THE GLOBAL ESCO NETWORK

UN environment programme | copenhagen climate centre

Regulatory Barriers for Energy Service Companies

Perspectives Based on Feedback from National ESCO Associations

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List of Acronyms:

ADES	Abu Dhabi Energy Services
AEEE	Alliance for an Energy Efficient Economy
ANESCO	Asociación Nacional de Empresas de Eficiencia Energética
APEIA	Asia-Pacific ESCO Industry Alliance
APESE	Portuguese Association of Energy Service Companies
CCEE	Consejo Colombiano de Eficiencia Energetica
CEBC	Clean Energy Business Council
CEF	The Carbon & Energy Fund (UK)
CO_2	Carbon dioxide
DBOO	Design, Build, Own and Operate
EEC	Energy Efficiency Council
EESL	Energy Efficiency Services Limited
EPC	Energy Performance Contract
ESAC	Energy Services Association of Canada
ESCO	Energy Service Company
ESCOROM	Asociatia ESCOROM a Societatilor de Servicii Energetice din Romania
ESTA	Energy Services and Technology Association
ETL	Essentia Trading Ltd. (UK)
GDP	Gross Domestic Product
GHG	Greenhouse gas
IFRS16	International Financial Reporting Standard
IEA	International Energy Agency
JAESCO	Japan Association of Energy Service Companies
kWh	kilowatt hours
MAESCO	Malaysia Association of Energy Service Companies
MJ	Megajoule
M&V	Measurement and Verification
NDC	Nationally Determined Contribution
NDEE	Non-domestic energy efficiency framework (Scotland)
RE:FIT	Retrofit Accelerator (UK)
SOFIAC	Société de financement et d'accompagnement en performance énergétique (Canada)
UAE	United Arab Emirates
UK	United Kingdom
USD	United States Dollars

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Introduction - ESCOs and the Climate Change Agenda

Chapter 1

Since the beginning of the climate change agenda, the obvious emissions reduction focus has been on reducing the energy sector's dependence on fossil fuel resources. But there is another agenda that actually had the head start. The energy efficiency agenda originates back from the energy crises in the 1970s and has led to several energy efficiency programmes such as the American Energy Star programme dating back to the 1980s.

The Energy Service Company (ESCO) concept emerged at the same time, when there was little, if any awareness of climate change, but utmost awareness of the cost of energy, developing a business model that finances the replacement of outdated and inefficient technology with new and efficient alternatives and repays it with the value of the saved energy. The ESCOs thrived in the US in the 1980s and the concept has taken root in other regions since then, particularly in China.

It is natural to assume, then, that the climate change agenda arriving in the 1990s would provide new impetus to the evolving ESCO industry. Mysteriously, it did not. While the climate change mitigation agenda was clearly focused on the energy sector and the renewable energy alternatives were far away on the horizon, the 'first fuel' or the 'Negawatt' became new names for energy efficiency as the main means to reduce emissions from the energy sector. But not the ESCO.

In the meantime, renewable energy has become mainstream, whereas the ESCO has faced barriers to their obvious business model: To pay the investment in energy efficiency with the value of the saved energy. It is time to mainstream the ESCO!

It is time for a number of reasons:

1. The less energy demand, the less generation capacity is needed when replacing fossil resources with renewables, which is now facing supply chain constraints
2. If it was as easy to invest in energy efficiency as in renewable energy, most would choose energy efficiency - because the returns are generally much better
3. The dynamic energy efficiency gains are diminishing - they are now less than 2% annually according to IEA, meaning that generic energy efficiency improvements now require more dedicated efforts
4. The energy efficiency agenda is labour intensive and thus particularly well suited for economic recovery post-corona - but also just for economic activity in general.

The ESCO is the obvious response to these four points - and a few more. More than 85% of Nationally Determined Contributions (NDCs) under the Paris Agreement on climate change mention energy efficiency as a priority, but very few, and probably less than 10 countries, specify how the efficiency gains are to be achieved. Without plans, chances are that little will be accomplished. Setting the ESCO sector free is a one-solution answer to this challenge.

Countries commonly address energy efficiency through prescriptive, technology-specific, temporary programmes offering grants to investments that could quickly pay for themselves without it. In practice, that means that countries make the cheapest reduction options expensive for government budgets. Oftentimes, they even exclude ESCOs and their expertise from participating in the programmes. ESCOs, on the other hand, would focus on a performance-based approach and seek out the best energy efficiency investments and finance it through the energy savings.

As the climate change agenda tightens, we can no longer afford to leave the immense emissions reduction options in

energy efficiency untouched. But it requires professionalism. The required expertise rests with the ESCOs, not with the owners of the inefficient assets. Activating the - commonly domestic - energy efficiency expertise should be a first choice for climate policy developers and for the NDC updates.

That said, the ESCO is not a magic wand that makes all challenges for energy efficiency implementation go away. There is an entire ecosystem around ESCOs and energy efficiency that need to be put in place, including the building of trust in the ESCO industry; actively creating demand for ESCO services; the financing of the ESCOs, and model Energy Performance Contracts that are financeable. But most importantly, policy makers need to remove regulatory barriers that hinder ESCOs from doing their business, stop discriminating against ESCOs in their energy efficiency programmes and put in place regulatory instruments that foster a push for energy efficiency investments in the market.

This publication focuses on these regulatory barriers. Over the months of April to November 2021, the Global ESCO Network has conducted a series of interviews with representatives of partner associations in order to map barriers for ESCOs that can be characterized as regulatory in nature. The interviews have been open and explorative, but structured with the aim to facilitate a categorization and benchmarking across countries.

The national markets for ESCO services vary widely in terms of maturity and size and the existence of an ESCO association in a market is no evidence of either. That said, no analysis has been made in a country without an ESCO association, as ESCO associations have been the point of entry for the analysis. This in itself is a potential flaw in the analysis in the sense that the existence of an ESCO association in most cases signifies the existence of a relatively functioning market and thus that the totality of barriers is being overcome by market actors. But it would be a mistaken conclusion that the absence of an ESCO association signifies that there is no functioning market for ESCO services. There are examples of functioning markets with no ESCO association, and only barely functioning markets that do have an association. This initial analysis has no data from the former and thus cannot estimate the significance of ESCO associations present as an indication of barriers to ESCO operation.

This is a first attempt by the Global ESCO Network to systematize the information on regulatory obstacles and establish a typology that can form the basis for expanding the analysis. 12 ESCO associations have participated in the analysis. It is therefore also the ambition to update this publication regularly, first and foremost with further input from ESCO associations that are not represented in the analysis, but moving on also to countries that do not have ESCO associations to clarify if particular regulatory barriers prevent the market for ESCOs to take off in the first place.

The focus is on regulations, because these are the ones that policy makers can help to address, alleviate and even use actively as instruments in pursuit of emissions reduction objectives through the reduced use of energy. As such, the document similarly presents itself as a simple guidebook for policy makers as to which interventions they could easily turn to in order to activate the ESCOs in support of energy efficiency strategies and policies.

ESCOs are still not well recognized as an industry, nor entrenched in national policies – or if they are, such policies may be countermanded at state and province levels that have their own regulations, or lack thereof. Nowhere has their full potential been unleashed and, in many places, they still struggle to find sufficient foothold. Where they are thriving, it is rarely a result of dedicated policies that promote Energy Performance Contracting. Despite this, the market conditions that allow ESCOs to thrive have been well researched, are relatively well understood, and have a fair degree of commonality in different markets around the globe, though in each case needing to take account of local circumstances.

The growing urgency of decisive responses to a rapidly changing climate, and the inherent ESCO promise of delivering profitable investments to the same effect, mandate a prominent role of the ESCO community in the global climate change agenda.

What ESCOs could achieve in a barrier-free world

Chapter 2

Let's be frank about it: Energy efficiency is not cool. It ticks in as a saving measure and who really wants to save if we don't have to? Instead, abundance and consumption appeal to us and we'd rather buy a new extravagant piece of equipment, spared no expense, than look for savings in our current environment.

Or not so anymore? It depends on who you ask. To many, saving implies that you are poor, so from that perspective alone, selling the energy efficiency agenda can be hard. To others, the idea of replacing a perfectly functioning piece of equipment for a better and more efficient model seems wasteful - unless it is a new smartphone, of course. 'Don't fix it if it ain't broke.' Well, maybe it is broke - from the perspective that its continued use is harmful to the planet and the environment that surrounds us all. But maybe equally so is the production of a new unit to replace the old one? Clearly, the latter perspective complicates the picture, but fortunately there are professionals in the energy efficiency market that can and do make those considerations - because they are the ones that put their hands on the stove and guarantee the energy savings and consequently also the emissions reduction outcomes - the Energy Service Companies.

Ambitious energy efficiency policies can keep global energy demand and energy-related carbon-dioxide (CO2) emissions steady until 2050, according to a new report by the International Energy Agency. Perspectives for the Energy Transition: The Role of Energy Efficiency shows that despite a near-tripling of the world economy and a global population that increases by nearly 2.3 billion, end-use energy efficiency alone can deliver 35% of the cumulative CO2 savings through 2050 required to meet global climate goals. (IEA, 2018)

Of course, these days putting your hand on the stove is no longer so risky, because the energy efficient stove is an induction stove which only heats up precisely what you need, not your hand.

Because we are not inclined to save, the world is wasteful. The energy efficiency potentials are immense - so immense that in theory, exploiting them all would mean that there would be no climate crisis. We are that wasteful. Looking at an energy system from start to finish, what ultimately trickles down to run your laptop's functions may well be less than 20% of the energy content in the fuel, if the electricity source is the coal fired power plant down the road. Most energy is lost as waste heat at the plant, then as transmission and distribution losses in transformers and grid, then as heat in the transformer you need to connect your laptop to power, then as battery efficiency loss and finally as heat in the laptop that needs to be cooled with the built-in ventilator. Similar considerations are relevant for most other pieces of energy consuming equipment.

There are efficiency gains possible in practically every stage of energy production, conversion, transportation and usage. And to exploit these potentials, at every stage there are barriers - and not only the psychological lack of inclination to save if we do not have to. The cost of the wasted energy is passed along through the value chain to be paid, ultimately, by the consumer.

