Energy

Energy Performance Contracts

a pathway to sustainable energy solution

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Table of contents

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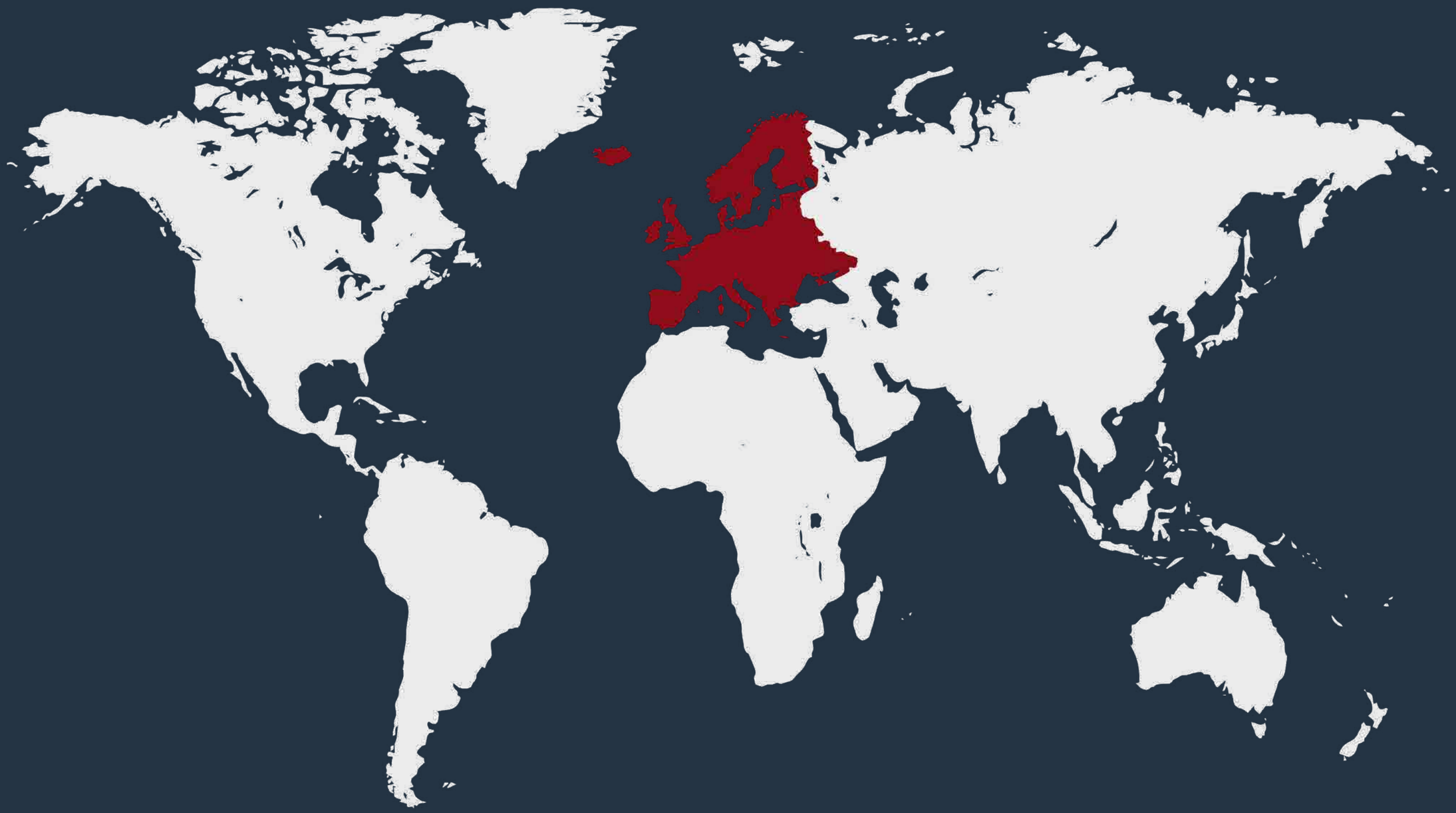
Introduction

During his speech at the United Nations Climate Change Conference (COP21) in Paris on December 1, 2015, Barack Obama quoted that «*The climate crisis is not a distant problem; it is happening right now*».
In the aftermath of this milestone, the European Union had set ambitious **energy targets**, aiming for a 20% reduction in overall energy consumption and 20% of final energy consumption from renewable sources by 2020. These targets though have increased to **30% and 27% by 2030**. In 2024, renewable energy sources (RES) continued to play a significant role in the European Union's energy landscape.

In the first half of 2024, renewables accounted for 50% of public electricity generation in the EU. These figures represent a substantial increase from 2023, when renewables contributed 24.5% to the EU's gross final energy consumption. Additionally, the transition to nearly Zero Energy Buildings (nZEB) requires a significant portion of buildings' energy to come from on-site or nearby renewable sources.

Turning to the present day, with President Trump withdrawing the United States from the Paris Agreement and pursuing a "drill, baby, drill" energy policy, the EU leadership in clean energy becomes even more crucial.
To address these challenges, **Energy Performance Contracting (EPC)** offers a solution by providing integrated services, including planning, financing, installation, and monitoring of RES systems.



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Europe

Dismantling the definition

Performance Contracting, also known as Energy Performance Contracting, is a cost-effective method used to reduce the operating costs and environmental impact of buildings. In this arrangement, an **Energy Services Company** takes full responsibility for upgrading a building's systems, which may include replacing boilers, improving insulation, updating cooling systems, and installing energy-efficient lighting and automation controls, as well as integrating renewable energy solutions.
As a matter of fact, it is an internationally recognized method for reducing operating costs and environmental impacts of buildings with minimal risk to property owners.
The ESCO assumes the performance risk by offering a long-term financial guarantee, ensuring that the projected savings in energy, water, and operational costs are realized and maintained over time. If the savings fall short, the ESCO compensates the building owner or adjusts its fees.

Subject and term of the EPC Agreement

The subject of EPC agreements typically involves the **implementation of energy-saving measures** in public sector projects. This can include thermo-modernization, street lighting, and energy management systems. The agreements outline the scope of work, including the development of project documentation, financing, execution of construction works, and installation of energy management systems and energy management.

EPC agreements are designed to **ensure that energy savings are achieved and maintained** over the contract term. This focus on guaranteed energy savings is crucial for the financial viability of the projects and aligns the interests of both the public entity and the **Energy Services Company** (ESCO).

EPC agreements are generally long-term contracts, often spanning several years. This extended duration allows for the implementation of energy-saving measures and the monitoring of their effectiveness over time.

Turn-Key Responsibility: The ESCO handles all aspects of the project, from initial energy audits and design to installation, commissioning, and ongoing performance measurement.

Performance Guarantee: The ESCO guarantees that the energy, water, and operational cost savings will meet projected levels. If the savings fall short, the ESCO compensates the building owner for the difference or adjusts its fees.

Measurement and Verification (M&V): Regular monitoring ensures that the promised savings are realized. If not, the ESCO must make adjustments to ensure savings are met over time.

In essence, performance contracting is a way for building owners to improve efficiency and reduce costs with no upfront investment, relying on the ESCO to guarantee the results.

Obligations of ESCOs and risk allocation

ESCOs are involved in the **entire lifecycle of the project**, from planning and obtaining necessary administrative decisions to executing construction works and maintaining the systems. They must also ensure that the project documentation is prepared according to **technical specifications and energy analysis**.

ESCOs are obligated to guarantee a certain level of energy savings, which is a fundamental aspect of EPC agreements. This guarantee is typically expressed in technical units and directly impacts their performance and remuneration.
The ESCO's payment is often tied to the actual energy savings achieved, motivating them to ensure that the savings are measurable and verifiable. If the guaranteed savings are not met, ESCOs may face contractual **penalties or reduced remuneration**.

