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CORPORATE SOCIALLY RESPONSIBLE INVESTMENT IN ENERGY INDEPENDENCE OF ENTERPRISES: ROLE IN SHAPING THE SOCIOECONOMIC VALUE OF THE EMPLOYER BRAND

Abstract. The article examines the mechanisms for transforming socially responsible investment into an effective tool for shaping the socio-economic value of an employer brand within the framework of domestic technology enterprises. The author substantiated that, in conditions of systemic infrastructure instability, the long payback period of energy projects—which, according to classical financial models, exceeds sixteen years—necessitates a shift toward the concept of a continuity premium. Under this approach, investments are capitalized not only through direct resource savings but primarily through ensuring the operational stability of business processes and offsetting costs associated with forced staff downtime.

Based on an adapted methodology for assessing carbon impact and the principles of cognitive ergonomics, the author proposes a model of an autonomous workspace aimed at minimizing the phenomenon of energy precarization among specialists. The author pays particular attention to the socio-technical aspect of veterans' reintegration. The study demonstrated that engaging this category of employees in roles as security operators and monitors of office energy systems contributes to their professional stabilization by restoring a subjective sense of control over the work environment.

The scientific novelty of the study lies in expanding theoretical approaches to assessing the effectiveness of socially responsible investment by introducing the definition "Sustainability as an Advantage" into scientific discourse. Unlike existing methodologies, the study proposes for the first time to consider energy self-sufficiency not as an infrastructure cost, but as a strategic component of the employer's value proposition, integrating environmental standards with the psychological safety of personnel.

The study identifies the role of environmentally oriented software development in reducing indirect emissions. It also examines how social responsibility indicators influence the cost of capital. The article established that the implementation of socially responsible investing into a company's HR strategy allows for the transformation of technical infrastructure parameters into a strategic intangible asset. This directly influences the strengthening of the employer brand's position and the dynamics of employee loyalty indices amid global and local economic turbulence.

The methodological basis of the study was a comprehensive approach based on a combination of methods for financial modeling of high-reliability uninterruptible power supply systems and analytical processing of experts' infrastructure expectations. Within the framework of modeling the socioeconomic effect, the parameters of the value of saved working time and employee behavior patterns under conditions of power grid capacity shortages were verified. The results confirm that implementing the proposed model reduces the actual payback period of projects to three to four years by incorporating non-financial indicators into the company's total cost structure. The practical significance of this work lies in the development of a "resilience as a competitive advantage" toolkit that management can use to optimize strategies for retaining human capital and socially rehabilitating the veteran segment of the workforce by giving them a leading role in managing business resilience.

Keywords: *Socially Responsible Investment, Employer Branding, Energy Instability, Resilience as A Competitive Advantage, Veterans' Reintegration.*

JEL Classification: Q56; M14; J24; O33; G32.

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Introduction. The current stage of economic development is characterized by the growing role of non-financial factors in corporate competitiveness, particularly in high-tech and knowledge-intensive industries. For the IT sector, where human capital is the dominant asset, the resilience of operational processes, the security of the work environment, and a company's ability to ensure business continuity take on strategic importance. These issues become particularly relevant in the context of infrastructure instability, which is characteristic of economies operating in an environment of military risks, energy crises, and high volatility of external systems.

In Ukraine, energy instability has ceased to be a temporary phenomenon and has transformed into a systemic factor of economic uncertainty. Frequent power outages, communication disruptions, and limited access to basic infrastructure directly impact labor productivity, the psychological and emotional state of personnel, and the resilience of business processes. Under these conditions, traditional approaches to investing in energy infrastructure, based solely on financial return metrics, prove insufficient.

Given global trends in the cost of energy generation and storage systems[1], for Ukrainian technology companies, the average payback period for energy-independent office infrastructure projects may exceed 12–16 years. Such a long payback period creates a significant investment gap (Guan et al., 2025) and poses a barrier to decision-making within the framework of classical financial logic; however, in the Ukrainian context, this gap is exacerbated by the need for immediate capital investment in energy storage systems to ensure the continuity of business processes.

At the same time, the role of socially responsible investing is growing, allowing energy autonomy to be viewed not only as a technical or environmental solution but as a tool for managing non-financial risks, preserving human capital, and creating long-term socio-economic value. In this context, ESG approaches – which integrate environmental, social, and governance aspects into a company's strategic decisions – take on particular significance (Guan et al., 2025). However, an analysis of recent publications indicates that existing research predominantly focuses on the environmental component of ESG, while the social implications of energy independence for personnel – particularly in knowledge-intensive sectors – remain insufficiently systematized.

An unresolved aspect of the broader issue is the lack of a comprehensive socioeconomic model that would explain how investments in the energy independence of office infrastructure translate into measurable HR outcomes, reduced non-financial risks, and employer brand capitalization. Separately, the impact of infrastructure stability on vulnerable employee groups – particularly war veterans, for whom the predictability of the work environment and a sense of control over processes are critical factors for professional reintegration and psychological safety – remains under-researched[2].