The barriers are rarely technical. There are technical solutions to most energy efficiency demands, but the lack of knowledge of those available technologies, on the other hand, is a common barrier. It is even a barrier at universities that are training engineers in using outdated technologies. And de-learning is oftentimes much more difficult than learning in the first place. 'You can ask me, I'm a doctor.' Well, sometimes you may have to ask somebody else. Technical solutions are bound in

tradition, not only in technological advances. There is inertia in adopting new solutions, new principles and new technologies which stand in the way for rapid transfer and diffusion of more efficient ways to produce, transport and use energy. In the 1990s, in Japan, the conventional business view of climate policy was a 'widespread consensus' on the existing energy efficiency of the economy, characterizing it as a 'wrung-out towel', contrasting with the inefficient 'dripping wet towel' of the United States.[1] If there wasn't an American and a Japanese way of doing things, then such differences would not exist.

There are also philosophies standing in the way, particularly in the utilization of waste heat from power plants and large-scale industrial installations. Until recently, the common technological option for utilizing the waste heat has been to use the low-temperature cooling water for district heating and, still less so, district cooling. But the business model for such utilization requires the compulsory connection to large, common heating and cooling facilities. Such solutions face barriers all the way around, from power producers that have no interest in becoming heat suppliers to homeowners that do not want to be compelled to use a particular source of heating or cooling and policy makers that do not want to compel them. The continued inefficiency of power production is thus commonly a matter of principle. Globally, less than 5% of the power sector's waste heat is utilized. The rest is simply lost. See Figure 1, where this loss is represented by all areas above the black line. If you were to point to one single cause of the current climate emergency, it is the failure to utilize the power sectors' waste heat.

Oftentimes, energy efficiency gains do not benefit those that invest in them. That is a particular concern in the built environment, which is responsible for somewhere between 30 and 40% of all the energy we consume. Hence, it is no small issue if the main driver for energy efficiency - the cost saved on energy - does not work, because the investor in the building is not the one paying the energy bill. The solution to this challenge is performance-based building codes, but these are not common and even they do not address the way buildings are ultimately used once they are built. It's a hotel guest phenomenon. 'I paid for this room, so I can soak myself in luxury' - or not, but the price is the same. For that reason, we need to put our key card in a slot to switch on the light, because otherwise hotel guests would leave their rooms without switching anything off. Those who built the hotel don't mind either, because they rent it out to a hotel chain, which pays the energy bill. These split incentives are commonplace. In the public sector, it is commonly not the user of a building that pays the energy bill. In the private sector, it is commonly not the investor that pays the energy bill. Aligning all interests to make energy efficiency investments happen has been a challenge for decades, and there are few solutions unless we rethink our owner-tenant models. If hotel guests actually paid for their consumption separately, they probably would not soak themselves in more luxury than they do at home.

But even when interests are aligned - when the owner of the building also lives in it, uses it and pays the utility bills - there may not be sufficient motivation to invest in energy efficiency, because the energy is just too cheap. Energy is the most subsidized commodity on the planet, surpassing agriculture (which attracts about 540 billion USD annually) by a factor 10 (IMF, 2021). Every dollar spent on subsidies erodes the foundation for energy efficiency investments as it reduces the value of the savings. Eliminating subsidies may be the single most impactful intervention to drive energy efficiency investments forward, possibly followed by introducing energy and carbon taxes. It may also be the single most impactful measure for governments to improve their government finances, creating a fiscal space that might well be utilized for the further uptake of profitable energy efficiency investments.

Because a further barrier to energy efficiency investments, paradoxically, is that they are difficult to finance. While these investments on the one hand provide probably the best returns on any investment made in the service of GHG emissions reduction, they are also the most cumbersome to devise a viable financing model for. The most obvious reason for this of course is the split incentives mentioned above. If the investor achieves no return on the energy efficiency investment, how should a bank consider the investment proposition as anything else than a lousy business? As a minimum, alternative collateral should be provided. In those cases where the investor directly profits from the investment, collateralization may still be problematic, because the typical energy efficiency investment is integrated in a building or a line of manufacture

[1] Referred in 'A Strategic Assessment of the Kyoto-Marrakech, System Synthesis Report. Michael Grubb, Tom Brewer, Benito Müller, John Drexhage, Kirsty Hamilton, Taishi Sugiyama and Takao Aiba. The Royal Institute of International Affairs, June 2003, Briefing Paper no. 6.
In 2015, energy intensity for Japan was 4 MJ per dollar of GDP. Energy intensity of Japan fell gradually from 5 MJ per dollar of GDP in 1996 to 4 MJ per dollar of GDP in 2015. In 2015, energy intensity for United States of America was 5 MJ per dollar of GDP. Between 1996 and 2015, energy intensity of United States of America was declining at a moderating rate to shrink from 8 MJ per dollar of GDP in 1996 to 5 MJ per dollar of GDP in 2015. Source: https://knoema.com/atlas/Japan/Energy-intensity, https://knoema.com/atlas/United-States-of-America/Energy-intensity. Such generic comparisons should be viewed with caution as they do not consider differences in national economic structures, including composition of industry.

and would be difficult to take back if a loan turns sour. It may be almost as expensive to take the new windows in a building out as it was to put them in in the first place.

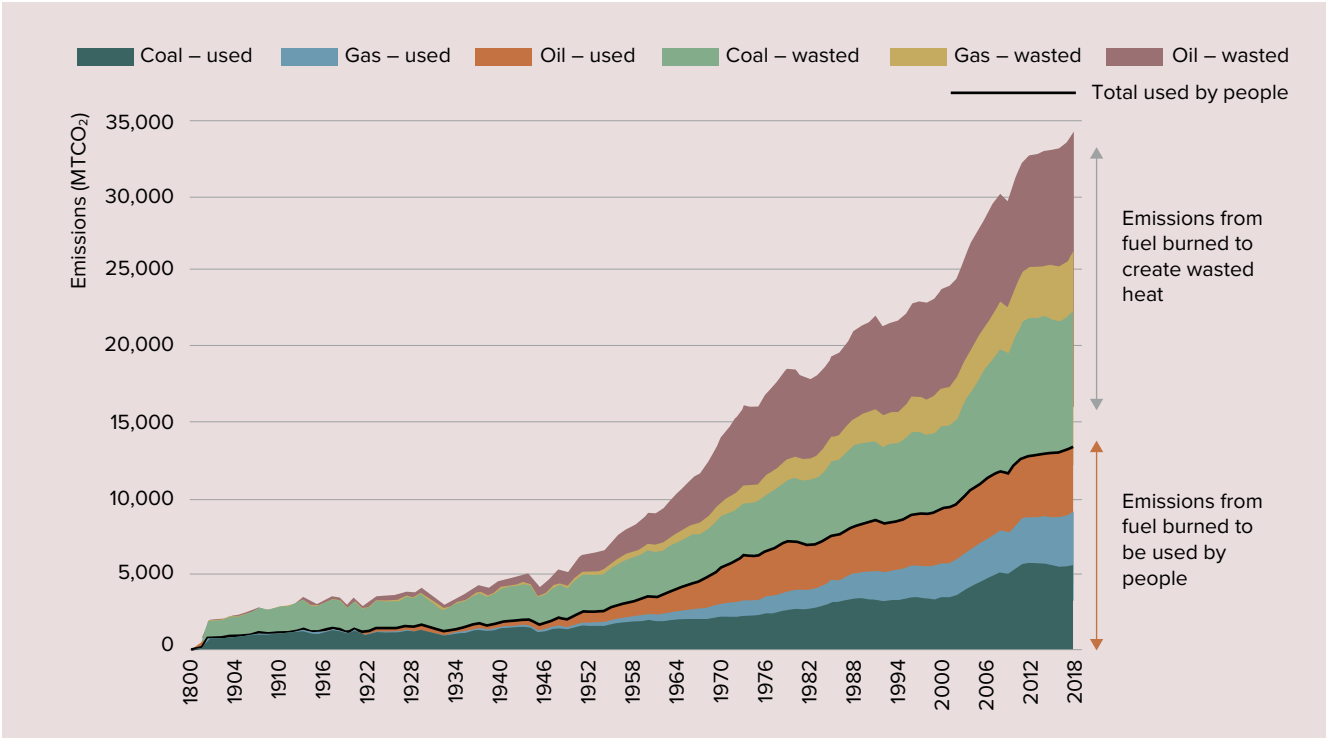
The reason why energy efficiency investments still do happen despite these barriers is that some places, energy prices are high; some places, building standards impose energy efficient construction, and some places, owners of energy inefficient assets are able to finance the investments themselves. It may also be because governments do run programmes that support energy efficiency investments. Such programmes are commonplace and thus of course cannot be considered a barrier. The barrier that nevertheless is linked to these programmes is that they are expensive for governments and therefore are both temporary and limited in scope, rarely matching their full potential. Neither do they deliver any return on the investment to the government - except, of course, delivering a return in the form of GHG emissions reduction. And neither do they secure that the best returns on investments is a decisive decision parameter, because the subsidy reduces the importance of returns and rather benefits those that are able to finance the remainder the investment themselves - who are unlikely to be the owners of the least efficient technology.

2.1 Enter the ESCO

While the above are fundamental barriers that stand in the way for energy efficiency actions in general, there are also remedial measures available. One of these is fertilizing the establishment of an Energy Service Company ecosystem. ESCOs are neither a quick-fix or one-size-fits-all solution. In fact, they come with an additional set of barriers that also need addressing if they are to become the answer to the perils of energy efficiency investment.

ESCOs are professionals in energy efficiency. They can stand up to conventional, but outdated wisdom on how things were done in the past. Their business is to be at the forefront with the application of technology that represents the best compromise between novelty, efficiency and dependability, because their business depends on the optimization of these parameters. They should have no vested interests in a particular technical or technology solution, acknowledging that some certainly do as they are fundamentally selling their own equipment on an energy performance contracting basis. Sometimes this may be the necessary price to pay to get the investment going. Most ESCOs, however, are independent technicians that design systems-based approaches that optimize the entirety of a consumption source, making the cherries pay for the pie.

Figure 1. The production and waste of fossil fuel energy



Source: Ketan Joshi (https://ketanjoshi.co/blog)

Although ESCOs may be representing the essence of energy efficiency expertise, their business model is in fact mostly based on financing. Commonly offering their clients to renew their installations without asking even for a down payment, they purchase the hardware in their own name and install it at their clients' premises, receiving their contractual remuneration from the value of the energy saved. It is comparable to leasing, and in some instances leasing models are used, rendering the ESCO a financing tool just as much as a provider of expertise. In practice, they operate as investors on behalf of their clients, transforming to their own core business what their clients consider peripheral.[2]

And exactly because of energy efficiency generally has the status as 'non-core-business', it is challenging to have clients even entering the dialogue. 'Not only are you trying to sell something that I have never considered; you also propose technology that our plant manager has never heard of, and you offer it to me at no cost. You need a reality check!'. There are too few initiatives around to sharpen the focus of potential clients. 'Nothing so focuses the mind as the prospect of a mandatory regulation.' Well, that is probably taking a Mark Twain analogy too far, but mandatory energy audits are gaining ground and reveal tremendous energy efficiency potentials to those corporations that have to have them made, commonly by energy efficiency experts. Surprisingly, even tremendous efficiency potentials remain unexploited. Mandatory implementation of documented potentials in energy efficiency is probably the only possible, but rarely attempted approach to force companies into making these highly profitable investments - or at least let ESCOs make the investments for them.

