



Enabling Energy Service Company (ESCO) Market for ASEAN's Low-Carbon Buildings Transition

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Highlights

- Energy efficiency remains ASEAN's most cost-effective strategy to curb rising building-sector emissions, reduce grid investment needs, and strengthen long-term energy security amid rapidly growing urbanisation and cooling demand.
- ESCOs can play a central role in enabling building retrofits by providing integrated, performance-based services covering audits, financing, installation, and Measurement and Verification (M&V), reducing complexity and making energy savings more bankable.
- Despite many registered ESCOs in ASEAN, actual project deployment remains limited due to weak enforcement of EE regulations, inconsistent accreditation, and limited access to finance—especially for smaller firms.
- Public-sector restrictions on performance-based contracting significantly hinder ESCO market growth; enabling ESCO access to government buildings can unlock stable demand, strengthen creditworthiness, and catalyse investment.
- On-bill financing holds potential to expand EE uptake for underserved segments, but requires major regulatory reforms, utility engagement, and tailored market assessments before ASEAN countries can adopt it at scale.

Introduction

The building sector in countries within the Association of Southeast Asian Nations (ASEAN) is undergoing a transformative shift as countries strive to balance economic growth with environmental sustainability. Buildings account for nearly a quarter of ASEAN's total energy consumption and total process and energy-related CO₂ emissions.[1][2] With urban populations expanding and construction booming, 8th ASEAN Energy Outlook projects energy use in buildings to grow by approximately 50% by 2050. Without intervention, this trajectory poses significant challenges for energy security, climate commitments, and public health.

Energy efficiency (EE) has been identified as a key lever to facilitate the building sector in achieving Net Zero emissions. EE measures are crucial for emissions reductions, not only in existing buildings, but also in new buildings. New builds should be designed to facilitate EE through measures such as maximising natural lighting and thermal comfort. Retrofits are key for existing buildings, as most structures were built long before EE and sustainability were priorities.

Older buildings often rely on outdated systems compared to the technological advances today and have equipment with deteriorated performance. Retrofits enable reduced energy consumption and extend the lifespan of existing infrastructure.

While there is a clear need for EE measures, many building owners hesitate to pursue these upgrades because of financial constraints, uncertainty about energy savings, or a lack of in-house capacity to design and implement complex retrofits. This is where Energy Service Companies (ESCOs) can step in to remove these barriers by offering turnkey solutions, covering audits, financing, implementation, and monitoring, while guaranteeing performance outcomes. In essence, ESCOs make EE projects feasible by aligning incentives – ESCOs only profit when the promised energy savings are achieved, which builds trust and accelerates adoption.

ESCOs are companies that have the capability to provide, or manage a group of service providers, who can service the whole development value chain of an EE project. This includes undertaking energy audits across various levels – Level 1 (walkthrough), 2 (detailed) and 3 (investment grade) – through which EE measures are identified and recommended, undertaking a financial assessment of the proposed projects, designing business model, contractual and repayment schemes, raising finance for project implementation, installation and commissioning and measurement and verification.

There have been few ESCO-developed projects in ASEAN, with most being implemented in Singapore, Malaysia, Thailand, and Philippines. Few, if any, have been developed in other ASEAN Member States (AMS). Additionally, ESCO projects have primarily been developed for the commercial buildings sector, rather than the residential buildings sector. The profile of energy consumption in the residential sector – mostly appliance-led – does not typically require the expertise of ESCOs. Nonetheless, there have been some discussion about the potential for on-bill finance (OBF) to catalyse increased activity from ESCOs and wider energy service professionals within the residential sector.

OBF is a method of financing EE improvements that uses utility bills as the repayment vehicle. While there remain minor deviations in defining OBF, it is a mechanism that allows the upfront cost of EE improvements to be covered by an electric utility or a third-party financier. It is also commonly known as on-bill lending and on-bill repayment.[3] Unlike one-time grants, a common tool to bridge financing gaps, OBF promotes accountability and delivers immediate results to users. By tying repayments to utility bills, OBF places customers on a manageable EE journey, empowering them to fund upgrades while seeing reductions in electricity use, assuming consistent consumption patterns.

Opportunities and benefits of energy efficiency and energy service companies

Energy Efficiency is the invisible powerhouse – the first fuel in the race to net zero

EE reduces demand before the need to generate energy, cutting emissions at the source. By optimising how energy is used, from smarter buildings to more efficient appliances, EE unlocks massive savings and accelerates progress toward net zero. It is not just a technical fix, rather a strategic shift that empowers the buildings sector to do more with less.