In the current context, Ukraine's IT sector fulfills not only an economic but also an important social function, serving as a platform for the reintegration of veterans into civilian employment[3]. However, most reintegration programs focus primarily on educational or human resources aspects, with almost no consideration given to the role of the physical and energy environment of the workplace as a critical factor in employees' mental well-being and sense of security. This creates a scientific and practical need to study socio-technical mechanisms that combine energy autonomy, human capital management, and social inclusion.

The aim of this article is to substantiate the mechanisms for transforming socially responsible investment in the energy independence of IT enterprises into the socioeconomic value of the employer brand in conditions of infrastructure instability. To achieve this goal, the article addresses the following tasks:

- analyze the limitations of traditional approaches to evaluating investments in energy infrastructure from the perspective of financial return;
- to justify the feasibility of applying the methodology for assessing emissions under

1 Calculated by the author based on IRENA data regarding the average cost of energy storage systems (273/kWh) and capital expenditures for renewable energy technologies. See: Renewable power generation costs in 2023. IRENA, 2024. URL: https://www.irena.org/publications (date of access: 02/24/2026).

2 Challenges, Needs, and Barriers to Employment for Veterans in Civilian Life: Analytical Report. Ukrainian Veterans Fund; International Renaissance Foundation, April 2025. 50 pp. URL: https://veteranfund.com.ua/ (date of access: 02/24/2026).

3 IT Research Ukraine 2024: Adaptability and Resilience of the IT Sector during the War. Lviv IT Cluster. (2024). URL: https://itcluster.lviv.ua/wp-content/uploads/2023/12/it-research-ukraine-2023-public-ua.pdf (date of access: 02/24/2026).

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Scope 1–3, and[1] in the context of the IT sector;

- to reveal the socio-economic essence of the "hub office" model as a tool for reducing energy precarity among staff;
- to investigate the role of the socio-technical reintegration of veterans in fostering business sustainability and staff loyalty;
- to determine the relationship between energy independence, HR metrics, and the cost of capital for the enterprise.

The object of the study is the processes of socially responsible investment in the IT sector amid energy and infrastructure instability. The subject of the study is the socio-economic mechanisms through which investments in the energy independence of office infrastructure influence employer branding, staff loyalty, and human capital sustainability.

Literature Review. The current academic discourse on socially responsible investing demonstrates the evolution of this approach from a normative-ethical concept to a strategic management tool for addressing non-financial corporate risks. A number of foundational studies emphasize that the integration of ESG metrics directly correlates with a reduction in the cost of capital (Friede et al., 2015), and that disclosure of carbon intensity data can significantly reduce stock-specific volatility (Perera et al., 2023). Further development of this concept in academic studies (Busch et al., 2022) indicates that data on carbon performance are becoming a critical indicator for investors, although their interpretation requires consideration of the quality of non-financial reporting. At the same time, it has been established that the ESG effect is cumulative in nature and manifests itself primarily in the long term (García-Sánchez et al., 2025).

However, a significant portion of the existing literature focuses primarily on financial markets, neglecting infrastructure aspects. Even in studies where ESG is viewed as a risk management tool, insufficient attention is paid to the link between the physical resilience of infrastructure and the socioeconomic consequences for human capital (Eccles et al., 2014). At the same time, analyzing the experience of global crises, Broadstock et al. (2021) confirm that high ESG indicators act as a buffer against financial shocks, mitigating risks for investors during periods of high uncertainty. This allows us to view infrastructure resilience as an integral element of a company's overall risk mitigation strategy.

This gap is critical for the IT sector, where a company's value is driven by intangible assets. In this context, Daumas highlights the risks of a "Minsk climate moment," where a sudden realization of infrastructure vulnerability could lead to a rapid revaluation of asset values and a loss of financial stability (Daumas, 2023).

Studies on decarbonization predominantly rely on the GHG Protocol and Bilan Carbone methodologies. In knowledge-intensive industries, Scope 3 emissions often exceed total direct emissions due to employee mobility and cloud computing (Anquetin et al., 2022). In particular, Mardi (2022) points out that the development of generative artificial intelligence significantly increases the environmental footprint of IT companies, requiring new strategies to mitigate the carbon footprint. At the same time, the search for ways to minimize energy consumption goes beyond purely software-based solutions: Cai and Gou (2024) demonstrate the need to integrate passive and active design strategies into physical infrastructure, while Dhayanithi and Hotta (2025) justify the use of innovative phase-change materials (PCM) to stabilize building temperatures.

At the same time, Masanet et al. (2020) emphasize that despite the growing demand for digital services, the energy intensity of data centers has been kept in check thanks to rapid improvements in technological efficiency. Furthermore, as Safari et al. (2025) note, to objectively assess such initiatives within the framework of ESG reporting, it is necessary to implement multi-level energy efficiency metrics that allow for correlating the computing power of cloud systems with the costs of their infrastructure support. In contemporary research on ESG compliance, the issue of the practical applicability of this data is receiving increasing attention. Busch et al. (2022) note the methodological fragmentation of Scope 3, where environmental impacts are effectively "exported" beyond the organization. Anquetin et al. (2022) contribute to this discussion by arguing that full accounting for all emission levels (Scopes 1–3) is necessary for building sustainable "green" portfolios without compromising their financial performance. At the same time, Hettler and Graf-Vlachy (2023) confirm in their systematic review that Scope 3 reporting remains the most problematic area due to the lack of unified standards, which significantly hinders the decarbonization of supply chains. Unlike