But here is a paradox. Companies commonly do not want to devote capital to make these investments - but they will not allow ESCOs to do them either, because they want to retain ownership of their assets. It is a catch-22 - or more precisely that 'you cannot have the cake, and you cannot eat it either' - regardless of how many cherries. 'Compulsory' just doesn't sound good in any language.

Such absence of regulation is not the only barrier that ESCOs face. It may not even qualify as a real barrier - who wouldn't wish for new regulations that could boost your market? Much more commonly, ESCOs suffer from a number of regulatory barriers that are either intended, but most commonly are only accidentally standing in the way for the ESCO business model. This publication maps out many of them in the following chapters and hence they are left out here.

It is symptomatic that there are no estimates on the amount of energy efficiency investments that could be made with a minimum Return on Investment of say 10 or 15%, such returns in any case being circumstantial and not least depending on energy subsidies and carbon taxes. There are only generic estimates by IEA that 1.7 trillion USD a year should be invested on the demand side alone, if the 35% energy efficiency potential are to be attained by 2050. It is likely that at least half of these investments can be made with such returns. At best, however, such numbers are only of academic interest. In practice they reveal little of what an ESCO ecosystem might be able to achieve if barriers to energy efficiency investments were broken down. The returns also vary significantly from sector to sector and from country to country, complicating the mapping of the ESCO business potentials in a world free of regulatory barriers.

IEA analysis in Perspectives for the Energy Transition: The Role of Energy Efficiency demonstrates that on top of a wide range of benefits including cleaner air, energy security, productivity and trade balance improvements, there is a compelling economic case for energy efficiency. But, without further policy efforts, these benefits are unlikely to be realized as less than a third of global final energy demand is covered by efficiency standards today.

But it is still possible to make estimates to the effect that those energy efficiency investments could have on the global carbon emissions. The wastefulness of the global economy was already highlighted at the outset. Not only are we wasting up to 80% of the energy we produce; we are also wasting trillions of dollars in subsidies supporting the wastefulness. The previous Figure 1 is as simple as it is disturbing, illustrating the amount of emissions affiliated with the energy that we do not use - except the figure does not provide the full picture. What is above the black line are supply side inefficiencies. That is the waste heat that many places are considered a necessary evil as discussed above. As fossil fuels are phased out, these losses will, naturally, also be phased out, but waste heat will remain from nuclear and biomass-based power generation and thus remains a valid target for effi-

2 There are many different ESCO models, some of which do not include financing.

ciency gains. These, however, are rarely the target of ESCOs, who are focused on demand side efficiencies.

Demand side energy efficiency potentials are smaller by nature from the simple logic that only 40% of the emissions stem from energy that is actually being put to use, more or less efficiently. If IEAs 35% efficiency gains are applied in this figure, there would be an emissions reduction potential of about 5 Gigatonnes of CO2e that could be avoided if ESCOs were allowed a barrier-free access to do their business. This is not too far from the annual net emissions of the United States.

Obviously, this is a theoretical value and as described above, there are several barriers to scale if these potentials are to be exploited even partially, and many of these barriers are not of a regulatory nature. Why then this focus on regulation and regulatory barriers in particular?

Because most other barriers are affiliated to the ESCO business model and are, mostly, for the ESCOs to remedy themselves. As with most other business, either they find the formula or the person that can sell their product, or they go bankrupt. If the bank believes that a particular business model or product is risky or unconventional, it will probably not finance it. Such barriers are not particular for ESCOs. But there is no reason to make it harder than it has to be, particularly not when ESCOs are fundamentally delivering on the agenda that national governments claim to be pursuing when they state that energy efficiency is a priority for them in their emissions reduction plans. By not eliminating the barriers that governments are causing themselves, they are standing in the way for a solution to their own challenges. And in that context, even the absence of regulation can constitute a barrier.

A simple example of such a barrier in the absence of regulation is the failure to establish accreditation of ESCOs. Most countries have energy auditors, and energy auditors commonly come with certification. For ESCOs, on the other hand, there is frequently no accreditation, even if they are delivering a comparable service and in addition to that a contractual relationship oftentimes including financing, which would seem to call for at least a similar concern for the quality and credibility of the services provided. Without it, the industry faces competition from companies that are not really ESCOs or operators that through their substandard work lend a bad reputation to the industry. As ESCOs are also frequent suppliers to public sector entities, it is an obvious opportunity to institute a public or publicly endorsed accreditation system for ESCOs. This and other barriers in the absence of regulation are analysed in depth in Chapter 6 - and similarly for the barriers that exist in actual regulation, which are in Chapters 4 and 5.

The reason to focus on regulatory barriers is also the lack of awareness. Even if the sector is sometimes disliked for making a profit on replacing other peoples' functioning assets - which is the fundamental commercial strategy for any business (and particularly so for smartphones) - the reason for regulatory barriers standing in the way is normally based on regulators' misunderstanding rather than discrimination. And even where the sector is understood and there is even awareness, the regulations that stand in the way serve other purposes and are therefore not always straightforward to eliminate. It may then become a question of instituting a particular regulatory framework for ESCOs, which is a much more cumbersome affair.

That does not render deregulation irrelevant for ESCOs, and the survey among the twelve ESCO associations - even with its relatively limited scope - documents a wide span from countries where there are practically no regulatory barriers to countries that seem to be regulating the ESCOs out of the market. Clearly, there is room for improvement across most places and - even with the limited sample of countries represented in the analysis - sufficient scope for cross-fertilization and inspiration. And maybe even more importantly, there is in this analysis a specific opportunity for policy makers to directly compare their own approach to paving the way for the ESCO industry to deliver its contribution to national emissions reduction strategies.

How much the ESCO industry can achieve comes down to case-by-case national assessments, and such assessments should not establish an artificial differentiation between energy efficiency potentials and ESCO potentials. If energy efficiency is the 'what', the ESCO is the 'how'. And even in that distinction, the ESCO is not always the only 'how'. With the analysis presented here, the vote is out how much more the ESCOs can achieve if countries start eliminating regulatory barriers that prevent ESCOs from delivering their services.

A country-by-country survey of regulatory barriers for ESCOs

Chapter 3

The decision to survey the regulatory barriers for ESCOs is directly linked to the role that regulation generally plays in relation to the global climate change agenda and its focus on emissions reduction. From the logic that the market forces that brought about climate change are unlikely to suddenly and on their own work against it, changing the market conditions through regulation is widely thought to be one of the important avenues forward. Among economy experts, the introduction of carbon taxes seems to be a preferred instrument. It is also evident that regulation has been the basis for the development of those technologies that are now slowly but surely outperforming fossil fuels. It is equally likely that regulation in the form of fossil fuel subsidies, as lined out above, remains a decisive explanatory factor for the consumption of fossil fuels being such a hard habit to break.

Regulation makes or breaks markets, and even if liberal thought shuns regulation, it does not oppose the idea that there must be regulatory frameworks within which competition can thrive - as long as regulators refrain from interfering in the choice of technologies. Nevertheless, regulators do interfere with choices of technology and provide beneficial conditions for particularly favoured ones - as has been the case for the fossil fuel industry for decades, for wind turbines and solar PV since the 1980s and 1990s, and these days for electric cars, green hydrogen and micro-scale nuclear power with the justification to underpin penetration of technologies that are not competitive on market terms. Similarly, countries run programmes for the support of specific energy efficiency interventions such as energy renovation of housing. But while the latter may well require support for market penetration, the reason is not that they cannot compete on market terms. Obviously, regulation that allows and promotes feel less intrusive than that which forbids and prevents - except for those that experience a resulting competition from an uneven playing field. The survey of regulatory barriers for ESCOs naturally focuses on those that forbid and prevent. It is a general observation that those mainly pertain to ESCOs working with public sector clients, whereas ESCOs report few if any regulatory barriers that prevent their work in the private sector. Here, regulatory barriers mainly manifest themselves by absence of regulation. Private sector entities are commonly allowed to be as wasteful in their consumption of energy as they please, the absence of regulation making this one of the most obvious unutilized energy efficiency potentials. Therefore, in this context, the failure to transform this potential into a market for ESCOs is considered a regulatory barrier.

On the other hand, the competition from fossil fuel subsidies or the subsidies for renewable energy are not, even if it is a source of competition and clearly affects the business case for energy efficiency. It also plays a role in that decision that fossil fuel subsidies are specifically targeted in the context of UNFCCC as a global menace the abolition of which was reconfirmed as a priority during the recent COP26.