ESCOs are expected to manage various risks connected to EPC projects. Most of the risk associated with the investment

stage lies with the ESCO, including construction risks and the risk of not achieving guaranteed energy savings.

In EPC contracts, the scope of activities and obligations of the ESCO in the management phase is usually included in a separate appendix to the agreement, which is referred to as energy management standards. At this stage, the ESCO is obliged to ensure the **functioning of the energy management system**, including, in particular, bearing the risk of obtaining guaranteed energy savings.

Role of public entity

The public entity is responsible for providing **access to facilities** and ensuring **cooperation** with the ESCO. The public entity shares the risk of not achieving guaranteed energy savings during the management stage.

Public entities play a crucial role in overseeing EPC projects, ensuring **compliance with contractual obligations** and monitoring energy savings. This authorization is correlated with the ESCO's obligation to report on the status of the project's implementation and its technical condition.

Financing of EPC projects

The innovative ESCO financing model allows modernisation projects to be undertaken without the need to engage own financial resources. The investment costs, in part or in full, can be repaid from the achieved and guaranteed (under the EPC contract) energy savings, through the visible difference in energy bills.

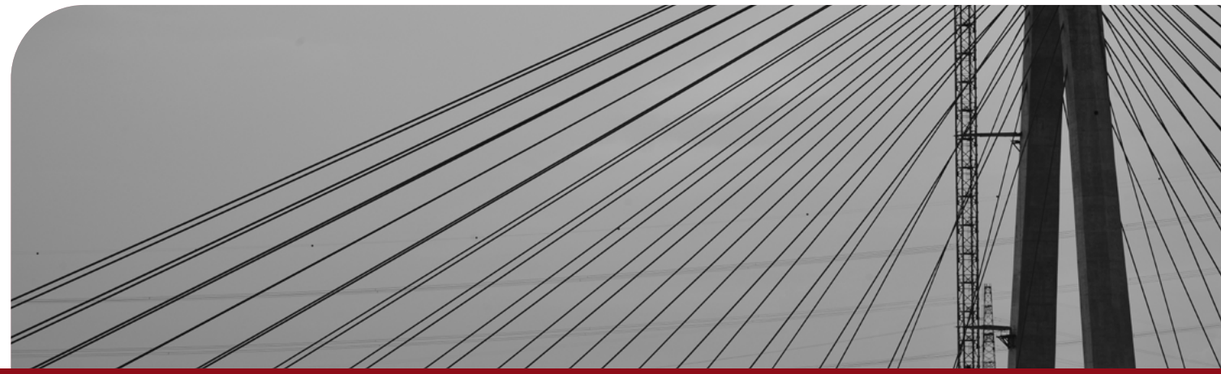
Public entities may also leverage grants or subsidies to support the initial investment, enhancing the project's financial feasibility. The service provider is generally responsible for financing the EPC project. This is because the majority of the risk of financing the project is transferred to the ESCO, provided that the liabilities of the EPC contract are classified as being outside the public debt.
In the case of financing from ESCO's own funds, which mainly concerns smaller and medium-sized EPC projects, there is no need to include specific provisions in this regard in the contract.

In a situation where the financing comes from external entities (e.g. investment funds, banks), the EPC contract should provide for a so-called financial closure, consisting in the ESCO's confirmation of the conclusion of relevant agreements (loan agreements, credit agreements).

A significant portion of the financing comes from the **savings generated by reduced energy consumption**. ESCOs provide upfront capital for the project, which is recouped through the energy savings achieved over the contract term. This **performance-based financing model** aligns the financial interests of both the ESCO and the public entity, incentivising ESCOs to maximise energy savings to recover their investment
EPC agreements may include provisions for adjusting remuneration based on changes in energy prices or consumption patterns. This ensures that the financial structure remains viable throughout the project lifecycle, accommodating fluctuations in energy costs and usage.

Remuneration for ESCOs is closely tied to the performance of the energy-saving measures implemented. Payments are generally made based on the actual energy savings achieved, with provisions for periodic adjustments to account for changes in energy prices or consumption patterns. This performance-based remuneration model ensures that ESCOs are incentivized to deliver on their promises of energy savings.

The remuneration structure is designed to cover investment costs and is subject to adjustments based on performance and macroeconomic indicators, such as inflation or construction price indices.



Legal framework and tax considerations: compliance with local and int.al regulations

Europe's clean energy transition has been accelerated by the **European Green Deal**, passed in 2019, which updated climate laws and set ambitious targets. The EU aims to reduce emissions by 55% by 2030 and achieve climate neutrality by 2050. Hundreds of regulations have been introduced across European countries to incentivize clean energy investment and reduce carbon pollution.

At the start of the Green Deal, renewables accounted for a third of Europe's electricity, while fossil fuels made up 39%. Today, **fossil fuel generation** has decreased to 29%, with wind and solar energy driving the shift. **Nuclear energy generation** has remained stable. Additionally, Russia's invasion of Ukraine led to skyrocketing gas prices, prompting European countries to seek cheaper, cleaner energy alternatives. Countries like Portugal, the Netherlands, and Estonia have seen the highest increases in clean power over the last five years.

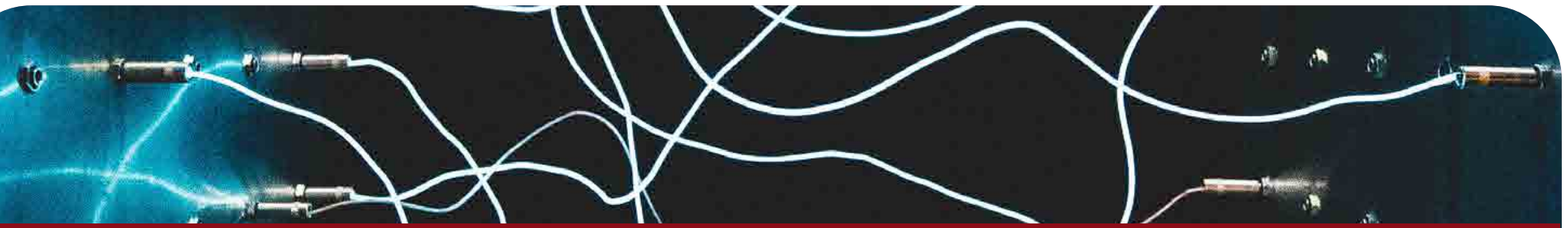
Energy companies must navigate both local and international regulations when engaging in EPC contracts to avoid significant business implications, such as delayed project timelines and increase costs.

European Union

In the European Union, EPC contracts are vital for meeting energy efficiency targets and supporting climate goals.

Key directives of the European Parliament and Council, such as Directive 2012/27/EU (replacing Directive 2006/32/EC), **encourages the use of EPCs** to assist businesses reduce energy consumption and CO2 emissions.

Financial tools like the European Fund for Strategic Investments and the European Investment Bank (EIB) support energy efficiency projects, especially in buildings and for small and medium-sized enterprises (SMEs).



Several **updated directives** also drive progress in this area.

- Directive (EU) 2018/2001 replaces Directive 2009/28/EC, introducing stricter renewable energy targets in line with the European Green Deal and 2030 Climate and Energy Framework.
- Directive (EU) 2018/844 updates Directive 2010/31/EU on building energy performance, aiming to improve energy efficiency and sustainable development in buildings.
- Directive (EU) 2021/1780 focuses on energy upgrades to reduce CO2 emissions and promote climate neutrality.
- Directive (EU) 2021/693 strengthens requirements for reducing energy consumption and greenhouse gas emissions in the construction sector.

These directives combine building renovation with the development of sustainable new projects to further EU energy. goals.

Case studies for EPC initiatives worldwide

Energy Performance Contracting case studies demonstrate how ESCOs help organizations improve energy efficiency while sharing financial risks.