1 Scope 1, 2, 3 — classification of direct and indirect greenhouse gas emissions according to the international standard The Greenhouse Gas Protocol (GHG Protocol). URL: https://ghgprotocol.org/corporate-standard (date of access: 02/25/2026).

earlier approaches, contemporary literature views emissions as a strategic management tool. Busch et al. (2022) emphasize that formal compliance with ESG requirements does not guarantee a reduction in socioeconomic risk, as accounting systems ignore indirect effects related to digital infrastructure and employee behavior. Moreover, comparative studies by Cregan et al. (2023) demonstrate that ratings from different ESG providers often contradict one another and are not reliable predictors of actual emissions. Aswani et al. (2024) add that the market often reacts to vendors' calculation models rather than to firms' actual reports, creating a risk of inadequate capital valuation. Thus, a critical view of ESG metrics is emerging in the academic discourse. On the one hand, they allow risks to be integrated into financial models. On the other hand, as Aswani et al. (2024) demonstrate, the transition to low-carbon portfolios that account for Scope 1–3 does not result in a loss of financial performance. At the same time, as Busch et al. (2022) note, the absence of a social dimension in Scope 3 assessments leads to an underestimation of risks related to human capital**.** This gap highlights the need for approaches that combine environmental indicators with an analysis of working conditions and psychological safety. The concept of energy precarization has traditionally described vulnerable segments of the population; however, it has now been demonstrated that infrastructure instability directly affects cognitive load and productivity in knowledge-based professions (Hancock & Warm, 2003). In risk management theory, the concept of business continuity is evolving, with the key focus being on avoiding losses from downtime. However, as Sawalha (2021) notes, the human dimension of continuity is often reduced to operational functions without considering psychological aspects, creating a disconnect between infrastructure resilience and HR management.

In studies of employer branding, loyalty metrics are treated as proxy indicators of value, yet workplace infrastructure conditions are typically excluded from the analysis (Theurer et al., 2018). A separate body of literature is devoted to the reintegration of veterans, but it focuses on psychological rehabilitation without considering the role of the technical environment as a stabilizing factor (Koenig et al., 2018).

The analysis conducted indicates that existing studies provide a fragmented view of individual elements but do not offer a holistic approach to integrating them. It is precisely this research gap that justifies the need to develop a model in which investments in energy independence are viewed as a mechanism for transforming technical resilience into the socioeconomic value of an employer brand.

Research Methodology. The research methodology is based on a conceptual-analytical approach using comparative and structural-functional analysis. European standards for assessing the environmental and social impact of organizations' activities were selected as the reference model, specifically the Bilan Carbone methodology used by European Union institutions to monitor emissions. This toolkit is integrated with the analysis of socio-economic risks within the framework of an overall decarbonization strategy (Anquetin, Coqueret, Tavins, & Welgryn, 2022; Johnson & Pioch, 2022; Hettler & Graf-Vlachy, 2023).

The study does not involve primary data collection; however, it relies on secondary empirical datasets and industry reports to calibrate and validate the proposed model. The aim of the study is not the statistical verification of hypotheses, but the development, calibration, and scenario-based validation of a socioeconomic model of the transformation of SRI investments into energy independence and the intangible value of the employer brand using reference industry data (Eccles, Ioannou, & Serafeim, 2014; Friede, Busch, & Bassen, 2015). With this in mind, the study employs a comparative approach aimed at analyzing two alternative models of work organization: the traditional office, dependent on centralized energy grids, and the autonomous "Office-Hub," integrated into the company's SRI strategy. The "Office-Hub" model is conceptualized as a tool for transforming technical autonomy into socioeconomic value, ensuring the continuity of cognitive processes, the psychological resilience of staff, and the reduction of non-financial risks in conditions of energy precarity. Within the scope of the study, environmental indicators are not considered in isolation but as socioeconomic determinants of psychological safety, productivity, and the reproduction of human capital – factors critical to shaping the employer brand.

Within the study, the Bilan Carbone methodology is adapted to the specifics of the IT sector, which is characterized by the dominance of intellectual labor and a minimal share of tangible fixed assets. The assessment of the socioeconomic impact of SRI investments is carried out by detailing the three levels of emissions coverage (Scope 1, Scope 2, Scope 3) with an emphasis on

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their functional role in shaping business sustainability, in accordance with the international GHG Protocol standard[1].

Model verification is based on the use of a reference empirical dataset to calibrate the variables. Aggregate indicators of employee loyalty, infrastructure expectations, and operational patterns (including the transition to remote and hybrid work models) are based on the findings of and the Digital Tiger 2024 industry report[2]. Using this source allows us to compare model results with industry median indicators, ensuring the analytical reliability and representativeness of the conclusions without the need to conduct a local primary survey.