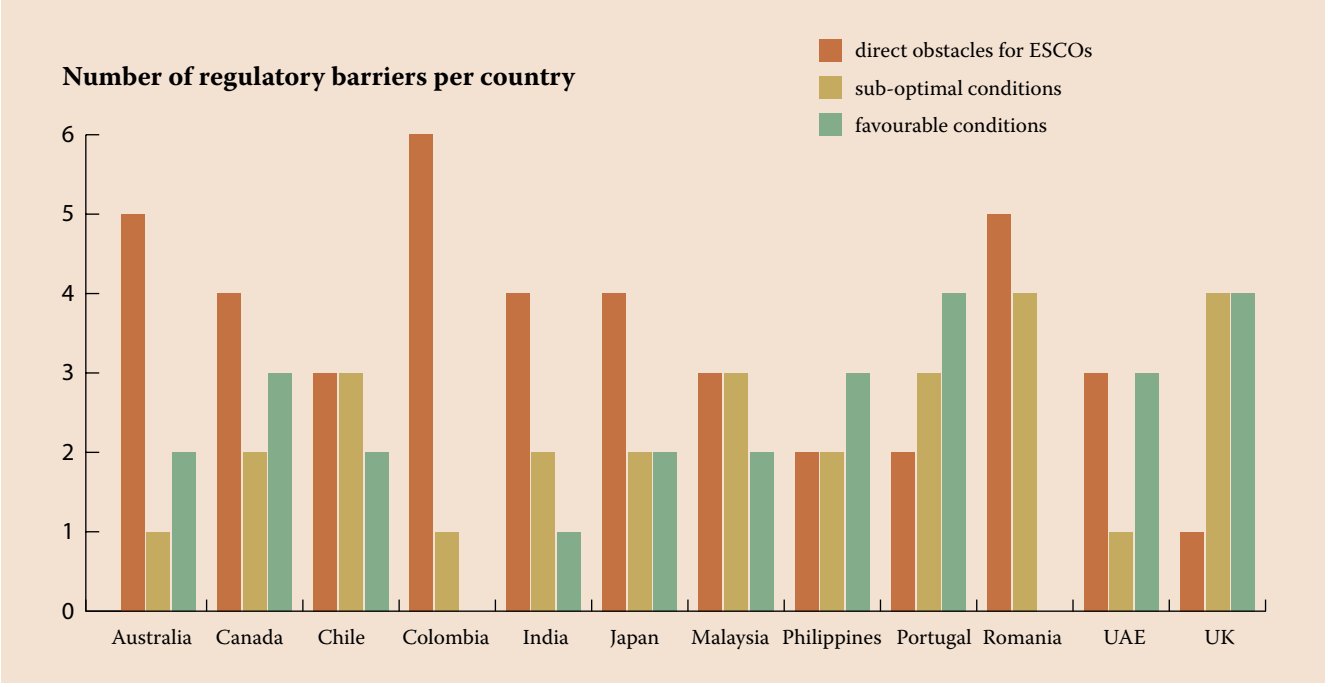
These two examples illustrate that there is a measure of subjectivity in the definition of regulatory barriers. In principle, allowing the absence of regulation to constitute a barrier means that every absent regulation that by its absence fails to create a market for ESCOs is a regulatory barrier. Therefore, the approach in this context is that an existing 'positive regulation' in any given country becomes the benchmark for the consideration of a regulatory barrier through its absence in other

countries. Hence, only where examples exist of such positive regulation that eliminates a market barrier in a given national market, are their absence in other markets considered a barrier.

Another and probably even larger barrier that penetrates the ESCO market in the public sector sphere are structural barriers. These are barriers that are more related to 'the way things are commonly done', be it how the ownership of publicly owned buildings is organized and the autonomy with which a public entity commonly makes decisions, for instance in the form of decisions that a given entity are supposed to make, but does not - or for that matter decisions that a public entity is not supposed to make, but does.

Especially the split incentives that may exist among public sector bodies in the form of owner-tenant conflicts of interest are common and require active circumvention - if they can be circumvented at all. In that context, it is difficult to consider the entire ownership structure of public buildings in a country a regulatory barrier. Not only may it be challenging to identify the specific legislation that establishes this structure, but it is also not a law or regulation that is a relevant target for revision. The barrier here is not the structure in itself, but rather the absence of a solution to work around this structure that is the barrier. And that in itself is also a structural barrier - unless there are examples of circumventing regulation that can form the benchmark of 'positive regulation' in other markets.

Figure 2. Prevalence of analysed regulatory barriers by interviewed ESCO Association



While the above can seem to be a bit convoluted attempt to define what is in and what is out of the analysis, it has proved functional for the purpose. With the anticipated expansion of the analysis in the coming years the approach will be distilled and refined for the purpose of producing policy recommendations to governments based on practical and recorded regulatory experience.

ESCOs encounter development barriers in every country where they are present, as can be expected for an unconventional business model. While numerous obstacles are inherent to the country itself, multiple common points can be observed in ESCO socio-technical systems around the globe. Some of these barriers are tied to laws and regulations.

Figure 2 illustrates the relative weight of regulatory barriers for ESCO operation among the nine barriers identified during the interviews with the ESCO associations. The observations by the national ESCO associations are colour coded to illustrate the existence of favourable conditions (yellow), sub-optimal conditions (green), or direct obstacles for ESCOs (orange). It is obvious, that nowhere are the conditions ideal.

As discussed above, there are different types of regulatory barriers relevant for the ESCO business. Some are specifically linked to the ESCO business, while others are embedded in regulation that is not targeted at ESCOs per se, but affect them nevertheless. And a third category is barriers in the absence of regulation. These are considered where specific examples of regulation exist in some markets, but are absent in others, constituting a barrier in the absence of a regulatory framework directly targeted at ESCOs. Hence, in practice there are three categories of barriers for ESCOs:

1) barriers due to existing regulation not specific for ESCOs;

2) barriers due to existing ESCO-specific regulation, and

3) barriers in absence of regulation.

In the following three chapters, the barriers are further detailed, as is the tabulations regarding the observed regulatory barriers. The structure of the chapters follows the overall barrier category above.

Barriers due to existing regulation not specific for ESCOs

Chapter 4

Regulatory frameworks are put in place by public sector regulators to allow, promote or require certain societal activities to happen, as well as to establish the limitations pertaining to such activities. Good governance principles stipulate that stakeholders are consulted in the development process to ensure that the provisions of the regulation does not have unintended effects in spheres not targeted. Obviously, not all stakeholders are equally equipped to make themselves heard, and the special interests of one group may be considered too inferior for the greater regulatory objective. Oftentimes, however, some regulatory spill-over effects are simply missed and end up constituting obstacles to entities or businesses not targeted. ESCOs experience such barriers in the form of regulation that are in place to serve other purposes.

Table 1. Barriers due to existing regulation not specific for ESCOs

Barrier / Country	4. Barriers due to existing regulation not specific for ESCOs		
	4.1 Split incentives and delineation of mandates	4.2 Consumption charges not based on consumption	4.3. Public sector budget and accounting rules
	Are there ways to address split incentives in the distribution of budgets?	Not part of the ESCO association analysis	Is it possible to secure long-term contracting?
Australia	Split incentives issues.		No restriction on public contract duration.
Canada	Split incentives issues.		No restriction on public contract duration. Issues with operational savings being "claimed" and used for other budgets.
Chile	Split incentives issues.		No restriction on public contract duration.
Colombia	Not observed.		Possible in theory, but complex in practice.
India	Not observed.		No restriction on public contract duration.
Japan	Not observed.		Up to 10 years for ESCOs. Normally under 1 year for government contracts.
Malaysia	Unclear responsibilities between ministries of Finance, Housing, Energy and Public works.		Up to 21 years for PPP or BOT projects, applies also to ESCOs.
Philippines	Not observed.		Possible in theory, complex in practice.
Portugal	No reported split incentives issues.		No restriction on public contract duration.
Romania	Unclear responsibilities between ministries of Energy and Ministry of Public Works.		Maximum length is five years, unclear if it applies to ESCO activities.
UAE	Not observed.		No restriction on public contract duration.
UK	No issues in the public sector, but issues exist in the private sector.		No restriction on contract duration.

Here, these barriers are classified as regulation that whether directly or indirectly, jeopardize the development of a vibrant ESCO ecosystem, but does so unintentionally. By ecosystem we mean not only affecting the ESCOs themselves, but potentially also some of the entities, services, and opportunities that ESCOs need to thrive. These barriers are often linked to antiquated legislation tailored to different business models, but also encountered in countries where ESCOs have developed a substantial activity and have achieved some modicum of recognition by regulating bodies.

4.1 Split incentives and delineation of mandates

Split incentives are commonplace in the built environment, also known as the owner-tenant conflict of interest. Why would owners invest in energy efficient hardware when the savings only benefit the tenant? Highly efficient white goods in a rented apartment for instance. Owner-tenant conflicts of interest are not necessarily a result of regulation. It is in the nature of the contract between the two parties, and it fundamentally penetrates the entire construction market from the beginning of the design of buildings.

Where regulation nevertheless plays a role is in the public sector, where different public sector entities act as both owners and tenants. Budget line speculation constitutes a regulatory hurdle to ESCO development in multiple countries. It refers to a situation where the entity with the mandate of commissioning the ESCO intervention is not the one that benefits from the subsequent energy savings. This set up is common in public buildings, where an entity is the formal owner of government buildings and therefore also oversees the renovation of the assets, but where the buildings are used by other public entities who are the ones responsible for paying the energy bills. It may even be a third public entity that is responsible for paying the bills. In some cases, the issue might be more structural, as is reported by the ESCO associations MAESCO in Malaysia and ESCOROM in Romania, where there is a split in the delineation of responsibilities and mandates leading to inaction e.g. in Romania energy efficiency initiatives are led by the Ministry of Energy, but the mandate on public buildings resides with the Ministry of Public Works. The ESCO associations ANESCO in Chile, ESAC in Canada, ESTA in the UK and ESCOROM in Romania report that split incentives and responsibilities occur in their jurisdictions, and that they do not encourage the hiring of ESCOs, as the benefits are reaped by the user of the building - or by the entity that is paying the bills - as reductions of energy use and emissions. The users rarely have the legal mandate to implement energy efficiency interventions, either directly or through ESCOs, which otherwise could help circumvent budget restrictions. Even if they could, they might be reluctant to do so, as they could be relocated, thus not reaping the long-term savings and therefore potentially face a net loss on such ventures.

4.1.1 Potential solutions

Addressing split incentives and mandates is far from a simple matter. In the public sector, it stems from a certain organisation within public powers, which is commonly beyond regulatory remediation. It is not a solution to reorganize the public ownership structures for government buildings. The simple solution is to institute a mandatory energy audit regulation as presented earlier, and imposing implementation of interventions identified beyond a given threshold - and either not minding the split incentives or allowing the investments to be reflected in increased rental charges. Such revisions also interfere with budget regulations that in many cases restrict which costs can be carried forward as rental increases. In some cases, a possible way forward may be that a mandatory energy audit regulation requires the owners to implement audit recommendations, and at the same time compels the users to contribute financially through the achieved energy savings, as long as the intervention doesn't negatively impact their overall annual energy expenses.

The Portuguese Association of Energy Service Companies (APESE) reports how public finance for energy efficiency programs based on ownership of assets prevents the participation of ESCOs

The government in Portugal has over time established a variety of support programs for energy efficiency, usually based on revolving funds, providing interest free loans. Although, in many cases ESCOs are not eligible to these programs, as only the owners of the assets are the eligible entity, and ESCOs would need to go through the owner of the building to access the finance, enhancing the complexity of fund access. There are cases where ESCO can directly apply to access the funds, but e.g. in the most recent program ESCOs could only get 40% of investments financed, while owners would get 80%.

