

THE ESCO MECHANISM IN THE ROMANIAN PUBLIC HEALTHCARE SYSTEM: STRUCTURAL ADVANTAGES, ADMINISTRATIVE CHALLENGES, AND COMPARATIVE PERSPECTIVES

Cristian Nicolae STOINA, PhD

Associate Lecturer at ASE, External Lecturer at INMSS

1. INTRODUCTION

The Romanian public healthcare system evolves within a macro-environment marked by a severe asymmetry between the volume of allocated financial resources and the actual costs of maintaining a resilient hospital infrastructure. The majority of inpatient medical facilities within the public network operate inside pavilions or monobloc buildings constructed prior to 1990, characterized by poor thermotechnic performance, degraded fluid distribution networks, and deficient ventilation systems. Unlike other segments of the public built environment, hospitals represent energy-intensive consumers with a non-linear demand profile, dictated by uninterrupted operational hours (24/7/365) and the mandatory maintenance of rigid microclimate parameters in high-epidemiological-risk zones, such as operating theaters and intensive care units [1].

Increased price volatility in the liberalized energy market over recent years has transferred immense financial pressure onto the operational budgets of hospitals. The substantial funds diverted toward settling utility bills generate a crowding-out effect on expenditures directly linked to the core medical act, such as purchasing pharmaceuticals, sanitary supplies, or diagnostic equipment [1]. Concurrently, the obligations assumed by Romania under the European Green Deal and Directive (UE) 2023/1791 on energy efficiency mandate a 3% annual deep renovation rate of the total floor area of buildings owned by central and local public administrations, establishing the public sector as an exemplary vector in the climate transition [2].

In the context of a structural crisis, the ESCO (Energy Services Company) mechanism, operationalized through Energy Performance Contracting (EPC), no longer represents merely a secondary technological option, but rather a strategic alternative for financing and management. The ESCO model enables public hospitals to thoroughly modernize their energy and critical infrastructure without mobilizing upfront public capital, with the investment being reimbursed exclusively from the net value of energy savings achieved and contractually guaranteed by a private operator over a medium- or long-term horizon.

The objective of this paper is to provide a multidimensional evaluation of the specific advantages and barriers hin-

The Romanian public healthcare system is subject to acute financial strain, directly amplified by disproportionate operational expenditures across a clinical building stock marked by profound physical and functional obsolescence. Within this precarious administrative landscape, deploying Energy Performance Contracting (EPC) through energy service companies (the ESCO mechanism) emerges as a strategic alternative for rehabilitating healthcare infrastructure, bypassing the requirement for immediate public capital mobilization. This study provides a critical evaluation of the feasibility, techno-economic yields, and specific barriers hindering the assimilation of this model within the domestic hospital network. The investigative approach relies on a qualitative methodology, utilizing a PESTEL matrix to map external environmental impacts in Romania, paired with a comparative framework using a Most Similar Systems Design (MSSD) model benchmarked against the consolidated systems of the Czech Republic and the United Kingdom (NHS). Primary focus is directed toward institutional support architectures, the transfer of technical performance risk, and the accounting treatment of public debt. The findings indicate that while ESCO structures guarantee utility expenditure rationalization and clinical microclimate optimization, their operationalization is obstructed by severe systemic constraints: high hospital management turnover, methodological complexities in defining energy baselines within dynamic clinical environments, and a lack of regulatory harmonization regarding multi-year budgetary credit commitments. Overcoming this administrative stalemate demands coherent public policy interventions, with the authors proposing the adoption of a healthcare-specific model EPC contract, the clarification of off-balance sheet accounting rules in full compliance with Eurostat directives, and the establishment of a Central Technical Assistance Unit.

Keywords: energy performance contracting (EPC); ESCO mechanism; hospital management; energy efficiency; PESTEL analysis; comparative analysis; off-balance sheet accounting; healthcare infrastructure.

dering the implementation of the ESCO mechanism within the Romanian hospital network. By deploying an analytical methodology that merges the PESTEL framework with an international comparative analysis, this article aims to transcend the sphere of technical observations and offer decision-makers in healthcare management and line ministries concrete public policy solutions to unlock this economic-financial instrument. To this end, the manuscript is structured as follows: section two details the conceptual framework and literature review, section three explains the research methodological design, chapter four develops the multidimensional PESTEL analysis, while section five presents the comparative analysis of international models, with the paper concluding with administrative reform proposals and final conclusions.

2. CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

The concept of energy performance contracting through energy service companies (the ESCO mechanism) crystallized as a strategic response to the market failures burdening capital investments in energy efficiency within the public sector. This baseline dysfunction is conceptualized in the literature under the umbrella of the "energy efficiency paradox" [3]. The paradox describes

an economic anomaly where technologies characterized by a high internal rate of return (IRR) and short payback periods fail to be operationally assimilated due to rigid institutional barriers, chronic upfront capital deficits, and systemic aversion to structural technological risks [4].

The ESCO mechanism neutralizes these market asymmetries via a total or partial legal and financial transfer of performance risk. In accordance with the foundational tenets of transaction cost economics [5], Energy Performance Contracting (EPC) agreements mitigate uncertainty for the public procurer through firm performance guarantees. In the event that projected energy savings fail to materialize ex-post, the private ESCO operator is contractually mandated to directly offset the financial deficit, thereby safeguarding the budgetary integrity of the contracting public authority [4].

Within the boundary of global healthcare infrastructure, the literature highlights an exponentially higher complexity of EPC structures compared to the standard office or educational building segments. This gap is attributed to the high degree of "asset specificity" intrinsically linked to clinical facilities [6]. Air handling and filtration systems (HVAC), high-efficiency cogeneration or trigeneration units, and primary medical-grade steam networks are interdependent and directly interconnected with core clinical processes [6]. Consequently, any exogenous alteration applied to secondary energy parameters can directly compromise microclimatic vectors, dynamically influencing nosocomial infection rates and the biological safety of vulnerable patients.

At the national level, the scientific literature addressing the intersection of critical infrastructure energy efficiency and hospital management is highly limited Country-specific assessments indicate that while the aggregate technical potential to reduce energy intensity within Romanian public hospitals frequently exceeds the 40% threshold, the lack of viable model framework contracts, coupled with the executive reluctance of hospital managers to commit public institutions to long-term multi-year partnerships, stalls the operational transition from theoretical energy audits to actual project execution [7].

3. MATERIAL AND METHODS. RESEARCH METHODOLOGICAL DESIGN

The present investigative endeavor is grounded in a multi-dimensional qualitative and comparative approach, rigorously structured across two complementary methodological pillars designed to decode the systemic barriers within public healthcare infrastructure. On the first level, the research deploys an expanded PESTEL analysis, an instrument configured to dissect and map the macro- and micro-institutional influences exerted by the Romanian external environment on the assimilation process of the ESCO model. This framework enables the isolation and evaluation of interdependencies among political, economic, social, technological, environmental, and legal vectors governing the domestic hospital network, thereby providing a highly detailed system diagnosis.

On the second level, to transcend the sphere of basic factual observation, the study implements a comparative

analysis based on a Most Similar Systems Design (MSSD) framework. The national cases of the Czech Republic and the United Kingdom (NHS) are selected as benchmarks of best practices; these states, despite displaying distinct healthcare organization and financing models, have successfully developed consolidated, functional EPC markets within their public clinical sectors [4]. Faced with parallel European climate obligations, these systems offer ideal conditions for isolating independent causal variables.

The comparative framework focuses on the systematic evaluation of three key structural indicators: the layout of the institutional support and technical assistance architecture, the accounting treatment of long-term debt and its compliance with the statistical standard criteria issued by Eurostat [9], and the specific instruments deployed to mitigate and share financial and operational risks between contracting public authorities and energy service operators.

4. PESTEL ANALYSIS ON IMPLEMENTING THE ESCO MECHANISM IN ROMANIAN PUBLIC HOSPITALS

To decode the structural complexity of the Romanian institutional environment regarding the assimilation of energy performance partnerships, the evaluation of barriers cannot be conducted in isolation. External environmental factors directly condition one another, shaping parallel constraints that block managerial action. The synthesis of these impact vectors is structured within the PESTEL Matrix (Table 1), which serves as the analytical foundation for the detailed diagnostic of each operational and regulatory risk dimension.