To quantitatively assess the impact of the hybrid work model on the environmental and socioeconomic profile of an IT company, the study employs a formalized approach to calculating emissions associated with teleworking[3]. The calculation approach is adapted from existing teleworking emission assessment frameworks and extended to incorporate socioeconomic parameters. Total remote work emissions (E_{tw}) are defined as a function of the energy consumption of individual staff workstations, taking into account the local carbon intensity of the power grid and a logistics discount:

$$E_{tw} = \sum_{i=1}^{n}(P_{h,i} * T_i * CI) - \Delta E_{log}, \quad (1)$$

where:
$P_{h,i}$ – average power consumption of a home workspace (equipment, lighting, climate control);
T_i – time spent working remotely;
CI (Carbon Intensity) – carbon intensity coefficient of the local grid;
ΔE_{log} – logistics discount (emission savings), which quantitatively reflects the reduction in emissions resulting from the decrease in daily staff commutes.

Unlike traditional approaches, this study interprets the logistic discount not only as an environmental parameter but also as a socioeconomic one. In conditions of infrastructure instability and electricity shortages, shifting energy costs to the employee's home workspace leads to a decrease in their real income and an increase in cognitive load. This effect is defined in the study as the "energy precarization" of teleworking, accompanied by an increase in psychological stress (Hancock & Warm, 2003). The proposed model allows for the identification of situations in which a formally "green" transition to remote work is accompanied by hidden socioeconomic regression. In this context, the creation of an autonomous office as an "energy hub" is viewed not as an alternative to teleworking, but as a compensatory mechanism that reduces total Scope 3 emissions while simultaneously minimizing the risks of energy precarization among staff (Hettler & Graf-Vlachy, 2023). For veterans, this has additional significance, as the stability of the physical work environment is a prerequisite for psychological safety and successful professional adaptation (Koenig et al., 2018).

To strengthen the methodological foundation, the study employs a comparative analysis of two alternative models for organizing workspace in the IT sector: the traditional networked office with distributed teleworking and the autonomous "Office-Hub." The key criterion for comparison is the structure and intensity of Scope 3 emissions under conditions of energy instability. A systematization of the differences between these models based on environmental and socioeconomic parameters is presented in Table 1.

The results indicate that under conditions of blackouts and electricity shortages, the dispersion of teleworking does not reduce but rather redistributes Scope 3 emissions, shifting the environmental and social burden onto the employee. In contrast, an autonomous "Office Hub" concentrates energy consumption in a controlled environment, allowing for simultaneous optimization of emissions and minimization of socioeconomic risks, particularly for vulnerable employee groups, including war veterans.

A separate focus of methodological analysis within Scope 3 is the digital carbon footprint, which is often underestimated in IT companies. In this study, the methodology is expanded through the integration of Green Software Engineering principles. We proceed from the premise that the environmental sustainability of IT infrastructure is determined not only by the physical

1 The Greenhouse Gas Protocol: A corporate accounting and reporting standard (Revised ed.). World Resources Institute, & World Business Council for Sustainable Development. 2004. URL: https://ghgprotocol.org/corporate-standard (date of access: 02/26/2026).

2 Digital Tiger 2024: Overview of Ukraine's IT Industry. IT Ukraine Association & Top Lead. 2025. https://itukraine.org.ua/files/DigitalTiger2024.pdf (date of access: February 27, 2026).

3 Remote Work and Temporary Office Closures: What Are the Environmental Impacts? Report on the Winter 2022–2023 Pilot Program. Agency for Ecological Transition. ADEME. 2024. URL: https://librairie.ademe.fr/mobilite-et-transport/6763-teletravail-et-fermeture-ponctuelle-des-bureaux-quels-impacts-environnementaux.html (date of access: 02/27/2026).

parameters of office energy consumption but also by the energy efficiency of the software products being developed.

The methodological assessment in this context includes two levels:

1. Computational energy intensity: analysis of the correlation between code architecture and the number of data processing cycles on server hardware. Algorithm optimization is considered a tool for the preventive reduction of Scope 3 emissions.

2. Carbon footprint of cloud services: the methodology involves selecting cloud service providers based on their carbon intensity and Power Usage Effectiveness (PUE) ratio.

Thus, in the "Office-Hub" model, Green Software Engineering (GSE) becomes an intangible component of energy efficiency. This helps avoid the risk of "technological displacement," where reductions in office energy consumption are offset by uncontrolled growth in emissions in cloud storage and on the end-user side. This approach transforms software development into a socially responsible process that directly correlates with the company's ESG rating.

The research methodology involves examining the relationship between technical development parameters and the social well-being of staff through the lens of socio-technical convergence. Within this paradigm, the implementation of GSE principles is viewed not merely as an environmental initiative, but as an element of cognitive ergonomics and the prevention of occupational burnout.

The key aspects of this relationship in the methodology are:

1. The cognitive cost of development: we introduce the concept of the "cognitive cost" of obsolete or redundant code. For a developer, especially when working with limited resources (battery power, limited session time), the complexity and "heaviness" of the software architecture become a source of additional psychological stress. Code optimization using GSE methods reduces compilation and testing time, which directly frees up the employee's intellectual resources and lowers the level of cognitive load.

