-order closure quality, correct use of building-management-system alarms, waste-procedure compliance, energy-saving suggestions and response to occupant complaints. At the building-performance level, the relevant indicators include energy use intensity, after-hours consumption, water intensity, equipment downtime, comfort complaints, waste diversion and emergency call-outs. At the financial level, utility cost per square metre, repair and maintenance cost, vacancy, tenant renewal, effective rent and NOI margin can be tracked.

A suitable longitudinal test would compare these indicators before and after a training intervention while controlling for weather, occupancy, tariff changes, major capital projects and lease events. The basic financial expression is: $\Delta \text{NOI} = \Delta \text{Effective Gross Income} - \Delta \text{Operating Expenses}$. The model predicts that training will improve NOI only where employee-performance changes are observable and those changes alter income or operating expenses. This makes the framework falsifiable. If employees complete training but operating KPIs do not improve, the problem may lie in training design, motivation, authority, technology or culture. If operational KPIs improve but NOI does not, tariff, lease or market conditions may be absorbing the benefit.

Table 4.1. Practical KPI bridge from training to NOI

Stage	Suggested indicators	Expected direction	Potential NOI channel
Training input	Hours completed; competency test; refresher rate	Higher competence	Investment input; no immediate NOI assumption
Employee performance	PM compliance; fault closure quality; BMS response; waste compliance	Better task execution	Lower reactive work and service failures
Resource use	Energy intensity; after-hours load; water intensity	Lower use after normalization	Lower utility expense
Asset reliability	Downtime; repeat faults; emergency call-outs	Lower failures	Lower maintenance expense; service continuity
Occupant/tenant outcome	Comfort complaints; response time; satisfaction; renewal	Better experience	Rent/occupancy resilience
Financial outcome	Utility cost/m ² ; R&M cost/m ² ; effective rent; vacancy; NOI margin	Higher NOI if benefits exceed training cost	Operating expense reduction and/or income protection

4.4 Conditions That Can Weaken the Financial Return from Training

The model also identifies situations in which a well-designed training programme may fail to improve NOI. The first is a technology constraint. Employees may understand efficient operating practice but lack functional meters, sensors, controls or maintenance tools. Loeh et al. (2021) show the value of reliable facilities data, while Brackley et al. (2023) describe practical barriers to the use of building analytical systems. A second constraint is managerial authority. Where technicians cannot change schedules, approve small corrective work or escalate recurring faults, added knowledge may not translate into action. A third is incentive conflict. Staff who are judged mainly on complaint avoidance may maintain unnecessarily conservative set points even after energy training.

A fourth condition is weak measurement. If estates do not normalize utility data for weather, occupancy and operating hours, real savings can be hidden or false savings can be credited to training. A fifth is lease design. Where tenants directly pay utilities, the landlord may not capture the immediate saving even though the property becomes cheaper to occupy and potentially easier to retain. A sixth is staff turnover. Benefits decline when trained employees leave and knowledge is not embedded in procedures, shift records and refresher programmes. Finally, major capital works can dominate the financial signal. A chiller replacement, tariff shock or large vacancy event may move NOI far more than staff behaviour in the short term. These conditions do not weaken the case for training; they show why financial evaluation must be designed around the real operating and leasing structure of each estate.

5.0 Discussion

The review supports a practical conclusion: green facilities training is best understood as part of an operating system rather than as a stand-alone course. The strongest evidence is found at the beginning of the chain. Pham et al. (2020) and Yafi et al. (2021) show that training can strengthen employee green performance through commitment, competence and motivation. Wu et al. (2021) add that green values and intrinsic motivation can convert training into creativity, while Hameed et al. (2020) demonstrate the importance of empowerment. Together, these studies explain why the same training content may produce different results across estates. Employees need both knowledge and a work environment that lets them use it.

This interpretation is reinforced by leadership and culture research. Chen and Wu (2022) found that green HRM and transformational leadership jointly support employee green behaviour. Al-Swidi et al. (2021) likewise demonstrate the influence of leadership and organisational culture on green behaviour and environmental performance. For estate managers, this means that post-training supervision is as important as the training event. Green instructions should be written into standard operating procedures, shift handovers, maintenance checklists and performance reviews. Supervisors should ask for evidence such as trend logs, work-order histories and meter changes rather than relying on general claims that a building is being operated sustainably.