4.1. Political Factors

The main political barrier identified within the Romanian public system resides in the instability and lack of continuity characterizing top-level hospital management. Management contracts concluded under Law No. 95/2006 are limited to a maximum duration of 3 years [8], while the incidence of temporary interim appointments for 3 or 6-month periods remains exceptionally high. An ESCO/EPC agreement typically requires an average implementation and amortization timeframe spanning 10 to 15 years. Interim managers or those reaching the end of their tenure exhibit strong aversion toward entering long-term commitments, operating under the assumption that the economic dividends will be capitalized upon by their political successors, whereas any ongoing technical disputes will be retroactively attributed to them.

Another political vulnerability stems from the dual governance and administrative subjection of public healthcare facilities [1]. While clinical management and human resources are methodologically coordinated by the Ministry of Health, the physical buildings and land plots of county and municipal hospitals belong to the public domain of County or Local Councils. This fractional decision-making architecture generates severe coordination bottlenecks: initiating an ESCO project requires local or county council resolutions (HCL/HCJ), specialized committee approvals, and endorsements from the Ministry of Health—a bureaucratic trajectory that frequently deters private energy service companies.

Table 1. PESTEL Matrix of structural barriers and opportunities in implementing ESCO models within the healthcare sector

Dimension	Opportunities (Driving Factors)	Barriers (Constraints)
Political	• Strategic alignment with decarbonization targets set by the European Green Deal and RED III regarding public buildings [2]. • Mitigation of budgetary pressure regarding energy subsidies allocated to the public healthcare system.	• High managerial volatility within hospital administration; short executive mandates inhibit long-term contractual commitments [8]. • Prioritization of immediate clinical investments over the efficiency of secondary infrastructure.
Economic	• Optimization of healthcare operational budgets; conversion of utility waste into liquid funds for patient care and medical equipment [7]. • Relief of upfront public capital through the complete transfer of investment to private financing channels.	• High cost of debt capital across emerging markets in Eastern Europe [4]. • Absence of a dedicated national public guarantee fund to mitigate credit risk for healthcare ESCOs.
Social	• Optimization of the hospital microclimate; modern HVAC networks directly decrease the incidence of nosocomial pathogen transmission. • Enhancement of institutional resilience during regional energy crises.	• Resistance to operational change from within the internal technical and administrative hospital staff. • Chronic shortage of energy managers specialized in the specific load profiles of clinical infrastructure [1].
Technological	• High viability for infrastructure digitalization via IoT networks and advanced Building Management System (BMS) platforms. • Standardization of auditing metrics through internationally verified technical protocols.	• Severe physical and functional obsolescence of primary legacy networks; major technical risks in merging new ESCO hardware with defective legacy installations [6]. • Insufficient sectorial metering across medical departments.
Environmental	• Direct, quantifiable reduction of the carbon footprint and greenhouse gas emissions associated with the healthcare sector. • Mitigation of local pollution through the replacement of heavy fossil fuel boilers.	• Inefficiencies in technological waste heat recovery from laboratories and operating theaters. • Lack of localized methodological frameworks for integrating mini-cogeneration microgrids.
Legal	• Mandatory transposition of the European Energy Efficiency Directive (EED) into national legislation [2]. • Existence of a national framework for energy efficiency [14] and standardized model contracts for performance services [15].	• Methodological constraints generated by rigid national public debt interpretations. • Propensity of control bodies (Court of Auditors) to erroneously classify EPC agreements as on-balance sheet public debt, contradicting Eurostat guidelines [9] and public-private partnership frameworks [13].

Source: Author's own elaboration based on the cited literature and regulatory framework

4.2. Economic Factors

From a macroeconomic perspective, public hospitals in Romania operate under a regime of chronic underfunding, where personnel expenses consume over 70–80% of the total budget. The financing of medical activities through the DRG (Diagnosis-Related Group) system reimbursed by the National Health Insurance House (CNAS) is highly rigid and fails to absorb abrupt fluctuations in utility prices [7]. During periods of energy crisis, hospitals accumulate massive arrears toward energy suppliers, necessitating emergency budgetary rectifications from government reserve funds.