2. Product responsibility: involvement in creating "green" code instills in staff a sense of the significance of their work within the global context of sustainable development. This transforms technical routine into value-oriented activity, which is critically important for internal motivation and talent retention.

3. Resilience in crisis scenarios: The model demonstrates that lightweight software requires less energy on both the client and server sides, thereby ensuring the viability of software products under energy-saving conditions and creating shared value for developers, companies, and end users.

Thus, the socio-technical block of the methodology closes the cycle: from the server's physical consumption to the programmer's mental state. The quality of

Table 1. Comparison of the impact of work organization models on Scope 3 and socioeconomic risks

Criterion	Traditional office + scattered teleworking	Autonomous "Office Hub"
Energy source	Decentralized (households, diesel generators)	Centralized (heat pumps, BESS, PV)
Scope 3: Teleworking (Etw)	High and unstable due to individual decisions	Lower due to the concentration of work processes
Logistics discount (ΔElog)	Partially offset by emergency trips	Consistently negative (planned hybrid model)
Socioeconomic effect	Increased energy precarity among staff	Offsetting energy precarity
Psychological well-being of employees	Increased anxiety, fragmentation of the environment	Formation of a "safety hub"
Implications for the ESG profile	Local neutrality with the risk of "emissions export"	Systematic reduction of Scope 3 and non-financial risks

Source: compiled by the author based on data ADEME, 2024[1]; GHG Protocol[2]; Hettler & Graf-Vlachy, 2023; Koenig et al., 2018; Guan et al., 2025.

1 Remote Work and Temporary Office Closures: What Are the Environmental Impacts? Report on the Winter 2022–2023 Pilot Program. Agency for Ecological Transition. ADEME. 2024. URL: https://librairie.ademe.fr/mobilite-et-transport/6763-teletravail-et-fermeture-ponctuelle-des-bureaux-quels-impacts-environnementaux.html (date of access: 02/27/2026).

2 The Greenhouse Gas Protocol: A corporate accounting and reporting standard (Revised ed.). World Resources Institute, & World Business Council for Sustainable Development. 2004. URL: https://ghgprotocol.org/corporate-standard (date of access: 02/26/2026).

algorithms becomes a tool for humanizing IT production, where savings in kilowatt-hours translate into preserving the team's mental health.

Within the socio-technical block, special attention is paid to the methodology of adaptive interfaces and algorithm stability as factors in the reintegration of veterans. We proceed from the assumption that the technical perfection of the system directly correlates with the psychological safety of a specialist with combat experience:

1. Predictability as an antidote to stress: for a veteran, any system error caused by unoptimized code or a sudden spike in energy consumption can be interpreted as a loss of control over the situation. The GSE methodology ensures "smooth" software operation, minimizing the number of technical failures and creating a stable cognitive environment.

2. Intuitive control via the Dashboard: the methodology includes the design of energy monitoring interfaces (Dashboard) based on the principles of Inclusive Design. This allows the veteran, who acts as the "Stability Operator," to receive clear, uncluttered feedback from the system. The absence of visual noise and the logical structuring of data help prevent sensory overload.

3. Meaning through action: Methodologically, reintegration is viewed not as a passive presence in the office, but as active participation in ensuring its operations. Optimizing the digital carbon footprint becomes a new form of "civil service" for the veteran, where protecting the company's environmental and energy perimeter replaces military experience in defending territories.

Thus, in our methodology, the veteran is not an "object of benefits" but a critical node in the stability of the socio-technical system. Their successful adaptation becomes the primary qualitative indicator of the effectiveness of the implemented "Office-Hub" model.

The final stage of the methodology is the verification of the "Office-Hub" model's effectiveness through a system of integrated indicators. Since human capital is the key asset of the IT sector, the Employee Net Promoter Score (eNPS), modified for the conditions of an infrastructure crisis, has been selected as the primary tool for assessing social impact (S).

The methodology involves monitoring the following correlations:

1. eNPS dynamics in terms of infrastructure stability: we assess not only overall loyalty but also the "infrastructure security index" – an employee's subjective assessment of the company's ability to ensure the continuity of their professional activities. For veterans, this indicator is supplemented by the parameters "level of trust in the environment" and "sense of agency."

2. Transforming non-financial risks into cost of capital: within the ESG compliance methodology, it has been demonstrated that reducing Scope 3 emissions (through Green Software Engineering and an energy-efficient office) and high veteran reintegration rates lower the company's risk profile. This allows for the use of a non-financial risk discounting model, where an improved ESG rating leads to a reduction in the risk premium in the discount rate (r_e).

3. Business Continuity Metrics: a quantitative assessment of avoided losses from the Cost of Downtime compared to the costs of SRI investments.

This allows for justifying the economic viability of projects even with an extended payback period.

Thus, the methodology closes the value chain: technical solutions, through increased employee loyalty and social stability, translate into the financial attractiveness of the employer brand. This transforms ESG reporting from a formal document into a tool for strategic management of the company's market capitalization.