For instance, the Empire State Building in **New York City** underwent an extensive EPC project, resulting in a 38% reduction in energy use and a corresponding decrease in carbon emissions. This project not only improved the building's environmental performance but also served as a model for other iconic structures seeking to enhance sustainability.
Another example is the City of **London** which retrofitted its public buildings, achieving a 30% reduction in energy consumption and saving £1.2 million annually.
At the University of **Iowa**, a $50 million EPC led to a 30% energy savings across campus, with the university saving $60 million over 20 years.
Additionally, the City of **Toronto** implemented a 20% energy savings across public infrastructure, saving $2 million annually with a seven-year payback period.

Ahold Delhaize in **The Netherlands** used an EPC to save 28% energy in one of its commercial buildings, cutting costs by €500,000 annually.
Similarly, the City of **Reno** in the USA used a $16 million EPC to retrofit 18 municipal buildings, saving 28% energy and $1.5 million annually, with the energy savings funding the project.

These examples highlight how EPCs enable energy improvements without upfront capital, ensuring long-term savings and sustainability.

Major challenges

Despite being used in Europe since the 1980s, performance contracting remains underdeveloped compared to the USA, facing several barriers:

- **Lack of Awareness**: Many European countries, with Germany as an exception, have low awareness of performance contracting in both the public and private sectors, which hinders market growth.
- **Lack of Policies and Support**: There is a lack of specific government policies and mechanisms to promote performance contracting and remove obstacles to successful projects.
- **Capacity Constraints**: Public and private building owners often lack the technical expertise to identify qualified ESCOs for performance contracts.
- **Lack of Common Definitions and Harmonized Processes**: Varying definitions and contract types across countries create confusion and uncertainty, despite the EU's Energy Services Directive attempting to standardize the market.
- **Prohibitive Public Procurement and Budget Rules**: Public authorities face limitations in using future energy savings to finance projects due to strict procurement and budget rules, which can prevent the adoption of performance contracting.
- **Financing Constraints**: Governments facing budget deficits and rising energy costs may not recognize the cost-saving potential of performance contracts, and financing institutions are reluctant to offer financing due to unfamiliarity with the model.

- **Market Failures**: In the private sector, efficiency improvements may raise property taxes or benefit tenants, reducing the incentive for building owners to invest in energy efficiency. Additionally, decision-makers often prioritize short-term returns over long-term performance contracts.

Prospective patterns and advancements

Despite current barriers, several factors suggest that performance contracting in Europe is set to gain momentum.

- **Policy developments**, such as the EU-funded European Local Energy Assistance (ELENA) facility, and initiatives in countries like France and Germany, are promoting energy efficiency projects and increasing the visibility of performance contracting.
- The **EU banking sector** is also recognizing it as a viable financing option. Additionally, international trends in countries like the USA, China, and Brazil highlight the growing global interest in performance contracting as a tool for economic growth and resource conservation. With continued support from EU leaders, performance contracting is poised to play a significant role in Europe's energy transition.
- **Industry stakeholders and policymakers must collaborate** to raise awareness and create a consistent EPC framework at local, regional, national, and EU levels. Existing global EPC standards, such as Eurocontract, can serve as a starting point but should be refined by incorporating the best practices from other regions. Balancing the interests and risks of building owners, ESCOs, and financiers is key to success. Lessons from markets in the United States, Canada, and Germany show that these challenges can be managed effectively. A practical first step would be to agree on a common EPC definition across the EU that covers turnkey project responsibility, performance risk, measurement and verification, and a comprehensive set of energy and cost-saving measures.
- **Legal frameworks** are also evolving to promote sustainability in EPC projects, with stricter environmental regulations, such as requirements for Environmental Impact Assessments (EIAs) and increased sustainability reporting, including binding CO2 reduction targets and energy

efficiency measures, is driving political support for green policies, creating a favorable environment for performance contracting.

- **Digital tools, data analytics, and AI technologies** are revolutionizing Energy Performance Contracting projects by enhancing performance, mitigating risks, and providing a competitive edge. AI technologies, such as machine learning, image recognition, and natural language processing, are improving design efficiency, optimizing scheduling, enhancing bid evaluations, reducing labor costs, and enabling real-time project monitoring, with the global AI market expected to reach USD 4.51 billion by 2026.Cloud-based systems enable proactive interventions, and technologies like Building Information Modeling (BIM) and IoT enhance collaboration and real-time monitoring. Legal standards like ISO 9001 and ISO 45001 are also evolving to improve risk allocation and clarity in contracts. EPC projects must adapt to stricter environmental laws, with sustainability prioritized through certifications like BREEAM and LEED, and the integration of energy-efficient designs and renewable technologies.

In summary, the future of EPC projects will be shaped by technological advancements, evolving legal frameworks, and an increased focus on sustainability.

Conclusion: path to a sustainability or a dystopian distraction?

As EPC will be further established in the market, as a mainstream project implementation mechanism over the next years, more data from EPC projects in the tertiary sector will become available.
These data can help to further fine tune the benchmark ratings of EPC projects and increase the trustworthiness and credibility of the methodology for project developers and financial institutions.
It remains to be seen whether the flourishing period of the energy industry is a reality with tangible changes in the global energy and business landscape, or merely a utopian diversion from the economic confusion and rapid political developments, both in the energy market and in society itself.

At the end of the day, we are talking about an effort to reverse the terms of the environmental crisis for a more sustainable viability of the planet we live in because what will we have left to build on if we lose our global home, and where will our creations stand if there is no soil to support them?

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Croatia

EPC in Croatia

In line with other European countries, Croatia is also implementing energy efficiency measures. Pursuant to the Energy development strategy of the Republic of Croatia until 2030, with a view to 2050, energy efficiency policy is based on raising public awareness of energy sustainability which depends on rational energy consumption, while increasing energy efficiency is the most important mechanism for reducing energy consumption and one of the fundamental principles of the energy transition.

Regulatory framework

National legislation in the field of energy efficiency includes several laws within the competence of several ministries, and its implementation is within the competence of several institutions. The basic law transposing the Energy Efficiency Directive is the Energy Efficiency Act. It regulates the field of efficient energy use, the adoption of plans at local, regional and national level to improve energy efficiency and its implementation. In terms of the public building renovation, basic laws that regulate energy renovation are the Energy Efficiency Act and the Building Act. Ordinances and technical regulations that more closely define requirements and details of implementation follow from the said laws. At the time of contracting and payment of the renovation of public buildings, the legislative framework is also governed by the Public Procurement Act, Act on Value Added Tax, and similar legislation. Thus, a complete legislative framework that makes energy renovation of public buildings on the basis of various implementation-financial models possible, was created.

The State Agency for Real Estate Transactions (APN) conducts the procurement procedure for the energy service in the building sector on behalf and for the account of budgetary and extra-budgetary users of the state budget of the Croatia in accordance with the Public Sector Building Energy Renovation Program. In relation to Energy Performance Contracting (EPC) APN highlights the following:

- ESCO assumes most of the risks: financing risk, construction risk (design and execution of works) and availability risk (maintenance) of the implemented energy efficiency measures.

- ESCO invests its own funds in the implementation of the measures, and the Client (User) pays for the delivered energy savings as a fee for the energy service.
- EPC assets that are not separable from the building are, in accordance with the regulations governing ownership, the property of the owner of the entire building.
- ESCO invests, designs, executes and maintains the energy efficiency measures on the building and is the economic owner of the EPC assets during the contractual period. The economic owner is the party that bears most of the risks and is entitled to most of the rewards associated with that asset.

Financing

The financing of energy service providers did not come to life in full, and the problem lies in three key areas: financing by credit institutions, developed models are not applicable to the use of subsidies from ESI funds, calculation of the intensity of support. Banks in the Republic of Croatia do not show sufficient interest in financing projects according to the principle of contracting energy performance and there are several reasons for their position: credit unworthiness of a large number of potential energy service providers, an insufficient amount of guarantees and high cost of capital in the Republic of Croatia.