The introduction of the ESCO mechanism fundamentally

alters this energy-economic dynamic. The EPC contract transforms a variable and unpredictable operational expense into a fixed line item, strictly correlated with the achieved energy savings. Financially, the hospital pays the ESCO an amount equal to or less than the value of the saved energy [4]. Upon contract expiration, the entire modernized infrastructure transfers into the hospital's ownership, freeing up financial resources for acquiring medical technology or improving inpatient conditions. Nevertheless, the reluctance of the Romanian commercial banking sector to finance ESCO firms based exclusively on the project's future cash flows (non-recourse Project Finance) remains a major economic barrier [3].

4.3. Social Factors

Social factor analysis reveals that energy efficiency in hospitals cannot be evaluated solely through financial indicators; it must be directly correlated with the quality of medical care and patient safety. The degraded thermal infrastructure in many Romanian hospitals often generates deficient thermal comfort in wards during winter or overheating episodes during summer, due to the lack of centralized HVAC systems [1].

The ESCO mechanism couples this social dimension by enforcing rigorous environmental key performance indicators (KPIs). ESCO companies do not optimize consumption by reducing the supply of utilities, but rather by eliminating energy waste. A hospital retrofitted through an EPC provides a thermally controlled environment, reducing the risk of respiratory or infectious complications among vulnerable patients while simultaneously increasing the productivity and satisfaction of the medical staff [6].

4.4. Technological Factors: The IPMVP Protocol and the Clinical Baseline

The high level of technological complexity in a hospital imposes strict requirements that few ESCO companies in Romania can currently fulfill. The hospital energy structure involves multiple vectors: high-availability electricity, medium-pressure steam for sterilization (autoclaves), domestic hot water at controlled temperatures to prevent bacterial contamination, and complex mechanical ventilation systems with 100% fresh air intake in operating theaters [6].

A major theoretical and practical particularity, introduced by the international IPMVP protocol (International Performance Measurement and Verification Protocol) [11], lies in the complexity of defining the "energy baseline" within highly dynamic clinical environments. Unlike administrative buildings—where consumption is linear and depends exclusively on meteorological factors (heating degree-days)—a hospital's consumption is directly influenced by bio-technological clinical indicators. These include the number of discharged patients, case-mix complexity (the Case Mix Index - CMI), the expansion of high-power imaging equipment (MRI, CT scanners), or the conversion of low-consumption units into high energy-load departments.

To prevent the unfair penalization of the ESCO provider or overpayment by the contracting authority, the technological model requires dynamic baseline adjustment algorithms [11]. These algorithms adjust the savings equation in real time through integrated Building Management Systems (BMS), correlating the energy vector with the hospital's DRG database, thereby ensuring the scientific accuracy of the guaranteed performance.

4.5. Environmental Factors

Public hospitals rank among the largest consumers of fossil fuels and, consequently, represent significant contributors to urban greenhouse gas emissions. Many units operate on-site boiler plants equipped with obsolete technologies that produce high levels of harmful emissions [1]. ESCO

wable energy sources (RES), such as geothermal or air-to-water heat pumps, alongside photovoltaic arrays installed on pavilion rooftops [1].

Beyond carbon footprint reduction, modernizing hydraulic systems through the ESCO mechanism yields a direct ecological and biosafety impact. Obsolete hot water networks, characterized by stagnation zones and non-uniform temperatures, constitute an ideal breeding ground for *Legionella pneumophila* bacteria. By having the ESCO redesign the domestic hot water preparation and distribution systems, automatically controlled periodic thermal shocks are ensured, eliminating biological risks without the excessive use of polluting chemical biocides [6].

4.6. Legal Factors: Standard Procurement vs. Public-Private Partnership

The legislative dimension represents the primary Gordian knot blocking the ESCO market within the Romanian public healthcare system. Attempting to implement ESCO/EPC contracts exclusively through the lens of Law no. 98/2016 on public procurement [12] generates a profound conceptual and operational bottleneck. Classical procurement legislation is designed for linear transactions—where the hospital purchases a work or service based on the "lowest price" criterion, paying the countervalue from an annually approved budgetary credit. However, an energy performance contract is not a simple procurement, but a long-term mechanism in which financing is intrinsically linked to the transfer of operational risk.