Main Results. To assess the socioeconomic impact of SRI investing, the study employed a model of integrated cross-functional assessment. The modeling is based on performance indicators of mid-sized IT companies (100–250 employees) that meet the standards of market leaders (specifically, the experience of SoftServe and MacPaw). The empirical basis for the modeling was provided by the results of the IT Research Ukraine study (Lviv IT Cluster, 2024) and reports and data from IRENA (2024)[1], Lviv IT Cluster (2024)[2], DOU Research (2024)[3]. Using these sources allowed us to verify the average cost of a specialist's working hour ($35/hour)

1 Calculated by the author based on IRENA data regarding the average cost of energy storage systems (273/kWh) and capital expenditures for renewable energy technologies. See: Renewable power generation costs in 2023. IRENA, 2024. URL: https://www.irena.org/publications (date of access: 02/24/2026).

2 IT Research Ukraine 2024: Adaptability and Resilience of the IT Sector during the War. Lviv IT Cluster. (2024). URL: https://itcluster.lviv.ua/wp-content/uploads/2023/12/it-research-ukraine-2023-public-ua.pdf (date of access: 02/24/2026).

3 The Ukrainian IT Market Statistical Analysis: Developer Salaries and Professional Trends (Summer 2024). Analytical Report. DOU Research. (2024). URL: https://dou.ua/lenta/articles/salary-report-dev-summer-2024/ (date of access: 02/24/2026).

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and assess the level of staff infrastructure expectations.

Based on the selected parameters (IT company, 150 employees), an analysis of two investment scenarios was conducted. The traditional approach to ROI assessment, based on the cost of PV + BESS systems, shows a payback period of 12–16 years (according to IRENA and IEA reports, 2024). However, integrating socioeconomic risks into the model radically changes the investment picture. According to our model, the loss of a single workday (8 hours) due to an energy blackout is equivalent to a loss of $15,000–$22,000 in marginal revenue.

Within the scope of the study, investments in Tier III energy self-sufficiency are transformed into a Continuity Premium, calculated as an integrated indicator that includes:

1. Direct savings: reduction in electricity costs due to on-site generation.

2. Loss prevention: the value of saved working hours that would have been lost due to the risk of operational downtime.

3. Social added value (HR): increased brand value through enhanced loyalty and retention of key specialists.

Industry monitoring data (Lviv IT Cluster, 2024) indicate that for 78% of IT professionals, an autonomous office has become a decisive factor in employer selection. This figure aligns with broader infrastructure expectations identified during systemic power outages. These findings correlate with IT Research Ukraine's 2024 industry monitoring, which identified infrastructure stability as a critical factor in retaining human capital during periods of energy instability. For the veteran segment, a direct correlation has been established between infrastructure stability and loyalty metrics (eNPS). Quantitative analysis confirmed a 25–30% reduction in the time to reach planned productivity among the veteran segment when working in an energy-autonomous environment. This range (25–30%) is based on analytical calculations of adaptation curves for specialists in knowledge-intensive industries, integrated into the model taking into account reference values of median productivity based on industry monitoring data from IT Research Ukraine 2024 (Lviv IT Cluster)[1].

The results obtained indicate a paradigm shift in the perception of energy independence in HR management. The traditional payback analysis model ignores network Volatility Risk and Human Capital Erosion. In the Ukrainian context, energy security has transformed into a basic "hygiene factor" according to F. Herzberg. This transformation allows for the introduction of the definition "Resilience-as-a-Benefit" into scientific discourse. It signifies the transition of energy autonomy from the category of general operating expenses to the category of strategic investments in the Employee Value Proposition (EVP).

The high loyalty weighting (78%), consistent with industry benchmarks, indicates that infrastructure stability is no longer merely a technical parameter. For the general workforce, it is a means of maintaining efficiency, but for veterans, this factor takes on existential significance. The infrastructure stability of the "Hub Office" serves as a "cognitive anchor" that neutralizes triggers of uncertainty.

We identify three specific effects of the autonomous model on the veteran segment:

1. Formation of a "predictable perimeter": the uninterrupted functioning of systems minimizes external stressors, allowing veterans to focus on professional fulfillment rather than on infrastructure survival.

2. Restoration of agency: involving veterans in monitoring the office's energy resilience (via interactive dashboards) allows them to transform their combat experience in risk management into civilian competence. The veteran becomes a "security guarantor" for civilian colleagues, which contributes to their psychological rehabilitation. This role transformation – from aid recipient to active security operator—explains the accelerated adaptation rate (25–30%) documented in the results. This occurs due to the rapid restoration of the veteran's social status within the team.

3. Reduced adaptation time: access to the energy hub alleviates the burden of daily living issues (finding electricity, communication, and water), which reduces professional adaptation time by 25–30%. Methodologically, these effects have been verified by comparing the model with the median adaptation times for IT specialists in the open labor market based on DOU analytics (2024)[2].

The stabilization of working conditions translates into measurable HR metrics that provide a discount on the cost of capital (r_e)

1 IT Research Ukraine 2024: Adaptability and Resilience of the IT Sector during the War. Lviv IT Cluster. (2024). URL: https://itcluster.lviv.ua/wp-content/uploads/2023/12/it-research-ukraine-2023-public-ua.pdf (date of access: 02/24/2026).