The facilities literature helps explain how these employee-level effects can become physical building outcomes. Hahn et al. (2022) found that building operators often lack useful occupant information and rely heavily on communication. Weerasinghe et al. (2022) found that energy culture can be improved through awareness, feedback and responsibility. Brackley et al. (2023) identify organisational and technical barriers within facilities management companies themselves. These findings support a training approach based on real building tasks: reading trend data, diagnosing simultaneous heating and cooling, managing schedules, interpreting comfort complaints, identifying water leakage, closing faults correctly and explaining building controls to occupants. Generic climate-awareness sessions are unlikely to produce the same operational effect.

The property-finance evidence also suggests that operational quality matters even after a green building is certified. Clayton et al. (2021) found that interventions such as monitoring and tenant engagement can reduce electricity use, showing that active management adds value beyond labels. Leskinen et al. (2020) conclude that green certification can influence several property cash-flow components, and Li et al. (2021) report rental premiums in the Chinese office market. Yet the literature also warns against assuming that every green feature automatically saves money. Financial outcomes vary with market, lease structure, operating practice and the cost of implementation. The same caution should apply to training. The financial case should be demonstrated through property records rather than asserted from environmental intent.

The study on broader financial performance is especially useful here. Afum et al. (2021) found that green HRM by itself did not have a significant financial effect, but joint implementation with internal environmental management produced better outcomes. Ren et al. (2022), in contrast, found a positive pathway to financial performance through employee environmental commitment. These results are not contradictory when viewed through the proposed model. They imply that human-resource practices generate financial value when they connect with operating systems, managerial support and measurable performance. Training without an environmental management infrastructure may create awareness but little cash-flow change; environmental technology without capable employees may also underperform.

For sustainable estates, the most useful management response is therefore to move from “training delivered” to “capability proven”. A completed course is an input, not a result. An estate should be able to show what changed in work behaviour after training, what changed in building performance after behaviour changed, and what part of those changes affected income or expense. This approach also reduces the risk of greenwashing because claims are tied to operational records. It makes sustainability more relevant to asset managers, who can compare the cost of training with avoided utility and maintenance cost, service improvements and tenant outcomes.

The review also contributes a more precise research agenda. Direct studies of facilities training and NOI are extremely limited. Future work should use property-level panels or matched estates, with training cohorts linked to building and accounting records. A strong design would collect at least twelve months of pre-training and post-training data, normalize energy for weather and occupancy, distinguish capital expenditure from operating changes, and model lease events separately. Employee measures should be taken from supervisors or operating records where possible, not only self-report surveys. Such studies would allow researchers to estimate whether training changes NOI directly, indirectly or only under certain technical and organisational conditions.

6.0 Managerial Implications for Sustainable Estates

Estate owners and facilities managers can apply the findings in five practical ways. First, green training should be built around the building’s main cost and service drivers. A high-energy office may prioritise HVAC scheduling, controls and fault detection; a mixed-use estate may need stronger waste, water and tenant-engagement modules. Second, each module should have a corresponding operating KPI. Training on preventive maintenance should be followed by measures such as schedule compliance, repeat faults and emergency call-outs. Training on energy should be followed by after-hours load, energy use intensity and abnormal-consumption alerts.

Third, employee authority must match responsibility. Staff cannot be held accountable for energy or maintenance outcomes if they cannot change schedules, request repairs, access data or escalate recurring faults. Fourth, managers should combine training with feedback. Dashboards, weekly reviews and visible targets convert one-time learning into a routine. Finally, the asset or property manager should receive a quarterly Training-to-NOI bridge showing training inputs, employee-performance indicators, building outcomes and financial movement. This makes it possible to decide whether training should be expanded, redesigned or stopped.

7.0 Conclusion

This article examined green facilities training as a possible route to stronger employee performance and higher NOI in sustainable estates. The reviewed evidence gives strong support to the early stages of that route. Recent studies consistently show that green training and wider green HRM can improve knowledge, motivation, commitment, green behaviour and environmental performance. Facilities research shows that operator capability, occupant communication, monitoring and organisational routines materially affect building efficiency and service quality. Real-estate evidence shows that efficient operations, credible green performance and healthy building conditions can influence costs, rents, occupancy and property cash flow.

What the literature does not yet provide is a strong direct estimate of the effect of facilities training on property-level NOI. That absence should not be hidden. It is the main research opportunity. The proposed Training-to-NOI model responds by specifying a measurable chain from training input to employee behaviour, building performance and financial outcome. For practice, the message is simple: train for specific operating decisions, verify the behaviour change, measure the building result and then trace the financial effect. Sustainable estates are more likely to maximise profitability when human capability is managed with the same discipline applied to plant, energy, maintenance and leasing.

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