From the perspective of administrative and public law theory, the ESCO mechanism aligns much more organically with the philosophy of Public-Private Partnerships (PPPs) regulated by Emergency Ordinance (OUG) no. 39/2018 [13] and concession contracts. Nevertheless, the rigid normative overlap with the Local Public Finance Law no. 273/2006 [10] imposes strict multi-annual debt ceilings on local authorities that own the hospital buildings, thereby limiting their capacity to guarantee payments to the ESCO over 10-to-15-year terms. This systemic misalignment is exacerbated by the restrictive interpretations of secondary oversight bodies, such as the Court of Accounts (Curtea de Conturi), which tend to classify these structures as direct public debt (on-balance sheet). This eludes the joint methodological recommendations of Eurostat [9] and the recast European Energy Efficiency Directives [2]. Consequently, this deadlock suspends the assimilation of recently drafted national model framework contracts [15], perpetuating a massive implementation deficit compared to consolidated markets across the rest of the European Union [4].

5. INTERNATIONAL COMPARATIVE ANALYSIS: SUCCESSFUL MODELS IN THE HEALTHCARE SECTOR

The identification of endemic bottlenecks highlighted by the analysis of the Romanian internal environment necessitates the evaluation of best-practice administrative models that have successfully surmounted similar barriers. Within this perspective, the comparative analysis developed in this chapter does not represent a mere

factual description, but rather a methodological framework based on a Most Similar Systems Design (MSSD). Two distinct healthcare management paradigms are benchmarked: a mature, globally recognized reference system (the United Kingdom) and a consolidated transition model from a post-communist space (the Czech Republic), both providing concrete solutions to the administrative Gordian knots identified within the Romanian domestic hospital network.

5.1. The UK NHS Model (Mature System)

In the United Kingdom, the National Health Service (NHS) has integrated energy performance contracting as a central pillar in its strategy to achieve the "Net Zero Carbon" objective. The success of the British model is due to the establishment of a standardized national framework called the National NHS EPC Framework. Instead of each individual hospital trust negotiating complex contracts, the state provides pre-approved tender documentation and standardized contractual clauses [6].

This administrative framework has facilitated the mobilization of over £1.4 billion in funding dedicated to modernizing hospital thermal networks, with official data indicating a real 14% reduction in direct carbon emissions across NHS-managed buildings over the last five years [16]. The core clause of these contracts is the guaranteed savings mechanism, through which the technical risk of underperformance is fully assumed by the private partner; if the projected reductions fail to materialize during the post-implementation phase, the ESCO operator financially compensates the medical unit. Concretely, these contracts generate consistent reductions in utility bills ranging between 15% and 28%, allowing for the full amortization of investments within a medium-term horizon of 7 to 12 years [6].

Financing is facilitated by a dedicated public entity, Salix Finance, funded by the relevant government departments, which acts as the delivery body for state capital schemes. Healthcare units access these resources through competitive applications within the national Public Sector Decarbonisation Scheme (PSDS)[17]. The intervention strategy focuses on profound technological restructuring, prioritizing the substitution of polluting energy vectors—specifically replacing outdated gas or oil boilers with clean technologies based on high-performance heat pumps [16]. This component is closely linked to increasing energy autonomy through solar photovoltaic microgeneration installed on hospital roofs, upgrading building fabric insulation, replacing windows with high-efficiency glazing, and upgrading roofs. Operationally, electricity consumption is rationalized through a transition to LED lighting systems and centralized control via digital Building Management Systems (BMS) [16].

The viability of this integrated model is displayed by performance indicators recorded across several major clinical facilities. For instance, the Eastbourne General Hospital healthcare facility combined PSDS grants to support a structural transition that included commercial-scale heat pumps, solar panels, and complete insulation of the main building fabric, while the York Teaching Hospi-

tals medical network prioritized the outright elimination of fossil fuels from its district heating network [17]. In an approach focused on electricity cost efficiency, the Nottingham University Hospitals NHS Trust hospital complex achieved a substantial reduction in utility bills through a comprehensive conversion to LED lighting and solar capture. Similarly, the Hull University Teaching Hospitals medical unit completed an energy infrastructure project based on an independent solar farm connected to automated nodes for hospital microclimate optimization [17].