4.2 Consumption charges not based on consumption

The provision of energy services is commonly charged according to specific consumption and for that purpose the charging systems are diverse, not only in terms of what is charged for, but also who is collecting the charges. Oftentimes, the charging system is a main risk factor when ESCOs are establishing performance-based contracts. The charges are commonly a combination of fixed charges and consumption charges, ensuring that the supplier is remunerated for the fixed costs pertaining to the delivery. If energy is subsidized, the weight will be shifting towards fixed charges thus having the final charge become less dependent on consumption. Energy subsidies are already a challenge for ESCOs and energy efficiency investments.

In some cases, however, the charges do not reflect consumption at all. It is a common practice, particularly in Eastern Europe and China where district heating is common, to charge for heating of space not according to metered consumption, but instead per square meter. In that way, the charge is fixed for each unit of occupation regardless of the actual consumption. The traditional logic has been linked to the fact that individual units did not have any possibility of regulating the heat, as buildings were typically installed with single-string systems. The move towards metered consumption is a slow process that started in the beginning of the 1990s, but is far from completed. Changes are particularly challenging in existing buildings and buildings with mixed occupancy. In China, even in new buildings, consumers are commonly offered the choice between metered or per square meter consumption leading almost all to choose the latter. Here, regulations are on their way to catch up in order to push demand towards metered consumption.

Obviously, when the demand side is offered a charging model that allows indulgence with no additional charge, it becomes a hotel-like occupancy, where a traditional ESCO model is challenged.

The reason why the most obvious solution – to change the regulations that stipulate the charging model – is not implemented, is that it is so straightforward to do so. The technical solutions that would allow individual heating and cooling control in housing blocks commonly require building renovation. If buildings are with mixed ownership, which is common, a few occupants that may find their interests better served following the existing charging model can block a retrofit of the building, even if they are holding hostage those occupants that are either oversupplied or undersupplied with energy.

4.2.1 Potential solutions

Obviously, the stakeholder with the most skin in the game is the supplier of the service having no influence on the demand, although there is, of course, a technical maximum supply capacity. At the same time, suppliers are commonly not fully remunerated for the services provided. Solutions are now beginning to emerge that consider the entire supply chain, including the building envelope, as the responsibility of one supplier of DBOO – Design, Build, Own and Operate – services. It is already well adopted in the water sector and is beginning to emerge in district cooling projects in India. It is a model that may to some extent replace the common lack of performance-based building codes, but as the name indicates, it is a model either for new construction or for total renovation projects in larger districts of existing buildings. It is therefore not a solution for smaller ESCOs.

And the smaller scale solution should not be discarded. Compelling consumers to individually pay for metered consumption is in many instances favouring the few at the expense of the many. Energy services delivered through antiquated supply systems including single-string heating systems is not providing a level of service that occupants in more modern housing are taking for granted – except maybe for the few occupying the middle of the buildings. Political courage to demand this change, which could set in motion a large-scale renovation effort, is in great demand. Here, ESCOs could play a decisive role.

It should be mentioned, though, that this is a barrier not reported by the ESCO associations interviewed. Although Romania is part of the analysis, the absence of this barrier in the reporting is generally presumed to be a result of not having included other ESCO associations from the countries, where this barrier is most prominent. For the same reason, the barrier is not adopted in the relevant table above.

4.3 Public sector budget and accounting rules

In many countries, public sector entities are the primary customers of ESCO services. In other countries, however, the budgeting of ESCO activities, or the ability to engage ESCOs has been reported to be complicated for public sector stakeholders. The barriers consist mainly of two issues: 1) the length of the period over which public entities are allowed to contract any given service provider, and 2) the way that ESCO services are classified in the accounting rules.

Indeed, ESCO services are provided over several years and need to be budgeted as such. However, this often corrupts the contracting of ESCOs by public entities, like in the case of Colombia and at least until recently the Philippines, where these entities are bound either by law or by practice to restrictions on the length of contracting, limited to the number of years for which budget has been allocated for the public entity, or to the remaining length of the political term. This works counter to the purpose of the ESCO business, where energy efficiency measures are designed as more complex systemic measures that have a longer payback time, but where the overall energy savings potential can be considerable.

In some countries, like Canada, multi-year contracting is allowed by the regulatory frameworks, and practiced extensively at the federal level, but the local level of government is slower to adopt this practice and is typically less than 8 years. Recently, however, also local contracts have exceeded 8 years and more are in the pipeline. In other countries, multi-year contracting is allowed without an upper limit as long as a certain percentage threshold on the total finance needed is met by the public entity. In Romania, the maximum length of contracts is five years in theory, but only if the funds provided by the public entity are above 50% of the total cost. Nevertheless, even in this case, the ESCO concept being fairly unknown by the potential public clients, prevent projects from materializing, as public entities are reluctant to enter into contracts in the absence of a clear legislation, specifically confirming the legality of ESCO contracting. This emphasises the need for standardized ESCO contracts, as well as underscores the interdependence between the barriers and potential solutions presented here.

In most of the analysed countries, the legislation doesn't actually prohibit multi-year public contracts, although structural barriers inhibit public sector entities' longer-term contracting. Some ESCO associations report that public entities aren't willing to engage in contracting beyond election periods, which in practice generates a fluctuating market that only works in short windows of time in the beginning of an election period. In several instances, public entities are legally prohibited from engaging in contracting for services beyond their annual budget. As an example, the Colombian ESCO association CCEE reports that public sector entities in Colombia couldn't until recently enter into contracts beyond their annual budget. This has recently changed with a new law allowing for multi-year contracting. However, the new rules which also include service contracts, are excessively complex and public officials still have reservations in entering into contracts beyond the annual budgets of their institutions.

In some instances, the issue is simply the assurance of honouring the contract. Basically, there is lack of trust that either the ESCO, or the public entity will be able to honour their contract in the long term. This can range from the fear of ESCOs becoming insolvent during the implementation period, to a bad track record of public entities not paying their energy bills. In the case of Malaysia, even though there are success stories, there is an issue with the lack of an established mechanism to pay the ESCOs based on the achieved energy savings.

When it comes to the barrier of accounting, ESCO associations have referred to the international accounting legislation IFRS16 specifically, which requires public entities contracting ESCOs to report the ESCO intervention on their own accounts and budget, even though it is the ESCO that actually undertakes the investments and despite the fact the energy savings can be targeted to cover the incurred debt. This piece of legislation may force the public entities to register the ESCO related investments as their own, putting additional burden on already constrained budgets and eliminating the financing advantages of engaging ESCOs.

4.3.1 Potential solution

There are no simple solutions to this as the rules and regulations obstructing the provision of services to the public sector are not particular to ESCOs. Rather, they are generic in nature pertaining to all public contracting for services. A workaround therefore requires regulation particular for ESCO services and thus also demands a clear definition and delineation of such services. The multitude of contract models used by ESCOs may well be an obstacle to such delineation, not to mention that other lines of business may challenge any special treatment of energy services.

The most obvious potential solution to these challenges is the establishment of a public sector owned vehicle, a Super ESCO, which can provide a window through which private ESCOs can operate. This window can be organized in many ways, with or without financing, with or without energy audits or with or without its own implementation capability, leaving the private sector ESCOs to provide their services according to the design of the Super ESCO. As a Super ESCO in practice takes over one or more of the core functions of a typical ESCO, it may also render the private ESCOs contracting through the Super ESCO more like contractors or suppliers instead of functioning as 'full-package' ESCOs.

The Asia-Pacific ESCO Industry Alliance (APEIA) and the Philippine Energy Efficiency Alliance (PE2) present the case of how the barriers facing government procurement of ESCO contracts in the Philippines are being removed through new EE legislation

In the Philippines, the Government Procurement Reform Act of 2002 has been a barrier for ESCO procurement, effectively inhibiting ESCO interventions from materializing, as the law specifically only addresses procurement of pure goods and pure services. A failed attempt by an IFC/GEF project to help a government bank with the pilot procurement of an ESCO performance contract in 2002 confirmed this procurement barrier. Without clear provisions in the procurement law for ESCO performance contracts, ESCOs have in practice not been allowed to operate, as no public entity would enter into contracts with ESCOs without full clarity on the legality and asset transfer features of the agreement. In addition, a typical ESCO performance contract hypothetically needs to apply for a Multi-Year Contracting Authority, issued by the Department of Budget and Management and with timelines usually bound by the remainder of a 6-year term of the incumbent government administration. On top of these, government entities are not allowed to use energy savings to fund energy efficiency improvements or pay for ESCO services, as strict rules require that all forms of budgetary savings or unused allocations revert to the government treasury.

The passage of the Energy Efficiency and Conservation Act of 2019 is slowly removing the procurement barriers in the use of ESCO services for energy efficiency projects in government facilities. The new law creates an Inter-Agency Energy Efficiency and Conservation Committee (IAEECC) from the ministers of nine national government agencies, as well as builds on three other legislations -- the procurement law, the Build-Operate-Transfer (BOT) law, and the joint-venture guidelines for state-owned enterprises -- to enable broader ESCO-compatible procurement, contracting and financing modalities.

In January 2022, the IAEECC passed its Resolution No. 5, which institutes the Guidelines for the Government Energy Management Program (GEMP). The GEMP Guidelines document has explicit language for ESCO-led government energy efficiency projects, and defines standard terms and conditions for an energy savings performance contract (ESPC) with government entities.

Barriers due to existing ESCO-specific regulation

Chapter 5

In the previous chapter, regulatory barriers that unintentionally affect ESCOs and their business were addressed. But ESCOs also face regulatory barriers that are specific to the ESCOs or their business model. Such barriers may be due to misunderstandings within regulatory bodies of how the ESCO model works or conceptions of avoiding any support to private sector companies and in the process hampering their business instead. From a positive perception, such ESCO-specific barriers should be easier to abolish than those that unintentionally affect ESCOs, but are in place to achieve other purposes.