Tax and accounting rules

EPC in the Republic of Croatia is subject to a tax regulatory framework that is relatively underdeveloped and not specifically tailored to such models, requiring careful interpretation and alignment with existing tax and accounting rules.

Value-Added Tax (VAT): In Croatia, the standard VAT rate is **25%**, with reduced rates of **13%**, **5%**, and **0%** applicable in specific cases. A **0% VAT** rate applies to the **supply and installation of solar panels** on private residential buildings, premises predominantly used for housing (more than 50%), and public or other buildings predominantly used for activities of public interest, as well as in the vicinity of such structures (Article 38(6) VAT Act and Article 47(3) VAT Rulebook).

In all other cases, the **supply and installation of solar**

panels is subject to **25% VAT**, or to **domestic reverse charge** if applicable. The **13% VAT rate** applies to the **supply of electricity** to another supplier or to the final consumer. The **reduced VAT rate does not apply** to the **supply of solar panels without installation** (i.e. as commercial goods). In such cases, including accompanying equipment, the standard **25% VAT** rate applies.

(Corporate Income Tax (CIT)) - Under the corporate income tax (CIT) system in the Republic of Croatia, **there are no specific tax incentives or exemptions directly related to EPC projects**.

The general CIT framework applies as follows:

- The **standard CIT rate is 18%**, while a reduced rate of **10%** applies to taxpayers with annual revenues up to EUR 1 million
- **Tax-deductibility of costs**: Expenses related to EPC projects (e.g. design, equipment procurement, installation, maintenance) are **tax-deductible** if they are incurred for the purpose of generating taxable income and properly documented
- **No targeted tax relief** exists for energy efficiency investments unless they qualify under other schemes, such as: research and development (R&D) tax incentives, which may apply if the project involves innovative or technological components

The **timing of expense recognition** (e.g. capital vs. operating expenditure) should follow accounting standards and be aligned with the nature of the EPC agreement.

Under Article 5(1) of the Corporate Income Tax Act, the tax base is defined as accounting profit, adjusted by items specified in the Act. This means that:

- Taxable profit is determined based on accounting standards (IFRS or Croatian Financial Reporting Standards – CFRS)
- For construction-type contracts (such as EPC), CFRS 15 applies.

Accounting and tax treatment depends on the definition of the investor

A key challenge in the implementation of EPC models in Croatia lies in the differing interpretations by competent institutions regarding the accounting and tax treatment of EPC. The fundamental issue is the determination of who qualifies as the investor (i.e. the economic owner) in the EPC arrangement. According to accounting rules, the investor is the party who expects to derive economic benefit from the use of the asset over its life cycle and who bears the investment risk. This classification directly impacts: recognition of assets, timing of income and expense recognition, and calculation of tax obligations.

Revenue recognition in EPC contracts

According to CFRS 15 – Income, the method of income recognition depends on whether the outcome of the construction contract can be reliably estimated:

- if the outcome can be reliably estimated revenue and expenses are recognised based on the stage of completion during the accounting period
- if the outcome cannot be reliably estimated revenue is recognised up to the amount of costs incurred, and all contract costs are recorded as expenses in the period in which they occur

As a result, income for tax purposes is recognised either progressively (percentage of completion) or limited to the amount of costs, depending on the accounting certainty of the contract.

Tax Treatment Depends on the Investor.
If the ESCO (energy service provider) is the investor:

- It bears the investment cost and recognises the asset.
- Income arises only upon delivery of the service, i.e. through achieved energy savings.
- VAT is charged and income recognised when savings are invoiced.
- Investment costs are tax-deductible, and the provider may claim input VAT refund.

If the contracting authority is the investor:

- The ESCO must issue an invoice for the entire future remuneration upfront, including VAT.
- Although the full amount may be invoiced upfront, the ESCO is required to defer revenue recognition and recognise income progressively over the contract period, in accordance with the stage of completion and applicable accounting standards. As a result, corporate income tax is calculated based on the revenue recognised in each accounting period.
- The arrangement may be interpreted as a commodity loan, potentially requiring interest calculation.
- It also raises concerns under the Public Procurement Act, as this could be seen as loan financing without proper procurement procedures.

Practical implications for EPC models

Precise **contract structuring** and **role definition** are crucial

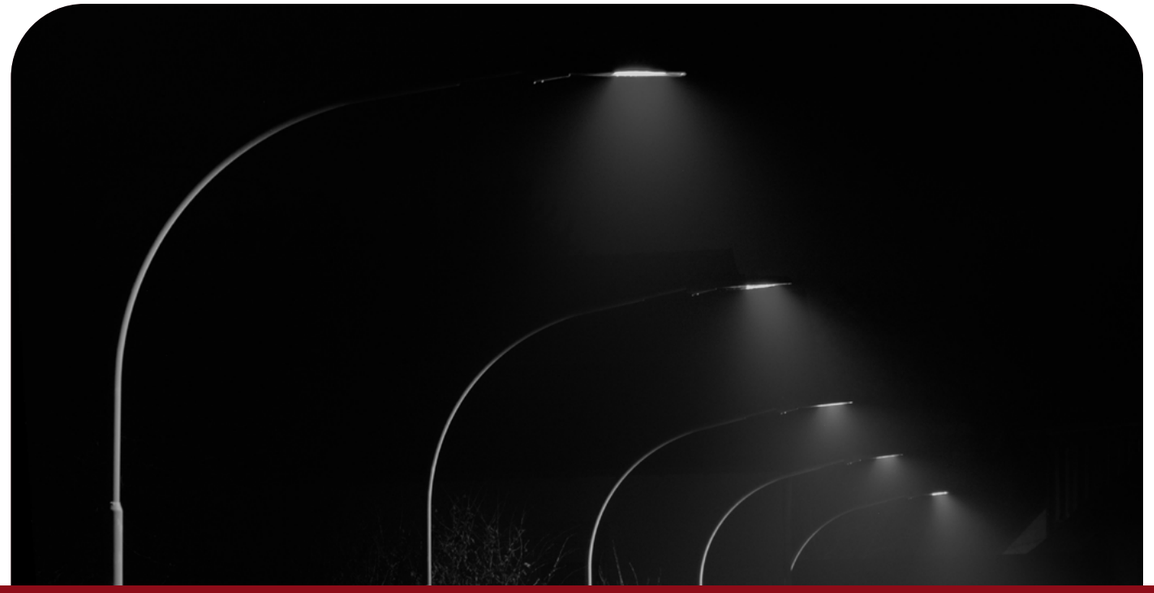
The position of the **economic owner** (investor) defines tax and accounting consequences

Misclassification can lead to **incorrect tax base calculation**, **VAT errors**, or **violations of public procurement rules**

Examples of good practice

In recent years, the ESCO model has once again been increasingly applied in public sector buildings, with Croatia successfully implementing it in large-scale public buildings, such as hospitals, universities, etc.

i. **Energy renovation of the General Hospital of Šibenik-Knin County** – This project, worth EUR 6,8 million, resulted in a reduction of annual energy consumption from EUR 584,000 to under EUR 279,000
ii. **Energy renovation of the University Hospital Centre Split – Križine** – the project was implemented under the ESCO model, with 35% co-financing from the Environmental Protection and Energy Efficiency Fund, while the remaining amount was provided by the investor. This is one of the best examples in practice, where three types of measures were performed (integral renovation, lighting, and the installation of a solar thermal system). The renovation resulted in 9,944,244 kWh of savings, which is equivalent of 2,684 CO2 and EUR 9,2 million in launched investments
iii. **University North** – Two buildings at University North have undergone energy renovation, resulting in annual savings of EUR 20,000, almost a 50 percent reduction compared with the pre-renovation baseline
iv. **City of Vrbovec** – The City refurbished its entire street lighting system to LED technology using EPC, resulting in electricity cost savings of EUR 90,700/year