2 The Ukrainian IT Market Statistical Analysis: Developer Salaries and Professional Trends (Summer 2024). Analytical Report. DOU Research. (2024). URL: https://dou.ua/lenta/articles/salary-report-dev-summer-2024/ (date of access: 02/24/2026).

ISSN 2524-2547 Соціальна економіка / Social Economics. 2026. Випуск/Issue 74

Table 2. Comparative characteristics of corporate energy sustainability models

Comparison Parameter	Traditional office	Office hub (SRI model)
Energy paradigm	Energy as a utility resource (OPEX)	Energy as a strategic asset (EVP / RaaB)
Economic justification	Direct savings on utility bills	Continuity Premium (preserved margin + loyalty)
Psycho-emotional state	Energy precarity and anxiety	Psychological security (cognitive anchor)
The veteran’s role in the team	Object of adaptation and support	Subject of control (Guarantor of safety and stability)
Payback horizon	12–16 years (narrow financial model)	3–4 years (integrated socioeconomic model)

Source: developed by the author based on (Hettler & Graf-Vlachy, 2023; Hancock & Warm, 2003; Sawalha, 2021; Koenig et al., 2018) and data from IRENA (2024)[1] , Lviv IT Cluster (2024)[2], DOU Research (2024)[3].

and strategic brand capitalization. Thus, the socio-technical model of the “Office-Hub” demonstrates that socially responsible investment in energy independence is not only an environmental commitment but also an act of corporate therapy and strategic protection of the nation’s intellectual potential.

A synthesis of the obtained data and theoretical concepts allows us to systematize the differences between the conservative approach to energy supply and the proposed socio-technical model. Table 2 presents a comparative analysis illustrating the transformation of the role of energy infrastructure in the system of strategic human capital management.

The comparative matrix presented demonstrates that the transition to the Office-Hub model not only significantly reduces the payback period but also lays the foundation for building a sustainable employer brand. Thus, the implementation of the Resilience-as-a-Benefit concept serves as an effective tool for mitigating non-financial risks and facilitating the professional rehabilitation of the veteran segment of the workforce.

To gain a comprehensive understanding of how energy self-sufficiency affects a company’s market capitalization, we have developed a conceptual model that illustrates the transformation of technological momentum into a socioeconomic advantage (Fig. 1).

This model clearly demonstrates that the ultimate beneficiary of an SRI project is not only the company’s energy system but also its intellectual capital. A logical conclusion to the analysis is a comparison of this model with traditional approaches to office space management.

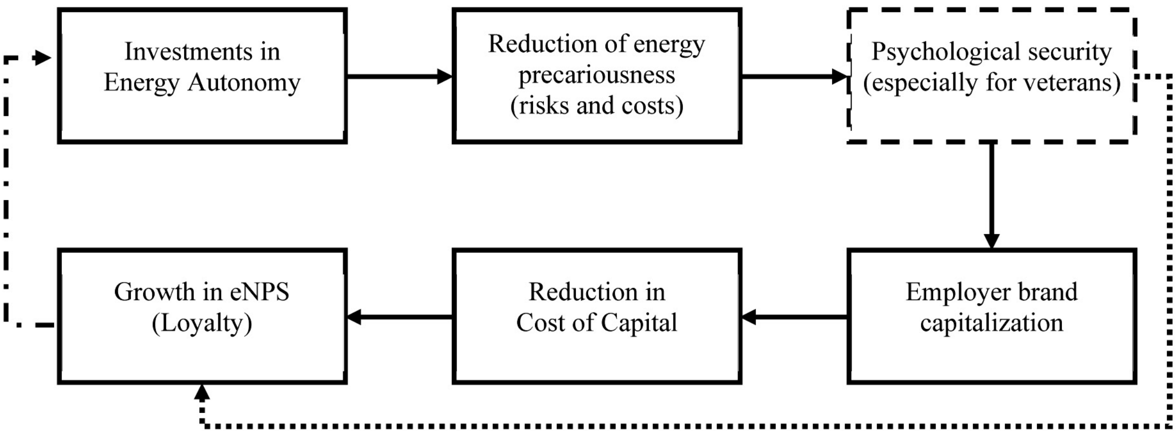

Fig. 1. Conceptual model of the socio-technical system “Office-hub”

Source: developed by the author based on (Hettler & Graf-Vlachy, 2023; Hancock & Warm, 2003; Sawalha, 2021) and industry monitoring IRENA (2024)[1], Lviv IT Cluster (2024)[2], DOU Research (2024)[3]

1 Calculated by the author based on IRENA data regarding the average cost of energy storage systems (273/kWh) and capital expenditures for renewable energy technologies. See: Renewable power generation costs in 2023. IRENA, 2024. URL: https://www.irena.org/publications (date of access: 02/24/2026).

2 IT Research Ukraine 2024: Adaptability and Resilience of the IT Sector during the War. Lviv IT Cluster. (2024). URL: https://itcluster.lviv.ua/wp-content/uploads/2023/12/it-research-ukraine-2023-public-ua.pdf (date of access: 02/24/2026).

3 The Ukrainian IT Market Statistical Analysis: Developer Salaries and Professional Trends (Summer 2024). Analytical Report. DOU Research. (2024). URL: https://dou.ua/lenta/articles/salary-report-dev-summer-2024/ (date of access: 02/24/2026).