Table 2. Barriers due to existing ESCO-specific regulation

Barrier / Country	5. Barriers due to existing ESCO-specific regulation		
	5.1. Contract format	5.2 Super ESCOs competition	5.3 Access to government finance
	Which are the barriers specifically related to ESCO contracts?	Are super ESCOs competitors rather than coordinators?	Can third party investors access public funds for energy efficiency?
Australia	No standard contract.	No super ESCO.	No Energy Efficiency programmes.
Canada	Standard contract at Federal level, but too complex and risky for ESCOs.	No federal super ESCO, However a private sector led super ESCO now operates across Canada	Owner can access subsidies, as can ESCOs on behalf of owner, not third-party financiers. No continuity across Provinces/ regions.
Chile	No standard contract.	Competition from the local super ESCO.	Third party can receive grants for EE programmes, but not ESCOs.
Colombia	No standard contract.	No super ESCO.	No Energy Efficiency programmes.
India	No standard contract.	Competition from the local super ESCO.	No Energy Efficiency programmes.
Japan	Too complex.	No super ESCO.	Third party can access energy efficiency programmes.
Malaysia	No standard contract.	No super ESCO.	No Energy Efficiency programmes.
Philippines	No standard contract.	No super ESCO.	Not currently, a programme for third party investors to access EE programmes is being drafted.
Portugal	Too complex, risky for ESCOs.	No super ESCO.	Some restrictions on ESCO access to funds.
Romania	Not fit for purpose.	No super ESCO.	Funds channelled to public utilities and building owners undermining ESCO activities.
UAE	Too complex and outdated.	Super ESCO performing as intended.	EE programmes depends on the Emirate; no financial incentives for EE.
UK	Not without issues but have been the base for strong growth in EPC.	No public super ESCO, but public frameworks exist that act as super ESCO.	Well established grant, interest free loan, and revolving fund scheme.

5.1 Contract format

Commonly, longer-term business relations between a supplier and a client are governed by a contract stipulating rights and obligations of each party. The complex issues oftentimes pertaining to the ESCO business model means that the contract governing the business relationship between ESCO and client constitute one of the central barriers for the entire ESCO business. The potential solution to this is the provision of model contracts for use in the contracting particularly between a private ESCO and a public sector entity. Model contracts work best for public tendering because government and public institutions often need a standardized approach, particularly in the context of programs. The model contract is supposed to alleviate the barriers pertaining to the cumbersome process of drafting and negotiating new contracts for each project, especially with clients that are unfamiliar with the ESCO concept. This commonly makes the process lengthy, tedious and expensive. The ESCO associations in Chile, India and Romania express the strong need for such a contract, and in some of the countries there is work ongoing to create such a standard contract. In Canada, the national ESCO association ESAC reports that there is a standard contract at Federal level, but other levels of government, namely Provincial and Municipal, do not have one and do not utilize the Federal standard form. The associations stress that the contract template shouldn't be too complex and be specifically tailored to the ESCO concept, rather than being a general contract for public procurement.

However, in countries with more ESCO experiences and where standard or model contracts do exist, some associations e.g. APESE in Portugal and JAESCO in Japan note that the contracts, or the operation manual for procurement of ESCO services for public buildings in themselves constitute a barrier rather than an incentive to ESCO activities. They are often too complicated or antiquated e.g. in the United Arab Emirates, the standard contracts haven't been revised since 2013, and 24% of ESCOs consider their complexity as the main stumbling block for the growth of the ESCO market. In some cases, their complexity stem from negative experiences from former BOT and PPP experiences. In these cases, the model contracts include numerous reservations that are to indemnify the public sector from negative side effects from the agreement e.g. in Canada the federal level contract template includes the right to withhold payments for the public sector entity if there is a dispute about the savings, until the dispute is resolved, which constitutes a huge risk for the ESCO from a financial perspective. In other cases, it is merely a matter of the contracts being drafted in a time where ESCOs were a real novelty, and thus needed to include a lot of details that are not really needed today, like is the case for the United Arab Emirates.

Other standard contracts are actually not tailored to ESCOs, but are based on templates tailored to the activities of traditional energy consultants or contractors. In Malaysia, work has

The Portuguese ESCO association APESE reflects on how the standard contract for public sector projects doesn't provide enough flexibility catering for the potential variety of ESCO services, and how early negative experiences with unbalanced risk sharing of public private partnerships (PPT) has had an impact on the current standard ESCO contract.

Unbalanced risk sharing placing undue burden on the public sector during early PPT experiences has created an adverse response, where risk in public contracts is skewed towards the ESCO. Current standard ESCO contracts are very complex, do not provide enough flexibility to the large variety of potential ESCO interventions, and place undue burden on the ESCOS. ESCOs are required to cover the costs of the energy audit, posing an upfront cost prior to knowing if the investment has a reasonable return. Two companies are then selected to provide final bids, upon which a new energy audit is required, further increasing the total transaction costs before even winning a bid. The ESCOs also carry the risk of energy performance of the asset after the intervention, without any provision for risk sharing with the user or owner of the asset, both becoming critical barriers for entering into agreements for public sector projects. In addition, the process for public tendering is complex, often requiring more than one year to develop a project. During this time, buildings, their use and available technologies might change, so additional analysis, procedures and paperwork is needed. In the end ESCOs spend more time with legal counselling and procedures for contracting rather than the energy audits and implementation themselves. One exception is streetlighting, where the available standard contract for this specific kind of intervention is simple and easy to implement, even if it is based on the more convoluted contract for buildings, leading to an actual well-developed market for ESCO interventions in the public lighting domain in Portugal.

been underway for a few years to establish an energy performance contract (EPC) template, but so far, the model produced resembles more the requirements of a construction contract, rather than being tailored to ESCOs. In Romania, the proposed standard ESCO contract doesn't include a Measurement and Verification (M&V) protocol, which is needed for a clear EPC, and doesn't require verification staff to be M&V experts. Thus, even with model contracts in place the result may nonetheless be that contracting becomes a lengthy process, with reported time frames of up to one year, which leads to high transaction costs and uncertainty regarding the implementation of projects, and therefore insecurity for the ESCO business.

Lengthy and cumbersome contracts are not in either party's interest. Overall, therefore, ESCOs need contracts that are tailored to their activities, void of undue reservations and exemptions and with a focus on ease of implementation and management. In the text box the situation in Portugal is presented, where the contract format is placing most of the contracting risks on the ESCOs. In Canada, the opposite seems to be the case, where the technology risk is skewed towards the public sector. Here, more specifically, the municipalities are liable for any damage or issue arising from the use of innovative technologies and/or approaches to renovate or construct new buildings. This leaves clients reluctant towards taking on new technologies and approaches, especially if they do not have a full understanding of both the ESCO concept and the technologies that are implemented in a given project.

5.1.1 Potential solution

The obvious solution to a barrier constituted by a model contract that does not fulfil its purpose is of course to replace it with one that does. The development of a fit-for-purpose model contract, however, is not straightforward if the experience base is either uneven or limited on both sides. Trust in the contract is as important as the contract itself. In the absence of experience and lack of trust in the legal format leads to contract monsters that cater to every detail, relevant and irrelevant alike. A way to avoid catering to too many details may be to establish straightforward dispute resolution modalities to replace them. The development of a standardized ESCO contract, should be written through a consultative process between the national or regional ESCO association, or in its absence national ESCOs, and the relevant public institutions, and private sector associations like the chamber of commerce. The process would benefit from being inspired by successful ESCO experiences in other countries and regions, and the consultation with third party experts. The creation of a contract format that exists within an existing national legal framework can potentially improve ESCO activity at a minimal cost.

In terms of risk sharing, this is usually something that is outlined in contracts, why the availability of a risk balanced standard contract is a good start. Although, as described above, in cases where existing regulation supersedes contractual arrangements, a revision of the current regulatory framework is needed. In the first instance, it must be acknowledged that ESCOs normally take on most of the risk in EE projects, and thus efforts should be made to minimize their risk when possible. On the other hand, as ESCOs (or delivery partners) are responsible for the design, installation and maintenance[3] of the technologies, the client shouldn't carry any risk related to the performance of the equipment and potential damages caused by the technologies and their management, unless there isn't an indication of clear misuse. A balanced approach on shared risk between the ESCO and the contracting entity can be conceived, to encourage ESCO activity and reduce risk for the client. Access to government finance for energy efficiency renovation could also alleviate part of the financial pressure on the ESCO, and therefore serve as risk mitigation (more on third party finance below).

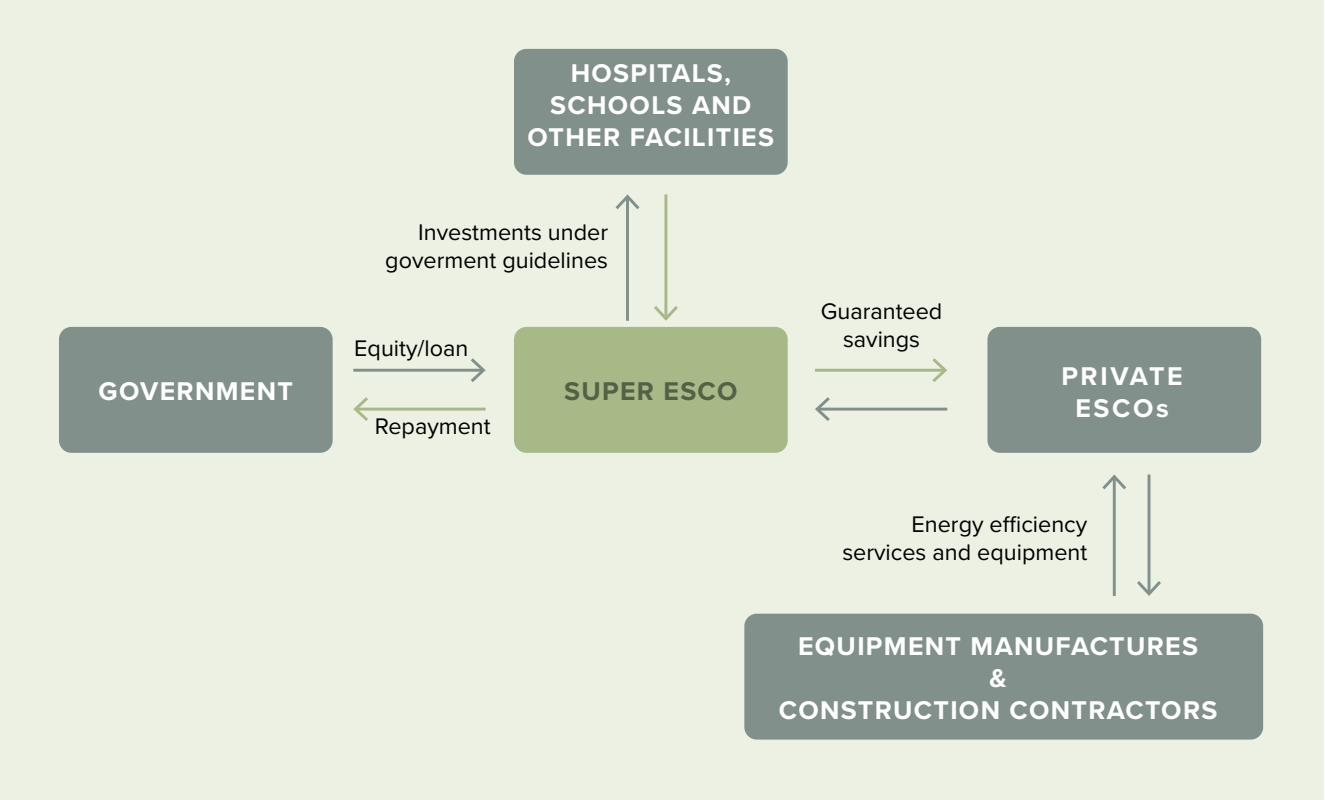
5.2 Super ESCO competition

Considering Super ESCOs as a solution to regulatory obstacles in one chapter and in the next presenting Super ESCOs as a regulatory barrier is a classic case of rendering the good the enemy of the perfect. Or of solving a set of problems with one solution that may create other ones.