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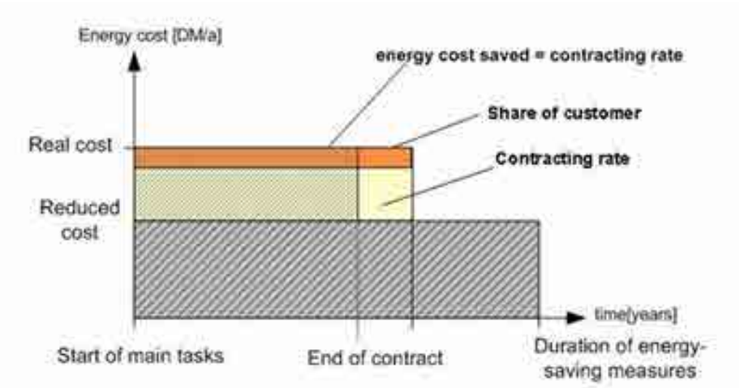
Greece

EPC in Greece

In Greece, national regulations mandate that new or refurbished buildings must meet at least 60% of their Domestic Hot Water (DHW) needs through solar thermal systems or other renewable energy systems. However, challenges such as economic stagnation and low investor confidence are hindering investments in RES applications in buildings. EPC's agreements are primarily driven by EU-funded programs and national resources dedicated to energy efficiency, such as the National Strategic Reference Framework (ESPA).

The legal and regulatory framework as well as the tax considerations for EPCs Contractors in Greece are:

- **Value-Added Tax (VAT)**: The standard VAT rate is 24% under Law 2859/2000, as amended by Law 5144/2024, applying to goods and services in engineering, procurement, and construction. However, reduced VAT rates or exemptions may apply to energy-efficient and renewable energy projects that align with EU sustainability directives.
- **Corporate Income Tax (CIT)** – Under Law 4172/2013, as amended by Law 5178/2025, Greece's corporate income tax (CIT) rate is set at 22% for most businesses, including those involved in EPC projects. The law provides guidelines for calculating taxable income, deductions, and allowances, particularly for energy efficiency and renewable energy investments. It also addresses withholding taxes for payments made to foreign contractors, with rates varying based on the nature of the services and tax treaties between Greece and the contractor's home country. The law is periodically updated to align with EU climate goals and global tax standards, supporting international investment in EPC projects.
- **Energy Efficiency Tax Incentives** – Law 4342/2015 as amended by Law 5164/2024 which focuses on energy efficiency in buildings, includes provisions for tax incentives for energy renovation projects. This law aligns with EU directives and offers incentives for public and private investments in energy-efficient technologies and renewable energy systems. EPC contracts related to energy-saving or energy-producing projects may qualify for tax credits, subsidies, or exemptions.
- Tax depreciation and capital allowances- Law 2238/1994, as amended by Law 2238/2018, allows for accelerated depreciation on energy-efficient or renewable energy systems in EPC contracts, enabling companies to depreciate costs faster and reduce taxable income in the early years of a project. The law has been updated to encourage investment in sustainable technologies and align with EU climate objectives, benefiting large-scale EPC projects in energy infrastructure.
- Development of renewable energy sources (RES)-Law 4843/2021 as amended by Law 5167/2024 addresses the improvement of energy efficiency in Greece, as well as measures related to the energy transition in line with national and European frameworks. It includes various provisions aimed at enhancing the integration of renewable energy, energy upgrades, and diversifying energy sources in Greece.
- Energy Taxation and Carbon Taxes – Laws 4336/2015 and 4414/2016 align with EU directives to reduce carbon emissions and promote energy efficiency. These laws are applicable to EPC contracts, especially for renewable energy projects, offering tax credits and penalties related to carbon emissions. They have been updated to strengthen carbon pricing mechanisms like carbon taxes and emissions trading systems (ETS), providing clearer guidance on energy taxation. These updates, amended by Law 5151/2024, support Greece's commitment to the EU's Green Deal and sustainability goals.



Case studies

While EPC has been successful in countries like Germany and Sweden, it is still in the early stages in southern European countries like Greece. The EPC market in Greece is still developing, with an estimated 70-100 EPC projects, most of which are pilot projects in schools, healthcare facilities, hotels, and some industrial applications. The energy efficiency measures were aimed at achieving the EU's target of a 9% reduction in energy consumption by 2020, while also focusing on improving infrastructure, enhancing energy services, and creating financing mechanisms to support energy efficiency.

METLEN Energy & Metals has secured three EPC contracts for energy storage projects in Chile, focusing on renewable energy. The projects, which include photovoltaic installation and significant energy storage capacity, are set to be completed by Q1 2026. These agreements strengthen METLEN's position as a leading EPC contractor in renewable energy and storage solutions, while supporting Chile's energy transition and METLEN's goal of achieving a 30% market share in the energy storage sector.

Some case studies include:

- **Athens City Hall**: Athens sets a strong example for Europe with its practical and ambitious approach to equitable energy transitions. Drawing from EU-funded projects like POWERPOOR, ASSERT, and the Athens Pilot Cities Program (ASCEND), the city is developing a replicable, evidence-based framework to combat energy poverty through community-driven solutions. By combining local action with European collaboration, Athens demonstrates how cities can lead impactful, scalable change. Its efforts highlight the potential for bold, thoughtful policies to create a more sustainable future for all.
- **Municipality of Thessaloniki**: Several public buildings were retrofitted with energy-efficient HVAC systems, lighting, and smart energy management, reducing energy consumption and costs.
- **The Ministry of Environment and Energy** has launched five programs totaling over €250 million for the energy upgrade of various facilities such as kindergartens, primary schools, municipal childcare centers, Municipal Water and Sewerage Enterprises (DEYAs), mountain tourism accommodations, and other businesses.
- **Greek Public Buildings – National Energy Efficiency Program**: Various public buildings, including government offices and healthcare facilities, underwent EPC upgrades funded through anticipated energy savings.
- **Athens Metro**: The Athens Metro upgraded its lighting, HVAC systems, and train systems through an EPC, leading to energy savings that repaid the initial investment, while reducing operational costs and carbon emissions.

These projects showcase the potential of EPC in overcoming capital barriers and contributing to Greece's energy transition and sustainability goals.

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Hungary

Legal Framework

In Hungary, the legal framework governing Energy Performance Contracts (EPCs) is primarily established by Act LVII of 2015 on Energy Efficiency (EE Act), which provides a solid foundation for promoting energy efficiency.

According to the EE Act, an energy performance contract (EPC), is an agreement between the energy consumer and the energy efficiency service provider. Such agreements are subject to continuous monitoring and verification throughout their duration. The service provider's compensation is linked to a contractually agreed level of energy efficiency improvement or other energy efficiency indicators.
This structure offers significant potential to accelerate the implementation of energy efficiency measures and investments.

Main advantage of EPCs

A major advantage of the EPC model lies in the comprehensive role undertaken by Energy Service Companies (ESCOs), which often cover the entire project cycle, from planning and implementation to operation and maintenance.
In many cases, ESCOs also assume responsibility for financing the investment. The investment costs are repaid from the guaranteed or actually achieved energy savings.
This model enables the implementation of developments with no significant own capital required from the client, as the ESCO assumes the investment and performance risk.

Public sector

In Hungary, the public sector is the main client base for EPCs. The structure is particularly well-suited for enabling public institutions to implement energy efficiency improvements without increasing the public budget deficit, provided that the investments remain the property of the energy service provider and the assets are accounted for in the provider's balance sheet, with a significant share of the associated risks and performance responsibilities also borne by the provider.
In this regard, long-term EPC-based collaborations can also be considered a form of public-private partnership (PPP).
For public institutions, the EE Act stipulates specific regulatory requirements, including the obligation to formalize EPC agreements in writing and to include a set of minimum contractual elements.