Energy Efficiency reduces the cost of getting to net zero

Achieving net zero requires substantial investment, as it necessitates investing in new renewable energy sources and other assets that support this goal.

EE reduces the amount of investment needed, as it means fewer megawatts are required, fewer substations are needed, and fewer transmission lines are laid. Every kilowatt saved through efficiency is a kilowatt that does not need to be generated, transmitted or distributed – saving billions in grid investments.

Energy efficiency reduces utility bills, enabling companies to be more competitive

EE plays a crucial role in strengthening a company's financial performance and market position. By lowering utility bills through smarter energy use, businesses can significantly cut operating costs. These savings free up resources that can be reinvested into innovation, talent, or customer value, ultimately enhancing competitiveness. This ability to reduce overhead without sacrificing productivity gives companies a sharper edge, allowing them to offer better prices, improve resilience, and stand out in a crowded marketplace. EE also reduces households' energy bills.

ESCOs provide a one-stop service, delivering the end-to-end value chain of an EE project

ESCOs act as comprehensive solution providers by offering a one-stop service that covers the entire value chain of an EE project. This integrated approach reduces complexity for clients, eliminates the need to coordinate multiple vendors, and guarantees accountability since ESCOs are directly invested in delivering results. It enables building owners to focus on the core of their business, leaving energy management to the energy experts. By streamlining the process and aligning incentives with outcomes, ESCOs make EE projects more accessible, reliable, and effective for organisations seeking long-term cost and sustainability benefits.

ESCO business models – low upfront cost, guaranteed savings and pay-as-you-save structures – are designed for organisations with diverse financial capacities

ESCO business models are structured to make EE projects accessible to organisations of all sizes and financial capacities. By offering no or low upfront costs, it removes the barrier of substantial initial investment, while guaranteed savings ensure that clients benefit from measurable reductions in energy expenses. Additionally, the as-a-service model (e.g., cooling, lighting) aligns payments with actual consumption, creating flexibility and reducing financial risk. This combination of affordability, assurance, and adaptability allows ESCOs to serve a diverse range of entities—from cash-constrained small businesses to large corporations—making EE both practical and financially sustainable across the building sector.

On-bill finance offers a new business model for ESCOs, enabling them to provide services to market segments that are not currently served

OBF enables customers to repay EE investments, often facilitated by ESCOs, directly through their utility bills, thereby reducing the need for large upfront capital expenditures. OBF repayment processes, when well-integrated into utility bills, are seamless and reduce administrative burden on customers. This mechanism is especially useful for residential and small commercial customers who may lack access to traditional financing and typically do not seek out the expertise of ESCOs.

Current state of energy efficiency and ESCO market in ASEAN

The number of ESCOs available in each AMS varies quite substantially. As seen in Table 1 below, Malaysia has the largest number of registered ESCOs at over 300 listed on the Energy Commission's website. Singapore, Thailand and the Philippines have 27, 41 and 60 ESCOs, respectively. There are reportedly no ESCOs active in Brunei Darussalam, Lao PDR, and Myanmar. It is also observed that some AMS have government-led ESCO accreditation programmes.

The remaining AMS lack registered or mature ESCOs, and EE projects are typically undertaken by general energy service providers (ESP) or in-house, such as in the case of Cambodia. [4] As an indication, a survey analysed 19 ESPs in Cambodia's garment industry and only 2 of them had high ESCO technical and financial capabilities.[5]

Table 1 Estimated number of energy service companies in each ASEAN Member State

Country	Number of Reported ESCOs	Source
Brunei Darussalam	No publicly available data	-
Cambodia	14 organisations offering services related to energy management, energy services, EPC (Engineering, Procurement, and Construction), green buildings, industrial HVAC, and lighting.	List of ESPs/ESCO - EuroCham Cambodia [6]
Indonesia	12 ESCOs listed on the government's website	List of ESCOs, EBTKE [7]
Lao PDR	No publicly available data	-
Malaysia	373 ESCOs listed on the government's website	List of Registered ESCOs, Energy Commission [8]
Myanmar	No publicly available data	-
Thailand	41 registered ESCOs	Investment in Energy Transition in Southeast Asia Report 2023, PWC [9]
The Philippines	37 registered, 6 certified by DOE	Investment in Energy Transition in Southeast Asia Report 2023, PWC [9]
Singapore	27 government-accredited ESCOs	ESCO Accreditation, NEA [10]
Viet Nam	Estimated to have 20 ESCOs	ESCO Market Report 2023, Pioneer International Consulting [11]

Policy Brief

A recent report published by the Global ESCO network indicated the different levels of ESCO market maturity, with 85 new ESCO projects in Thailand, 17 in the Philippines and only 3 in Indonesia (Table 2).[12]

Additionally, 90 projects were generated between 2023 and 2024 with grants provided under the Energy Efficiency Fund set up by the National Environment Agency in Singapore. However, there is a lack of data on the pipeline for new ESCO projects in Malaysia, Viet Nam and other AMS.