Super ESCOs have been created following the idea that ideally a state-owned ESCO could assist in coordinating, promoting, financing and overseeing ESCO development in its country. In the case of Canada, lacking a public led Super ESCO initiative, the private sector owned Super ESCO SOFIAC has filled the gap. When well-designed Super ESCOs function effectively, they stimulate the growth of ESCO markets, basically coordinating and connecting private ESCOs to the projects (e.g. hospitals, schools and other facilities), and also channelling finance and energy efficiency incentives for public projects to be implemented by ESCOs.

3 In Canada, most of the ESCOs do in fact not perform the function of maintenance. Instead, they provide a schedule of required maintenance for the client to administer. This leads to disputes when public sector clients in particular fail to maintain the asset and problems occur later and the savings depreciate over time.

Figure 3. Conceptual Model of a Super ESCO



Source: Econoler

The mandate and tasks of Super ESCOs can vary from country to country, from solely being a gatekeeper of tenders and public procurement of ESCO services, to itself acting as an ESCO and implement projects in both the public and private sector. Some ESCO associations report that Super ESCOs have strayed from what they thought was their original purpose, like the cases of Chile and India, where the national Super ESCOs are competing with private ESCOs rather than supporting their activities. In these cases, Super ESCOs are using their position of power in the market in conjunction with their connections to the public sector. With strong government backing, including financial backing, Super ESCOs that provide ESCO services in their own name have clear advantages in building up strong portfolios that make them susceptible to demand also from the private sector. As a result, ESCO companies in the country may suffer from the actions of the very entity created to support them. It is also reported that in countries where a Super ESCO strays away from its original purpose, there is no efficient communication between the Super ESCO and private ESCOs, effectively severing the tie between them.

The barriers established in this manner are less regulatory and more market based, but they originate in the regulations establishing the Super ESCO. If the Super ESCO ultimately encroaches on the private ESCO market, it may leave the private ESCOs in a worse state than without the Super ESCO in place. Even if the ESCO contracts are established and thus achieve the energy efficiency potential, the Super ESCO may ultimately monopolize public sector ESCO contracting, neglecting the additional capacity of the private ESCOs and thus potentially loosing projects that might have been implemented in a well-functioning and diverse ESCO market with equal opportunities for multiple agents.

The Alliance for an Energy Efficient Economy (AEEE) in India and the National Association of Energy Efficiency Companies reflect on how their countries' equivalents of a Super ESCO in practice exclude ESCOs from public projects.

In India, the Super ESCO Energy Efficiency Services Limited (EESL) has been instrumental in achieving large energy savings, amounting to 47 billion kWh energy annually, while reducing 36.5 million tonnes of carbon emissions. However, these achievements might partially have come at the expense of the development of a vibrant ESCO market. Government entities are able to choose EESL as implementing agency directly without the requirement of a public tendering process. The lack of a tendering process makes it easier to implement projects, but in these cases, there are no entry points for external companies, and no information is disclosed on the performance of the projects. On the other hand, AEEE reports that some public lighting tenders have been taking place where private companies have participated and won the tenders.

In Chile, the equivalent of a Super ESCO, even though not officially defined as one, the Agencia de Sostenebilidad Energetica seems to compete with the ESCOs. The Agency is the former energy efficiency agency, which has been converted to an operational entity, a third-party entity with government funding that ESCOs need to work through to access public projects. When municipalities want to make an ESCO tender, the Agency is asked to arrange the tender, but as the Agency is required to generate income, there are several cases, where the company implements the project on its own without the involvement of ESCOs.

5.2.1 Potential solution

At face value, this is a straightforward problem to solve. A Super ESCO is never formed with the purpose of competing with the private ESCO sector; more commonly it is in fact established to overcome challenges in getting energy efficiency investments in the public sector off the ground. It builds on the recognition of the ESCO contracting model, which suggests the understanding and approval of the approach within the Government offices. The barriers nevertheless created lie in the lack of understanding that the private ESCO market should be actively supported to engage with the Super ESCO. It should be considered an integrated part of the delivery model, and the mandate of the Super ESCO must be defined to clearly focus on the development of their national ESCO market, rather than incentivising their own growth through implementation of projects. Their finances should not be designed to be at odds with revenues to be generated from the private sector ESCOs energy performance contracting, but rather be based on fees connected to the tendering process for ESCO services. The Super ESCO models evolving in the UAE and Saudi Arabia are seemingly overcoming this barrier. Also, SOFIAC in Canada does not compete directly with the ESCOs. Instead, the ESCOs come to SOFIAC with projects to implement and get appointed by SOFIAC. Where SOFIAC sources the project then they carry out a procurement from their own held qualified bidders list. But in India and Chile the situation may be different (see textboxes).

The Clean Energy Business Council (CEBC) in the United Arab Emirates (UAE) share their views of how effective Super ESCO approaches in the UAE promote the development of a vibrant ESCO market

Most ECSO activities in the UAE are centered around Abu Dhabi and Dubai, while ESCO activity in the other five emirates is still stagnant. Three of the emirates have super ESCOs, and two of these are Abu Dhabi and Dubai, where the Super ESCO in Abu Dhabi has just recently been established. The newly established super ESCO in Abu Dhabi, Abu Dhabi Energy Services (ADES) has already achieved a considerable amount of energy savings and CEBC expect Abu Dhabi to have the most mature ESCO market in the region in the near future.

In Dubai, the Super ESCO, Etihad ESCO, is mandated to implement energy efficiency projects through the Supreme Council of Energy which sets targets and directs the Etihad ESCO to implement activities to achieve these targets. All projects related to government buildings must go through the Super ESCO. Etihad ESCO doesn't implement projects itself, but rather decides which buildings are to be retrofitted, and then sets the tender to hire ESCO providers, leading to a vibrant and competitive ESCO market.

5.3 Access to government finance

It is not uncommon that ESCOs are specifically prohibited from accessing public financial incentives for energy efficiency initiatives. In numerous countries where ESCOs operate, state subsidies in the form of grants, concessional loans, or tax rebates, cannot be exploited by third party investors, i.e., the public financing and incentive schemes are only applicable to the owner/user of the facilities; not a private sector stakeholder investing on behalf of owners/users, such as ESCOs, even if ESCO participation will achieve exactly the goals that such incentives are meant for.

There are at least three issues with such programmes:

1. It excludes professional energy efficiency expertise from the market. It is not that all installers are fly-by-night operators, but they have no skin in the game, so they may not be as diligent in choice of specific models that fit the purpose.

2. The programmes are oftentimes designed for single-tech solutions, typically targeting the cherries and leaving the pie untouched. A grant programme in Denmark, for instance, targets heat pumps, but offers no support for insulation and windows upgrades typically resulting in suboptimization. Professional ESCOs would refrain from such suboptimal installations.

3. Cherry-picking reflects good on policy makers, because they produce excellent results. But the investments fundamentally require no grant funding at all if they were implemented by ESCOs, whose business it is to make such installations – and include the lesser cost-efficient technologies in the package – on a commercial basis. These programmes, therefore, only look good because they are compared to the no-action baseline.

Other issues with such programmes are that they may prevent any action without a grant as consumers will simply wait for the next grant package if they missed the first. The worst effect, however, is that in principle it corresponds to fossil fuel subsidies, where the Government supports the less-efficient technology directly to consumers and leave the professional suppliers of optimal solutions to compete against the subsidy.

In other situations, ESCOs can access some extent of government finance, e.g., in Portugal through a dedicated revolving fund, granting concessional loans with fifteen years free of interest and three years grace period. Nevertheless, even in situations where finance and incentives are available, ESCO associations have expressed that oftentimes access these funds is too convoluted with long processing times that hamper swift market responses to tenders and project design. At the same time, as noted by the Portu-

guese and Canadian associations, financing allotted to such programmes is commonly only temporary, or it is a fixed amount that quickly runs out. It is therefore seldom a basis for a stable development of a supply-demand balance. This is commonly also linked to changing administrations and priorities, which lead to a discontinuity of financing and incentive schemes, creating a sort of stop-and-go effect, leading to postponement and discontinuity of interventions by ESCOs (and other market participants).

A particular variation of the issue, even where public finance and incentives are accessible by ESCOs, is observed in Portugal, where APESE has highlighted that at times governments are quick at announcing intended financing schemes and subsidies, but relatively slow at making the programmes operational. Oftentimes this leads to a freeze in the market, while market participants wait for these schemes to be launched. In some cases, the payback time of the intended investments can easily be shorter than the time it takes to make the funds available.

Various countries pursue energy efficiency policies which match the ESCOs business model, and distribute incentives to the private sector, however only under a certain emission reduction threshold. For instance, in the Philippines, a threshold of 15% of energy savings has to be reached over the course of a project for the ESCO to apply for energy efficiency incentives. This situation renders ESCO activities inflexible rather than develops them, by forcing them out of some contracts.

The Malaysia Association of Energy Service Companies (MAESCO) reports on positive developments on access to public funding

The Malaysian government has launched a USD 50 million EPC fund in 2017, and a credit guarantee fund of about 10% was provided by the Ministry of Energy and another agency a clear sign of government priority. It further provides an interest rate subsidy of 1% per annum to successful ESCOs.