Private sector

A promising financing mechanism in the private sector is on-bill financing, where the energy service provider finances the development, and the consumer repays through their utility bill. Although the introduction of this model in Hungary had previously been constrained by legal limitations, a significant legislative amendment in the summer of 2023—specifically, a revision of the 2013 Utility Billing Act—has created a legal pathway for service providers to include the costs of products or services directly in utility billing statements.
This amendment creates a legal possibility for invoicing fees associated with ESCO-type services on the utility bill as well. This development could open new avenues for financing energy efficiency projects, including in the residential sector.

Challenges

The development of the Hungarian EPC market faces numerous challenges, such as long payback periods due to artificially low energy prices, lack of market incentives, or specific obstacles (e.g., difficulty in decision-making in multi-apartment buildings, lack of experts, low demand for renovations, split incentives between owner and tenant).
Nevertheless, favorable changes in the legal environment are expected to create new opportunities for future development. There are solid examples, such as the case of the Vackor kindergarten project by the Municipality of Budapest District XVIII, which highlighted the complexity and need for specialized expertise, providing valuable experience for future projects.

Conclusion

In summary, Hungary possesses the necessary legal and institutional frameworks for achieving energy efficiency targets. The EPC and ESCO frameworks provide adaptable and effective mechanisms for addressing financing and risk-related challenges. To date, the public sector dominates demand. Nonetheless, a tangible increase in demand from the private sector is expected. Although challenges remain, the recent legal amendments provide favorable prospects for the wider adoption of energy efficiency investments and related financing models, contributing to building a more sustainable energy system in Hungary.

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Italy

EPC in Italy

The EPC contract made its debut in the Italian legal system with Directive 2006/32/EC, implemented by Legislative Decree No. 115 of May 30, 2008, and later included, with some amendments, in the Legislative Decree No. 102 of July 4, 2014 (the "**Legislative Decree 102**"), which provides its actual definition.

Although EPCs are considered as atypical contracts in the Italian legal system (as they lack detailed legislative regulation), Article 2, paragraph 1, letter n) of Legislative Decree 102 provides a comprehensive definition, according to which the EPC is an agreement between the beneficiary and the provider concerning measures to improve energy efficiency, where payments, in return for the investments made, are proportional to the level of energy efficiency achieved.

Notwithstanding the various forms an EPC can be structured (e.g., guaranteed savings, first-in first-out, or tripartite structures involving potential financiers), Annex 8 of Legislative Decree 102 outlines the content and minimum clauses that an EPC must include which, *inter alia*, are:

1. a precise list of efficiency measures to be applied and/or the expected results in terms of energy efficiency
2. the guaranteed savings resulting from the implementation of the measures provided in the contract
3. duration and key aspects of the contract
4. a list of obligations for all the parties
5. deadlines for assessment of the savings achieved
6. timing of the implementation phases of the measures and a possible list of inherent costs
7. provisions regarding of any changes made during the process
8. clear indication of the financial implications of the project and the interest of both parties in the savings achieved (e.g., remuneration)
9. specific provisions for the quantification and verification of the guaranteed savings obtained
10. quality controls and guarantees
11. provisions regarding the amendment of certain conditions that may affect the results (e.g., changes in energy prices)
12. detailed obligations of each party and remedies in case of failure to perform.

As mentioned in previous sections regarding also other jurisdictions, companies that adopt this contractual model — carrying out works in order to increase energy efficiency or reducing primary energy consumption — are identified by the acronym ESCo, which stands for Energy Service Company.

ESCOs entered in the Italian legal system with the Legislative Decree No. 115/2008, which implemented Directive 2006/32/EC on energy services. Specifically, Article 2, paragraph 1, letter i), of Legislative Decree No. 115/2008 defines ESCOs as natural or legal entity that provide energy services or other measures to improve energy efficiency in the premises of the client. The same provision clarifies that such entities "accept a certain degree of financial risk" since "payment for the services provided is based, wholly or partly, on the improvement in energy efficiency achieved and on the fulfilment of other performance criteria."

Public sector

EPC contracts are becoming an increasingly widespread tool in the public sector in Italy. Recent applications in the public sector have contributed to energy efficiency renovation projects.

- **School buildings in Milan**: One of the most significant examples comes from the Municipality of Milan, that launched an ambitious energy efficiency project involving over 100 school buildings. The interventions included thermal insulation, replacement of windows, modernization of heating systems, and installation of LED lighting. The EPC contract guarantees energy savings of 30–40%, with both economic and environmental benefits.
- **Healthcare sector - Padua Hospital:** The healthcare sector has also embraced the EPC model. The Padua Hospital Authority implemented an energy efficiency project across several hospital pavilions. The interventions included the installation of high-efficiency cogeneration systems, energy monitoring systems, and modernization of HVAC systems. The estimated energy savings exceed 35%, with the investment fully covered by the ESCO.
- **Ministry of defense**: The Ministry of Defense has also adopted the EPC model for the energy renovation of military bases in Piedmont and Lazio Regions. The interventions included the installation of photovoltaic solar panels, building insulation and the adoption of intelligent energy consumption management systems.

Private sector

Among the examples of EPC contract applications in the private sector, a notable case is the recent signing of an EPC contract between Plenitude — a company wholly owned by ENI S.p.A. and active in the renewable energy industry — and Marelli — a multinational company operating in the automotive components industry. The contract involves the construction of three photovoltaic plants located at production sites in Melfi (Potenza), Sulmona (L'Aquila), and Turin, with a total installed capacity of 5.4 MWp. These plants will be built under the EPC

(Energy Performance Contract) model, allowing Marelli to obtain energy from renewable sources at a fixed cost, without any initial investment.

2024 Italian Budget Law and exemption from technical verifications

With reference to the Law no. 207 of 30 December 2024 (the 2024 Italian Budget Law), an additional simplification measure has been introduced regarding investment projects carried out through ESCOs.
Specifically, if a company making the eligible investments enters into an EPC, in which the minimum savings target is equal to 3% for the production structure and 5% for the relevant processes, the reduction in consumption is automatically recognized, without the requirement to carry out any specific technical assessment.

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Poland

EPC in Poland

EPC agreements in Poland are designed to improve energy efficiency in public sector projects by engaging ESCOs to implement energy-saving measures. These agreements are structured to ensure that energy savings are achieved and maintained over a specified period. The primary goal is to **reduce energy consumption and costs**, thereby improving the overall **energy performance of public buildings** and infrastructure, expressing the effect not in money, but in technical units - most often in the form of a reduction in the amount of energy consumed.

EPC projects typically involve multiple stages, including the investment stage, where ESCOs undertake design and construction work, and the management stage, which involves ongoing energy management services. This structured approach allows for comprehensive project implementation and the achievement of guaranteed energy savings. The EPC projects assume **no impact on a public debt** providing proper distribution of risk between the parties.

Legal Framework

The legal framework for EPC agreements in Poland is primarily governed by the **Energy Efficiency Act (20 May 2016)** which obliges the entities from the public sector to implement public tasks using energy efficiency improvement measures. The essential terms of cooperation within the EPC agreement are defined by the provisions of the Public Procurement Law (11 September 2019) and the Public-Private Partnership (PPP) Act (19 December 2008). Regulation on risks (22 December 2021) provides for detailed types and scope of risks under the EPC projects.

The Ministry of Climate and Environment has issued **Guidelines** for Energy Performance Contracting. This document provides a comprehensive guide to carrying out EPC project in public sector at all stages based on national and international experiences and ready-to-sign templates of EPC agreements and contractual clauses for different types of projects including for projects of worth expenditure investment of ca. 6 million euros and hybrid projects - co-financed from EU funds.
The Ministry also published a **list of ESCOs** on the Polish market

which is publicly available and updated every 6 months. Also, there is available a **database of ESCO projects** depicting, among other thing, project description, sector, investment value and annual energy savings.