Table 2 Number of ESCO projects and estimated ESCO market size in ASEAN Member States

Country	Number of Projects	Number of New Projects	Market Size (in USD)	Source
Indonesia	2	3	175,000	The Global ESCO Market Report [13]
Malaysia	206	-	-	
Thailand	100	85	187.5 million	
The Philippines	71	17	111 million	
Singapore	90	-	683.2 million	Number of projects: The Business Times [14] Market size: Singapore Energy As A Service Market Size & Outlook, 2030 [15]

As observed in Table 1 and Table 2, while a non-trivial number of ESCOs exist in many AMS, this does not necessarily translate to ESCO projects. For example, in Indonesia, there are 12 ESCOs listed on the government’s website, but only a handful of new projects. Engagements with experts revealed that this disparity could be attributed to the presence of inactive ESCOs and a higher number of entities referring to themselves as ESCOs but who may be unable to provide the full service of an ESCO (i.e. services across the whole development value chain of an EE project). Many players refer to themselves as ESCOs, however, are only able to provide limited service – typically energy audits such as Level 1 and Level 2 energy audits – and are neither able to structure a project and raise finance for it, enter into an energy performance contract, nor manage the installation and commissioning aspects of the project.

The number of reported ESCOs tends to be more reliable where there are government-led professional ESCO accreditation programmes. These programmes require that aspiring ESCOs meet certain technical and financial qualifications to gain accreditation. Such programmes enhance the professionalism and quality of services offered by ESCOs, thereby enhancing confidence in the energy services sector, which helps promote the growth of the industry. The Singapore National Environment Agency’s ESCO Accreditation is an example.[16]

Challenges and barriers

EE presents easily achievable opportunities for reducing emissions in energy consumption, significantly contributing to the energy transition alongside the development of renewable energy technologies. There are many EE opportunities that are more cost-effective than generating an additional kWh of renewable electricity.

While the opportunities and benefits from implementing EE are clear, the ESCO industry across AMS is still not mature. Beyond the low electricity price in most AMS, the key challenges hindering the uptake of ESCO-led EE projects, and therefore the development of the ESCO market in AMS, include:

Weak implementation and enforcement of mandatory activities within the umbrella energy efficiency regulations

National EE regulation exists in many AMS, including Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam. These regulations often include clauses on energy managers, periodic energy audits and implementing outcomes of energy audits. However, there are varying degrees of compliance with regulations across the countries. In many of these countries, a gap exists between regulation and implementation.

Additionally, weak inter-ministry coordination has also resulted in weak enforcement and disincentives that do not motivate compliance. Coordination between the government agencies and ministries overseeing energy and the built environment is needed to ensure alignment and appropriateness of disincentives. This has therefore dampened the demand for EE projects and ESCO services.

Limited ESCO market growth due to constrained access to finance and cautious banking sector engagement (ESCO-financing catch-22)

The growth of ESCOs in AMS is constrained by a financing catch-22 – banks are reluctant to provide loans to ESCOs because they view the sector as immature and high-risk, yet ESCOs cannot mature without access to the very financing needed to implement EE projects, especially those structured under a shared savings or as-a-service model. This deadlock is compounded by banks' concerns over uncertain energy savings, a lack of collateral, and relatively small loan sizes compared to those for renewable energy projects. As a result, ESCOs struggle to demonstrate creditworthiness or scale their business models, while financial institutions remain hesitant to engage until the market proves itself. Breaking this cycle requires targeted interventions, such as risk-sharing mechanisms, government support programmes, business incubation and venture capital support or capacity building for both ESCOs and financiers – to unlock capital flows and enable the sector to grow sustainably.

Broad application of the term ESCO by firms with limited technical capacity has contributed to market confusion and diminished stakeholder confidence in the services provided by technically qualified ESCOs

The widespread classification of ESCO by firms with limited technical capacity has contributed to a fragmented market understanding of what constitutes a true ESCO. Many organisations adopt the label despite only offering partial services within the EE project development chain – such as only being qualified to undertake energy audits up to Level 2 – without the ability to deliver integrated solutions that include design, financing, and implementation. This dilution of the ESCO concept has led to confusion among customers, who struggle to distinguish between fully qualified providers and those with narrower capabilities. As a result, market confidence in ESCO services has been undermined, impeding broader adoption of EE measures and complicating efforts to scale sustainable energy solutions.