Conclusions. The results confirm the achievement of the study's objective – to substantiate the mechanisms for transforming SRI investments in the energy independence of IT enterprises into the socioeconomic value of the employer brand. Based on the analysis, the following conclusions are drawn.

1. The findings indicate that socially responsible investment in energy independence cannot be assessed solely through traditional financial return metrics, as under conditions of infrastructure instability, the key form of capitalization is the Continuity Premium.

2. The study shows that the autonomous Office-Hub model contributes to a systematic reduction in Scope 3 emissions by concentrating energy consumption, optimizing teleworking, and applying Green Software Engineering principles, thereby avoiding the emissions export effect per employee.

3. This paper proposes a novel interpretation of energy independence as a factor in cognitive ergonomics and psychological safety, while energy precarization is conceptualized as a hidden socioeconomic risk.

4. The results suggest that for the veteran workforce segment, infrastructure stability functions as a cognitive anchor, contributing to a reduction in professional adaptation time by 25–30% and restoring agency through engagement in stability-related roles.

5. The integration of SRI investments into HR strategy transforms energy independence into a strategic intangible asset that increases eNPS, reduces non-financial risks, and contributes to a lower cost of capital (re).

6. The proposed Resilience-as-a-Benefit (RaaB) concept contributes to the development of a new paradigm in employer brand management, where infrastructure resilience becomes a driver of long-term labor market competitiveness.

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КОРПОРАТИВНЕ СОЦІАЛЬНО ВІДПОВІДАЛЬНЕ ІНВЕСТУВАННЯ В ЕНЕРГОНЕЗАЛЕЖНІСТЬ ПІДПРИЄМСТВ: РОЛЬ У ФОРМУВАННІ СОЦІОЕКОНОМІЧНОЇ ЦІННОСТІ БРЕНДУ РОБОТОДАВЦЯ

У статті досліджено механізми трансформації соціально відповідального інвестування у дієвий інструмент формування соціоекономічної цінності бренду роботодавця в межах діяльності вітчизняних технологічних підприємств. Обґрунтовано, що в умовах системної інфраструктурної нестабільності тривалий термін окупності енергетичних проєктів, який за класичними фінансовими моделями перевищує шістнадцять років, зумовлює необхідність переходу до концепції премії за безперервність. За такого підходу інвестиції капіталізуються не лише через пряму економію ресурсів, а передусім через забезпечення операційної стійкості бізнес-процесів та нівелювання витрат, пов'язаних із вимушеним простоєм персоналу.

На основі адаптованої методології оцінки вуглецевого впливу та принципів когнітивної ергономіки запропоновано авторську модель автономного робочого простору, спрямовану на мінімізацію явищ енергетичної прекаризації фахівців. Особливу увагу приділено соціо-технічному аспекту реінтеграції ветеранів. Доведено, що залучення цієї категорії працівників до ролей операторів безпеки та моніторингу енергосистем офісу сприяє їхній професійній стабілізації через відновлення суб'єктного відчуття контролю над робочим середовищем.

Наукова новизна дослідження полягає у розширенні теоретичних підходів до оцінки ефективності соціально відповідального інвестування шляхом введення у науковий обіг дефініції «Стійкість як перевага». На відміну від існуючих методик, вперше запропоновано розглядати енергоавтономність не як інфраструктурні витрати, а як стратегічний компонент ціннісної пропозиції роботодавця, що інтегрує екологічні стандарти з психологічною безпекою персоналу.

Визначено роль екологічно орієнтованого розроблення програмного забезпечення у зниженні непрямих емісій та вплив показників соціальної відповідальності на зменшення вартості капіталу підприємства. Встановлено, що впровадження соціально відповідального інвестування в HR-стратегію підприємства дозволяє трансформувати технічні параметри інфраструктури у стратегічний нематеріальний актив. Це безпосередньо впливає на зміцнення позицій бренду роботодавця та динаміку індексів лояльності персоналу в умовах глобальної та локальної економічної турбулентності.

Методологічну основу дослідження склав комплексний підхід, що базується на поєднанні методів фінансового моделювання систем безперебійного живлення високого стандарту надійності та аналітичного опрацювання інфраструктурних очікувань фахівців. У межах моделювання соціоекономічного ефекту верифіковано параметри вартості збереженого робочого часу та патерни поведінки працівників в умовах дефіциту потужностей енергомережі. Отримані результати підтверджують, що впровадження запропонованої моделі дозволяє скоротити реальний термін окупності проєктів до трьох-чотирьох років за рахунок врахування нефінансових показників у структурі загальної вартості компанії. Практична значущість роботи полягає у розробці інструментарію стійкості як переваги, що може бути використаний менеджментом для оптимізації стратегій утримання людського капіталу та соціальної реабілітації ветеранського сегмента персоналу через надання їм провідної ролі в управлінні життєстійкістю бізнесу.

Ключові слова: *соціально відповідальне інвестування, брендинг роботодавця, енергетична нестабільність, стійкість як конкурентна перевага, реінтеграція ветеранів.*

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