5.2. The Czech Model (Consolidated Transition Model)

The administrative experience of the Czech Republic provides an essential methodological benchmark regarding the structural bottlenecks in Romania, demonstrating that a post-communist state, faced with a clinical building stock marked by similar physical and functional obsolescence, possesses the capacity to generate a sustainable investment dynamic through energy performance contracting. The determining factor in forging these partnerships was the Energy Efficiency Center (SEVEN), an independent advisory body whose institutional neutrality facilitated the optimal mediation of technical and economic interests between public hospital managements and private energy service providers [4].

An eloquent illustration of this management paradigm is the program implemented at the Na Homolce State Clinical Hospital in Prague (Nemocnice Na Homolce). By entering into an EPC commitment with a 10-year execution clause, a total investment of approximately CZK 150 million was mobilized for upgrading technological building equipment, supported by operational structural funds [18]. The project undertook a major reconfiguration of the facility's utilities: upgrading the central thermal node, integrating high-efficiency cogeneration modules, optimizing water consumption flows, and modernizing the photometric infrastructure through automated LED technology.

From a financial perspective, the viability of capital flows was secured via a non-recourse factoring agreement, whereby future receivables certified through realized savings were assigned directly to commercial banking institutions within the Czech market [4]. This mechanism guarantees the hospital a minimum annual saving of 4,200 MWh of electricity and 8,700 MWh of gas, translating into a direct reduction in operating costs of over CZK 30 million annually and an environmental mitigation of 5,823 tonnes of CO₂ emissions per year [19].

However, the long-term success of the strategy was contingent upon the early alignment of national legislation with the standards and methodological decisions issued by Eurostat, which cleared the way for accounting these operations entirely off-balance sheet [9]. This regulatory compliance enabled the profound modernization of state healthcare infrastructure without burdening the macroeconomic debt indicators of the Ministry of Health in Prague, shaping an optimal solution for leveraging private capital to upgrade public medical services.

The synthesis of portfolio data extracted from macro-European audits and the financial reports of

Table 2. Comparative framework of key performance indicators (KPIs) in hospital energy efficiency: Romania, the Czech Republic, and the United Kingdom

Analyzed State	KPI 1: Average reduction of sectorial energy intensity	KPI 2: Average timeframe for administrative and tender approval	KPI 3: Utilization of off-balance sheet private capital
ROMANIA (Incipient market)	• Below 5% • Brief and sporadic application, restricted to isolated pilot projects across county-level clinical infrastructure; absence of a technical scaling strategy [1, 7].	• 24 — 36 months • Protracted bureaucratic bottlenecks driven by overlapping local government jurisdictions and procedural ambiguity in classical procurement laws [12, 13].	• Incipient / Low • Structural reliance on rigid EU structural grants; explicit aversion within the commercial banking sector toward factoring and refinancing EPC agreements [15].
CZECH REPUBLIC (Mature regional model)	• 28% — 35% • High yields validated by profound technological overhauls and microclimate optimizations across major state clinical hubs [4, 19].	• 8 — 12 months • Operational stream-lining achieved through standardized guidelines and tender templates validated centrally by independent advisory bodies [4].	• Stable and Functional • Extensive utilization of non-recourse factoring mechanisms; successful accounting transfer off-balance sheet in full compliance with Eurostat criteria [9, 18].
UNITED KINGDOM (NHS) (Gold standard)	• 25% — 28% • Sustained performance driven by centralized national carbon budgets and stringent decarbonization mandates for critical clinical facilities [6, 16].	• 4 — 6 months • High-celerity procurement procedures underpinned by the National NHS EPC Framework and lists of pre-approved framework vendors [6].	• Very High • Massive mobilization of private institutional capital through hybrid public-private co-financing schemes managed by specialized delivery bodies [17].

Source: Author's own elaboration based on the cited literature and regulatory framework

the analyzed hospital units enables a clear mapping of performance gaps. The comparative centralization of key performance indicators (KPIs), detailed in Table 2, empirically highlights the distance between the incipient phase in Romania and the proven efficiency of consolidated markets.