Lack of public sector access has held back the growth of ESCOs in many ASEAN Member States

In many advanced markets such as Singapore, the United States of America, and Germany, access to public sector facilities has been a critical catalyst for ESCO growth, enabling companies to build robust project portfolios, demonstrate performance, and strengthen their financial standing. These markets have institutionalised energy performance contracting (EPC) in government buildings, providing ESCOs with stable demand and a platform to scale. These public sector projects often serve as anchor clients, offering predictable cash flows and credibility that help ESCOs secure financing and expand into the private sector. In contrast, procurement, contracting and budgetary regulations in many AMS do not enable the ESCO model, which relies on performance-based payments and long-term service agreements. This regulatory misalignment has limited ESCOs' ability to engage with the public sector, stifling their growth and preventing the sector from reaching its full potential in driving national EE goals. Bridging this gap through policy reform and enabling frameworks could unlock significant market opportunities, especially in the private sector.

Securing the involvement of utilities in an OBF programme will require major regulatory changes and require utilities to change their ways of working

Utilities in most AMS face major hurdles in adopting OBF schemes. Their revenue models depend on increasing electricity sales, making EE financially unattractive. Most are state-owned enterprises, requiring high-level regulatory changes for billing reforms. This creates administrative and political complexity in implementing OBF. Utilities lack incentives to promote reduced consumption through efficiency upgrades. They are often overleveraged, limiting their ability to raise new capital or take on debt. Without financial flexibility, utilities cannot absorb the risks of OBF programs. There's limited institutional capacity to manage performance-based repayment structures. These barriers prevent utilities from enabling ESCO growth through OBF. Policy reform and financial innovation are needed to unlock utility-led efficiency markets.

Policy recommendations

Strengthen regulatory follow-through and inter-ministerial coordination to sharpen incentives and disincentives

To unlock the full potential of EE across AMS, governments must prioritise the robust implementation and enforcement of existing EE regulations. Clear delegation of responsibilities to various actors, coupled with measurable key performance indicators, are needed.

While national frameworks in countries such as Indonesia, Malaysia, the Philippines, Thailand, and Vietnam include mandates for energy managers, regular audits, and follow-up actions, inconsistent compliance and weak enforcement have limited their impact. This gap stems largely from fragmented coordination between ministries responsible for energy and the built environment, resulting in misaligned disincentives and diluted accountability. Governments should establish formal inter-agency mechanisms to harmonise regulatory mandates, streamline enforcement protocols, and ensure that disincentives are both appropriate and actionable. Strengthening institutional coordination will not only improve compliance but also stimulate demand for EE projects and energise the ESCO market across the region.

Monitor and evaluate the effectiveness of regulations and policies periodically to maximise impact

Governments should institutionalise a robust system for periodic monitoring and evaluation (M&E) to ensure that EE regulations and policies deliver sustained and measurable outcomes. While many AMS have enacted national EE frameworks, the absence of structured feedback loops has limited their ability to assess real-world effectiveness, identify implementation gaps, and recalibrate strategies accordingly. A well-designed M&E mechanism should include clear performance indicators, regular data collection, and transparent reporting processes. It should also engage relevant stakeholders—including regulators, implementing agencies, industry actors, and civil society—to ensure that insights are grounded in operational realities. By embedding M&E into the policy cycle, governments can enhance accountability, improve resource allocation, and adapt interventions to evolving market conditions.

Amend regulations to enable ESCOs to deliver EE projects in government facilities

AMS should prioritise regulatory reform to enable ESCOs to access public sector facilities through performance-based contracting models. Drawing from international best practices, governments can institutionalise EPC frameworks that allow ESCOs to implement EE projects in government buildings. This access would provide ESCOs with stable, creditworthy clients, enabling them to build track records, strengthen balance sheets, and subsequently attract private financing. To achieve this, procurement, budgeting, and contracting rules must be adapted to accommodate long-term, performance-linked agreements. Establishing clear guidelines, standard contract templates, and inter-agency coordination mechanisms will be essential to streamline implementation. By unlocking public sector demand, governments can stimulate ESCO market development, drive energy savings in public infrastructure, and create a foundation for broader private sector engagement.