Conclusion

By focusing on guaranteed energy savings and adopting a performance-based remuneration model, EPC agreements offer a sustainable approach to energy management, benefiting both the public entity and the ESCO. As Poland continues to prioritize energy efficiency, EPC agreements will play an increasingly important role in achieving the country's energy goals.

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Portugal

EPC in Portugal

Across Europe, Energy Performance Contracts (EPCs) have evolved as a critical tool to promote energy efficiency and reduce operational costs. While in countries like Spain, the Netherlands, and Germany, EPCs are seen in both the public and private sectors, in others — such as Portugal — EPCs are restricted to the public sector.

In Portugal, EPCs are named Energy Efficiency Management Contracts ("Contratos de Gestão de Eficiência Energética") and aim to reduce the public administration's energy consumption and carbon footprint by outsourcing the implementation of energy efficiency measures to Energy Service Companies (ESCOs), which are remunerated based on verified energy savings.

Legal Framework

Pursuant to Decree-Law no. 50/2021, dated of 15 June 2021, which governs EPCs, the State and other public entities are required to implement measures to improve energy efficiency in public buildings and equipment used for public services.

Such measures include inter alia the installation of self-consumption generation units based on renewable energy sources. Among the key components of the applicable legal framework, particular attention should be paid to the following aspects:

Pre contractual procedure: in Portugal, the execution of EPCs is preceded by a restricted procedure with prior qualification or a negotiated procedure, in accordance with the Portuguese Public Contracts Code. ESCOs are required to carry out — at their own expense — an energy audit of the target facility, with a view to establish the baseline scenario and identify potential energy savings for the purposes of the technical proposal.

Key contractual requirements: Portuguese EPCs shall include a set of mandatory provisions to ensure legal certainty, performance accountability, and continuity of service throughout the contract's term. These include: (i) a minimum duration of 15 years; (ii) defined performance metrics; (iii) clear monitoring schedules, allowing for regular assessment of energy savings; (iv) contractual remedies for underperformance, including penalties or adjustment mechanisms; and (v) the terms governing the transfer of all equipment to the public entity at the end of the contract of ESCOs.

Rights and obligations of ESCOs under EPCs: They key rights of ESCOs under the EPCs include: (i) the right to exploit energy savings under the contract and throughout its term; (ii) the right to receive the contractual price, based on verified energy savings; (iii) the right to access and use public infrastructure, when necessary. A particularly noteworthy feature: if electricity generated by the self-consumption generation units exceeds consumption, the ESCO may store or sell the surplus to third parties, applying the profit-sharing terms defined in the contract.

In return, ESCOs are bound by the following obligations, among others: (i) bearing substantial operational and financial risk, especially if projected savings are not achieved; (ii) financing all investment and implementation costs upfront; (iii) obtaining all licenses, certificates, credentials and permits required for the purposes of the performance of the activities under the scope of the contract; and (iv) maintaining the installed equipment during the contract term.

Which entities can qualify as ESCOs?

The criteria to be used to determine whether a company may qualify as an ESCO and therefore become eligible to enter into EPCs are set out in the ESCOs Qualification System Regulation, approved by Order no. 6227/2022, dated of 6 May 2022.

The ESCO Qualification System is managed by the General-Directorate of Energy and Geology (DGEG) and aims to ensure that the EPC market remains restricted to entities with proven technical competence and financial robustness. The DGEG is required to maintain an updated registry of existing qualified ESCOs, made available to the public in its official website.

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Spain

EPC in Spain

In Spain, Energy Performance Contracts—known locally as *Contratos de Rendimiento Energético* (CRE)—are a key mechanism for improving energy efficiency in both public and private sectors. Under this model, certified ESCOs —*Empresas de Servicios Energéticos* in Spain (ESEs)—implement energy-saving measures with no upfront investment from the client; including the repayment of the costs over time through guaranteed savings.

The regulatory framework is based on EU Directive 2012/27/EU on energy efficiency, transposed into Spanish law through instruments such as Law 18/2014 and Royal Decree 56/2016. These regulate energy audits, ESEs accreditation, and project implementation standards.

Key sectors and applications

CREs are widely used across various sectors in Spain, recognized as one of the main countries leading the Green Transition in Europe.

The main sectors engaged on EPCs subscription are the followings:

Service Sector: with high energy consumption and often low profit margins, service sector organizations rely on CREs to reduce operational costs and improve competitiveness

Industrial Sector: As major energy consumers, industrial companies use CREs to accelerate energy efficiency projects, access financing solutions, and leverage the expertise of ESCOs

These contracts often finance asset modernization and include integrated operation and maintenance (O&M) services, allowing organizations to focus on their core activities while delegating technical operations to experts.

Regulatory requirements

CREs in Spain must meet minimum standards to ensure transparency, risk sharing, and measurable outcomes:

- Costs must correlate with Energy-Saving Measures (MAEs) tailored to user's needs
- The contract must provide a framework for risk mitigation and sharing, both technically and economically
- Adequate information must be provided to support credit approval procedures by financial institutions
- Energy savings must be measurable and linked to specific performance indicators
- Additional goals may include emissions' reduction, safety improvements, or cost optimization.

Examples of CRE application in Spain

CREs have been widely adopted in a variety of sectors and building types, including:

- **Administrative and Public Office Buildings**: Ministries, regional government offices, municipal buildings, and public agencies. The Public Administration has set the objective of annually rehabilitating at least 3% of the total area occupied by its facilities.
- **Educational Centers**: Public schools and universities (such as University of Zaragoza or the Universidad Autónoma of Madrid).
- **Museums and Cultural Centers**: Enhancing climate control and lighting, as the Museu d'Art Contemporani de Barcelona.
- **Healthcare Facilities**: Hospitals modernizing heating, lighting, and control systems (such as Hospital Universitario La Paz or Hospital Clínico San Carlos).
- **Sports Facilities**: Municipal sports centers and swimming pools.
- **Elderly Care Homes**: Upgrading boilers and automating energy management.

Advantage of CRE implementation

1. **Reduction of energy costs**: Significant energy savings translate into lower operational expenses.
2. **Enhanced sustainability:** EPCs contribute to the reduction of greenhouse gas emissions and support the transition to a low-carbon economy.
3. **No upfront investment**: Energy efficiency improvements are financed through the savings achieved, eliminating the need for initial capital expenditure.
4. **Guaranteed results**: ESCOs guarantee energy savings, reducing financial and technical risk for the client.
5. **Compliance with energy saving obligations:** Pursuant to Law 18/2014, electricity and natural gas suppliers and wholesale operators of liquefied petroleum gas and petroleum products shall contribute to the National Fund for Energy Efficiency with cash payments based on their annual sales. A large part of this financial contribution can be replaced by obtaining and liquidating energy savings certificates (CAEs). Liquidating CAEs is significantly less costly than assuming the equivalent cash payment obligations. CREs are an adequate mean to obtain CAEs.

Conclusion

Spain has developed a robust legal framework for EPCs, closely aligned with European directives but tailored to address specific national challenges.

Spanish regulations emphasize transparency and legal certainty, particularly in public sector contracts, which is crucial given the country's historical focus on public administration modernization. This legal clarity provides additional security for both public and private entities engaging in EPCs, reducing perceived risks and facilitating broader adoption.

These elements collectively position Spain as a reference point in the implementation of EPCs within the European context.

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Royal Decree-Law 6/2010, of 9 April, on measures to promote economic recovery and employment;

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The Netherlands

Background

The Netherlands is dedicated to becoming an energy-neutral country, keeping future generations in mind. For the scope of this article we take into account the EPC's in the fields of CO2, nitrogen and sustainable heat options.

This ambition requires a new approach to contracting, through the use of EPCs. Already in September 2013, more than 40 market participants and other stakeholders agreed upon the Energy Agreement for the Netherlands, which aligned with the EPBD. Since then, regulations regarding sustainability across several sectors have been tightened — a process that continues today.