6. ADMINISTRATIVE REFORM PROPOSALS AND POLICY-LEGAL SOLUTIONS FOR ROMANIA

The findings of the international comparative analysis clearly demonstrate that overcoming the institutional stalemate within the Romanian healthcare system does not require a simple replication of isolated technical interventions, but rather mandates a profound restructuring of the underlying legal and financial architecture. To successfully compress the current protracted administrative timeframe governing procurement procedures — currently locked within an unacceptable 24–36 month window — and to align it with the European benchmark of under one year, it is imperative to dismantle the regulatory ambiguities that obstruct multi-year utility budgeting. The primary, high-priority public policy initiative must center on achieving a flexible alignment between the operational mechanisms established by Public Procurement Law No. 98/2016 [12] and the provisions of GEO No. 39/2018 on public-private partnerships [13].

This statutory synchronization should be formalized through a joint decree issued by the Ministry of Energy and the Ministry of Health, establishing a model EPC framework explicitly engineered for healthcare facilities. While generic energy performance model contracts were introduced around 2024 [15], they completely fail to account for the

technological volatility of the underlying hospital energy baseline. The new statutory instrument must explicitly codify the guaranteed savings clause and the full transfer of technical risk to the private provider, thereby insulating public budgetary resources in full accordance with the verification metrics established by the IPMVP methodology.

The second core avenue of structural reform targets the neutralization of local budgetary constraints. The rigid application of Local Public Finance Law No. 273/2006 [10] heavily restricts the capacity of county and municipal councils — the de jure owners of hospital real estate — to commit to long-term multiannual financial obligations that extend past the annual fiscal cycle or short-term political mandates. To unlock private capital flows, Energy Efficiency Law No. 121/2014 [14] must be amended to include an explicit statutory exemption for public hospitals. This legislative revision must clarify that long-term multiannual payment liabilities incurred by a healthcare unit toward an ESCO do not constitute sovereign public debt and shall not impact local debt ceilings, provided that the realized energy savings are strictly verified in compliance with international statistical guidelines issued by Eurostat [9].

Concurrently, drawing on the successful operational frameworks of the British Salix Finance and the Czech SEVEN center [4, 17], this study proposes the centralization of expert knowledge through the establishment of a **Central Technical Assistance Unit for Healthcare Infrastructure Decarbonization**, under the technical coordination of the Ministry of Energy. This neutral advisory body will be tasked with pre-vetting tender documentations, effectively eliminating deep information asymmetry within the system and mitigating the fear

of personal legal liability among hospital executives. By converging these three distinct pillars — a tailored clinical framework contract, a legally secured off-balance sheet accounting treatment, and a centralized administrative facilitator — Romania can successfully deploy the ESCO mechanism, converting inefficient operational waste into direct, long-term capital investments for the quality of public healthcare.

7. CONCLUSIONS

The implementation of the ESCO mechanism within the Romanian public healthcare system constitutes a mature techno-financial solution, capable of simultaneously addressing chronic budgetary crises inside clinical facilities and international ecological decarbonization obligations. The structural attributes of this model — namely financing sourced exclusively from future generated savings, the contractual guarantee of performance metrics, and the thorough modernization of critical healthcare infrastructure — represent fundamental arguments for its urgent assimilation by domestic hospital management teams.

Nonetheless, this investigative endeavor has demonstrated that the domestic energy services market is paralyzed not by intrinsic technological limitations or a lack of interest from the private sector, but rather by the persistence of a rigid, anachronistic regulatory and accounting framework that remains unaligned with specific economic realities. The comparative analysis of the consolidated models in the Czech Republic and the United Kingdom clearly reveals that operational success is not contingent upon the gross volume of allocated public grants, but rather on the predictability of the rules of the game, the legal safeguarding of off-balance sheet accounting treatments, and the establishment of specialized bodies, such as a Central Technical Assistance Unit, acting as a facilitator and guarantor of contractual equilibrium. In the absence of a decisive, coordinated legislative intervention by the Ministry of Health and the Ministry of Finance, public hospitals in Romania will continue to waste substantial financial resources on covering inefficient utility bills — vital liquidity which, if strategically reallocated, would possess the capacity to dictate the difference between life and death across elite clinical wards.

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