Thoroughly evaluate the applicability of OBF schemes within the ASEAN context

AMS should undertake a thorough, context-specific evaluation of its applicability to determine the viability of OBF as a mechanism for scaling up EE investments. While OBF has proven effective in some advanced markets by leveraging utility billing systems to recover EE investments, its success depends heavily on regulatory, institutional, and financial conditions. In the ASEAN region, many utilities are state-owned, operate under volumetric revenue models, and face regulatory and financial constraints that may hinder their ability to implement or manage OBF schemes. A comprehensive assessment should examine utility incentives, billing infrastructure, credit risk management, legal frameworks, and consumer protection mechanisms. It should also explore alternative models such as third-party administration or risk-sharing facilities. A rigorous evaluation can identify enabling conditions, anticipate implementation challenges, and design tailored OBF frameworks that align with national energy goals and market realities.

Create sandboxes to allow more capital to flow to ESCOs (nationally)

Innovative financial mechanisms need to be created to increase the mobilisation of finance to EE projects and ESCOs. Without specific intervention from the government, it is unlikely that ESCOs would receive increased amounts of debt finance from banks due to creditworthiness challenges, especially if ESCOs lack access to deliver EE projects in government facilities. It is therefore recommended that spaces for financial innovation through sandboxes are created. The sandboxes should source innovative ideas from the market and provide them with a conducive environment for testing. These innovative ideas may include the following:

- **EE project pooling programs:** Most banks see individual EE projects as having too small a ticket size, but require the same due diligence requirements as larger ticket projects. Pooling small, similar projects (e.g., retrofits across multiple projects) into standardised portfolios can reduce due diligence costs and enable larger ticket sizes. The sandbox could support project pooling by assisting banks in identifying clients within similar industries to be pooled and to explore partnerships with utilities or ESCOs to build and manage portfolios.

- **Design of performance-linked financial products:** Design corporate loan products where repayment terms are directly linked to realised energy savings, with features such as:
 - Flexible repayment schedules or interest levels that can be adjusted based on verified energy savings performance
 - Grace periods aligned with energy savings realisation timelines
 - Integration of energy bill payment history into credit assessment
- **Develop regional de-risking mechanisms:** De-risking mechanisms such as guarantees and energy savings insurance have the potential to catalyse greater amounts of finance for EE projects. Engagements with financial institutions revealed interest to provide loans to ESCOs with the appropriate type and amount of guarantee coverage. Funds for such de-risking mechanisms can be accessed by tapping multilateral financing platforms such as the ASEAN Infrastructure Fund.
- **Explore options to increase the flow of venture capital into ESCOs:** ESCOs in many AMS are in the early stages of development. Many, if not all, are unable to obtain debt finance due to a lack of creditworthiness and a weak balance sheet. Therefore, equity investment is key to driving the growth of these ESCOs. The Ministries of Energy and Finance, and financial regulators should come together to explore approaches to increase the flow of venture capital into ESCOs.
- **Double down on efforts to innovate and mobilise greater amounts of blended finance from development and climate funds or philanthropic capital:** Significant efforts have been placed to mobilise increased amount of debt and equity finance for EE, the impacts of which have however been limited. It is therefore key to explore the mobilisation of less explored instruments and mechanisms such as blended finance, development and climate funding and philanthropic capital. These sources are crucial to de-risk private sector investments by investing in phases, activities of interventions where ESCOs and investors cannot get a commercial return due to various market and policy gaps. These sources of funding could also be channelled to develop OBF programmes.

Establish an ASEAN supply-demand regional matching platform

The availability of ESCOs and finance specific for EE exist in mature ASEAN markets such as Singapore, Malaysia and Thailand. A regional matching platform could facilitate matching of skills and financial flows with projects in other ASEAN Member States.

Establish a coordinated network of regional ESCOs – either a new regional ESCO Association or repurposing existing initiatives to have an ASEAN focus

A coordinated network of regional ESCOs should be established. This could take the form of a new regional ESCO Association or a new platform within an existing initiative such as the Asia-Pacific ESCO Industry Alliance. This platform would enable knowledge sharing, the exchange of best practices, and joint advocacy for supportive policies, while fostering cross-border collaboration on energy efficiency projects. Complementing this effort, a supply-demand regional matching platform should be developed to connect ESCO.

Harmonise training programme curricula and ESCO certification standard across ASEAN to support regional cooperation and ESCO access to the region

AMS should harmonise training curricula and certification standards. Inconsistent qualifications across Member States hinder cross-border operations, talent mobility and economies of scale. A unified certification framework would build trust and ensure consistent technical competencies. Standardised training should cover energy auditing, performance contracting, and M&V practices. Mutual recognition of credentials would enable ESCOs to scale regionally and attract investment. It would also facilitate participation in cross-border EE projects and green financing schemes. Harmonisation strengthens market transparency, competitiveness, and workforce readiness. This alignment is key to accelerating EE adoption across ASEAN.

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