By **2030**, at least **80% of building projects** by the Central Government Real Estate Agency (RVB) must be completely or almost completely emission-free, as stated in the Clean and Emission-Free Construction Covenant. This often leads to higher costs for builders and engineers, which must be financed — a challenge in itself. In tenders, organizations such as the RVB will now consider **sustainability criteria** when awarding contracts, rather than simply opting for the lowest price.

Traditional Tender vs EPCs

Energy Performance Contracting and traditional tendering processes aim for different outcomes. While EPCs are based on building and executing business cases, traditional tenders typically aim for the best economic performance of a project. The **differences between the two approaches** are outlined below.

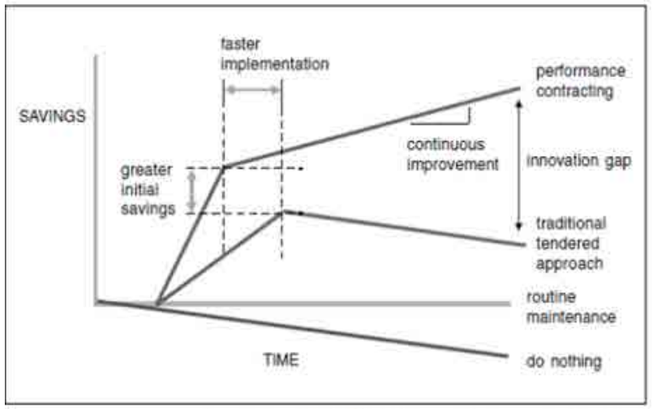
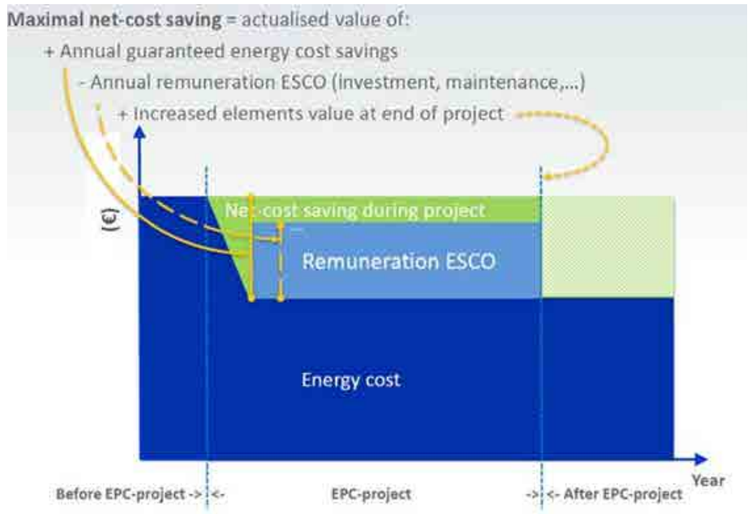


Figure 5.1: potential of EPC (Energy Charter Secretariat, 2003)

In traditional tenders, building management and maintenance are typically handled by multiple contractors. In contrast, under an EPC, a single party — often an Energy Service Company — assumes full responsibility for all maintenance phases. The parties agree upon specific energy-saving targets and other key performance indicators (KPIs) over a 10- to 20-year period. The client then compensates the ESCo through the energy cost savings achieved.

This long-term perspective and emphasis on energy savings are expected to enhance the overall efficiency of EPCs compared to traditional tenders, which in the Netherlands can have contract durations as short as one year



In addition to funding from European organizations, such as European Investment Bank, European Investment Fund and InvestEU, there are two organizations in the Netherlands that play an important role in financing sustainable energy management, being the **Netherlands Enterprise Agency (RVO) and Invest-NL**.

Invest-NL provides direct financing to companies and projects that make the Netherlands more sustainable and innovative — for a maximum of 50% in risk capital — and also finances investment funds with a minimum fund capital of €5 million, participating with investments ranging between €5 million

and €25 million. Investments are made across sectors such as Agrifood, Biobased & Circular, Energy, Deep Tech, Life Sciences & Health.

Burden or blessing?

While the EU directives mentioned in this article are designed to stimulate and enforce the energy transition and sustainable development, the Dutch laws implementing these directives are, at times, **slowing down progress** towards national sustainability goals.

Companies seeking to invest in more sustainable production processes (e.g. CCS, electric stoves or heat pumps) may need to secure “nitrogen space” to build/install modifications. However, under the Anti-Nitrogen Law (Stikstofwet), each project must demonstrate that it will not lead to an increase in nitrogen deposition in Natura 2000 zones within a specified proximity — a complex, slow, and legally vulnerable process that delays many construction activities, including housing, sustainable transport, and hydrogen energy projects.

At the time of writing, the Dutch government has not yet provided a solution to these issues, further slowing the approval and execution of new projects.

Case studies

- The **Pension Fund for Health and Social Care (PFZW)** has outsourced its entire pension administration to PGGM. PFZW is responsible for the pension policy and assets of more than 3 million current and former employees in the healthcare and welfare sector. At the end of 2023, the pension fund’s invested assets amounted to €218 billion. PGGM aims to provide good, affordable, and sustainable pensions for its clients and members. It invests in areas such as the heat transition and the sustainable food industry.
- **Leiden University** has reduced its CO2 with 47% as towards 1990, partly achieved by significantly reducing natural gas consumption and expanding the number of solar panels to more than 5,000. In addition, in 2023 to the University incorporated green roofs and biodiverse gardens on their campuses.

- The **municipality of Eindhoven** aims to become an energy-neutral city between 2035 and 2045. Construction and design company Ballast Nedam, as part of a consortium, is contributing to this mission. Among other initiatives, the entire interior of Eindhoven Town Hall has been renovated, with 95% of existing materials being reused. .
- In line with RED II, the Netherlands is developing a hydrogen network that will partially repurpose existing gas pipelines. A dedicated company, **Hynetwork**, has been established for this purpose. Hynetwork, a 100% subsidiary of Gasunie (wholly owned by the Dutch state), is building a transportation network to connect various industrial clusters, international partners, and hydrogen storage and import locations using CO2-free hydrogen. Former Minister of Climate and Energy Rob Jetten appointed Hynetwork to develop and manage this hydrogen transport network in accordance with the national “roll-out plan.” Stakeholders — including producers, buyers, trade associations, governments, foreign companies, network operators, industrial cluster representatives, and port companies — were invited to provide feedback until January 31, 2025. Hynetwork has been entrusted with a Service of General Economic Interest mandate to execute the project, which is now pending ministerial approval.
- **Ahold Delhaize** has fully allocated its first €500 million Green Bond (issued April 2023) to emissions-reducing projects. Most funds went to energy-efficient buildings, upgrading 6 distribution centers and 51 stores to EPC Label A, including Albert Heijn’s gas-free Home Shop Center with 5,400+ solar panels.

Conclusion

Although the Netherlands is incorporating European directives into national law, the implementation of sustainable development measures is often hampered by the very regulations intended to promote sustainability and the energy transition.

The Dutch market mainly focusses on smaller EPCs, that are mainly engaged by large municipalities of the country.
EPCs have many **advantages**: cost savings on energy and maintenance, guarantee of installation performance, CO2 reduction, improved comfort and indoor environment, external technical expertise and capacity, the anticipated energy savings are used as investment capacity for energy-saving measures. It is therefore no surprise that EPC's are used in the Netherlands with increasing frequency.

However, EPCs also have **disadvantages**. The contracts are often complex and require extensive legal documentation. Preparation, tendering, and contract management costs may be high. Flexibility is limited, as contracts often span many years. EPCs also pose risks for ESCos: if the projected savings are not achieved, or if the building is sold before the contract ends, financial and contractual complications may arise.

Therefore, before entering into an EPC in the Netherlands, it is recommended to consult a local legal counsel specialized in these complex contracts.

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For more information on this topic and on Energy Industry Group in Europe

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