5.3.1 Potential solution

The main challenge in this context is probably tradition. Energy efficiency grants have been around for decades. Practically all countries run them, be it on A/Cs, fridges, or more rarely pumps or insulation or a multitude of other items depending on market relevance. The programmes are easy to apply, easy to budget and the effect easy to (superficially) assess. Including third party investors in the programmes is considered an unnecessary complication, and it may well be an additional sentiment, as has been aired by ANESCO, the national ESCO association in Chile, that the professionals in the private sector ought to be able to run their businesses without such subsidies.

As described above, this rests on a misinterpretation of market dynamics. The simple solution is to provide access for the professionals in the ESCO sector to the same programmes that are offered to owners of inefficient installations. One of the first effects would be that the ESCOs would seek out the cases, where the energy saving potentials are the highest. This is unlikely to be the same as those that normally benefit from the consumer-driven programmes, where the most affluent with a baseline that is already better than the average, are better equipped to apply for support.

In principle, ESCOs would need no direct technology support programmes at all, but as long as Governments prefer such programmes a first step would be to allow third party financiers like ESCOs to access government finance on an equal footing by recognizing that their activities fall within the objective of these national programmes. Furthermore, regulation around ESCO activities eligible for grants may be designed to reward systems approaches with longer payback times as these refrain from cherry-picking and exploit the full energy efficiency potential.

Better yet, as ESCOs actually take on the financial risk of energy efficiency projects, they should be able to access an entirely different sort of finance and incentives targeted specifically at their business model. Such support, however, must be conditional on a clear-cut definition of ESCOs to prevent other actors from claiming that status and receiving such benefits without warrant. Nor should such support be in competition with the traditional grant programmes for specific technologies. Finally, whichever financing and grant programmes are designed, they should be long term commitments, ideally also across administrations, in order to benefit the energy efficiency market. This will underpin a stable market development and growth upon which energy efficiency businesses such as ESCOs can base a commercial operation.

Barriers in absence of regulation

Chapter 6

Certain barriers ESCOs encounter are due to the lack of regulation which can complicate or create uncertainty around their activities. These are often encountered in countries where ESCOs overall have little presence, and the legal framework is missing or incomplete. It may seem an oddity that a group of private sector entities are actively seeking regulation – a common perception of a liberal market commonly being that less regulation is to be preferred.

But regulation is commonplace and large global markets are created only as a result of regulation. We just don't think about it. Even the most liberal mind probably appreciates regulation of the aviation industry. This to say that the absence of regulation sometimes prevents desirable things from happening. Energy efficiency as a topic has been on the international climate change agenda since its inception in the 1990s. It was a topic even before climate change was a topic, earlier as part of an energy security agenda (which has pedalled to the forefront again due to the Ukraine crisis). But it has never taken off as the first natural choice on the climate change response agenda and there are few if any fool proof theories around to explain this conundrum.

But one possible reason is that energy efficiency is such a no brainer that it is bound to happen by itself. It hasn't and it doesn't and therefore there is an increasing amount of regulation, for instance in the form of minimum performance standards that aim to improve efficiency of hardware – while there are very few regulations aiming at improving the efficiency of 'software' in the form of the design of things e.g. pipes in buildings.

But as these regulations are far from delivering the potentials – and the efficiency gains required according to IEA in order to keep the Paris Agreement's targets within reach – it is worth considering if this approach is sufficient. While there is a minimum performance standard for a new pump, nothing prevents a 50-years old pump from keeping on running. Well, some places regulation actually does prevent that.

The point of this chapter is to identify innovative regulation that creates a market for energy efficiency in which also ESCOs play a role. Some of this regulation is ESCO-specific, and some is not. The focus is on the former. To avoid this becoming a long list of wishful thinking, the barriers in the absence of regulation is structured from beneficial regulation that does exist in at least one country, but remains absent in many or most others.

Table 3. Barriers in absence of regulation

Barrier / Country	6. Barriers in absence of regulation			
	6.1 ESCO Definition	6.2 ESCO accreditation	6.3 Standardized contracts	6.4 Energy audits requirements
	Does a law clearly define ESCOs?	Is there an ESCO accreditation scheme?	Does a simplified, standardized contract for ESCO activity exist?	Are energy audits mandatory, and do recommendations need to be implemented?
Australia	Yes	No	No standard contract.	No requirements
Canada	No clear distinction with an energy consultant.	No	At Federal level. other levels of government do not have one and do not utilize the Federal one.	Mandatory energy audit for federal buildings only and implementation of recommendations.
Chile	Yes	ESCO certification, but the certification system is not managed by ESCOs themselves.	No standard contract.	Audit mandatory for consumers above 60 GWh/ yr. No implementation requirements.
Colombia	No	No	No standard contract.	No requirements.
India	No legal distinction with an energy consultant.	Voluntary accreditation by the Bureau of Energy Efficiency. No perceived benefit for contracting.	No standard contract.	Mandatory for installations consuming over 6 GWh/ year. No requirement for implementation.
Japan	Yes, however the definition is not entirely adequate.	No	Standard contract exist but is too complex.	Mandatory beyond a certain consumption. No requirements for implementation.
Malaysia	Yes	Informal accreditation by the national ESCO association	No standard contract.	Mandatory for facilities beyond 6 GWh/year to report their consumption and EE measures. No requirement for implementation.
Philippines	Yes	Yes	No standard contract.	Mandatory every 3 year for consumers above 0.5 GWh/ yr. Mandatory to set annual targets and plans for EE, based on the audits.
Portugal	Yes	Yes	Standard contract exist but is too complex, and risk is skewed towards the ESCO.	Audits mandatory at least every four years for government buildings. No requirements for implementation.
Romania	No distinction with an energy consultant.	No difference between an ESCO and a consulting company, no certification.	Yes, but not fit for purpose.	EE law incentivises energy audits for both residential and industrial sectors. No requirements for implementation.
UAE	Yes	Yes	Standard contract exist but is too complex and outdated.	No requirements
UK	No official definition allowing distinction from energy supply / retail companies.	No accreditation for ESCOs. Other public frameworks provide pre-qualification.	Standard contracts based on existing public frameworks.	Mandatory energy audits. No requirements for implementation.

6.1 ESCO Definition

A major obstacle to ESCO activities in most consulted countries where the ESCO ecosystem is at its infancy is the absence of a clear-cut officially recognized definition of what an ESCO is. In countries where there is an official definition of ESCOs, in some cases the definition is outdated or ill-suited. In both cases the outcome is that there is no clear-cut delineation between ESCOs, being companies providing the entire set of energy efficiency services, from audit to equipment, installation and maintenance, financing and energy savings guarantees; and other companies which might only cater for one of these services. Indeed, many entities that are not "real" ESCOs, such as individual energy or building consultants in Canada, Colombia, Japan, Romania can define themselves as ESCOs and claim the associated benefits and contracts, relying on the lack of knowledge about ESCOs in most governments. The negative outcomes of this lack of clear definition are multiple:

- Uncertainty is created around what constitutes ESCOs, creating insecurity in the concept and making potential customers reluctant to engage.

- Energy efficiency measures can lean towards simple component-based interventions (e.g. replacement of one type of equipment like air-conditioners), without considering a systemic approach (e.g. a whole building approach including building envelope, water heaters, electric components and possibly including renewables).

- A lack of requirement of energy savings guarantees for ESCO services can lead towards an overestimation of saving potentials and use of sub-optimal equipment. In some cases, the use of equipment that does not comply with its stated energy performance has also been reported.

- Energy savings potentials are not fully achieved

6.1.1 Potential solution

Overall, it appears that a clear-cut definition of ESCOs is a crucial cornerstone to the development of their activities in any context. The demand for such definition stems not least from the complication of the principles underpinning the ESCO model – and the confusion among clients when market operators do not share the same perception or adhere to a uniform definition. Obviously, if two companies that both claim to be ESCOs, deliver widely differing services, it becomes difficult for clients to make an informed choice. There isn't necessarily one best ESCO definition, but in general terms the ESCO definition should include the provision of energy efficiency services for a client, where the ESCO has an active role in the financing of the components or services, and where returns are (at least partially) generated by the expected energy savings. It might well be a task for the Global ESCO Network to establish a commonly agreed ESCO definition among global promoters of ESCOs such as exactly the organizations that the Network represents. Such a definition could easily be adopted by Governments that wish to see a larger role of ESCOs in pursuit of national energy efficiency potentials.

The following definitions of ESCO and EPC as defined by the EU Directive on energy end-use efficiency and energy services 2006/32/EC, provide an example of such a definition:

(i) 'energy service company' (ESCO): a natural or legal person that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises, and accepts some degree of financial risk in so doing. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria.

(j) 'energy performance contracting': a contractual arrangement between the beneficiary and the provider (normally an ESCO) of an energy efficiency improvement measure, where investments in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement.

Similar fit for purpose definitions of ESCOs and EPC are observed in countries where ESCO associations have been consulted, in some cases like the Philippines, the definition also includes reference to specific ESCO services and goods they provide.

6.2 ESCO accreditation

Some countries do recognize a clear definition of an ESCO, however do not back it by an official accreditation process, and thus potential customers do not have a third-party assurance that the ESCO has the capacity to deliver the requested services. This barrier has in some cases been overcome by requiring ESCOs to provide documentation and references as part of a call for ESCO services. E.g., Canada has a request for qualifications process in public procurement, designed to test experience and solvency prior to procurement of ESCO services. Although this requires that the customer has an in-depth understanding of the capacities needed to deliver the services in a sector that is most probably outside of their own core business, and it also contributes to increased and recurring transaction costs for each individual tendering process and increased perceived risk by potential customers. In other cases, like Malaysia and the US, in the absence of an official accreditation, the ESCO associations provide certification, establishing a sort of assurance that the companies indeed can deliver certain ESCO related services, but this doesn't carry the same assurance as an official and impartial accreditation. ESTA in the UK is trying to operate its own draft accreditation scheme, while JAESCO in Japan reports, that it is practically impossible to differentiate between association members on the qualification of their services. In Canada, even though there is no official accreditation process, the federal government provides a list of qualified bidders available to all levels of government to use, and the private sector owned Super ESCO, SOFIAC runs a similar qualified bidders list.

As is the case for an ESCO definition being dependent on an effective accreditation scheme to improve confidence in the ESCOs, accreditation will not work without a clear ESCO definition. Some of the consulted ESCO associations in countries where there is an accreditation scheme and an ESCO registry in place, like India, but where the ESCO definition allows for non-ESCO[4] service providers to be accredited, experience that companies don't see a lot of value in being accredited, and are not willing to pay the accreditation fees, unless accreditation is a precondition to participate in e.g. public procurement tenders.

4 Companies providing some energy services, but not the full package from planning, implementation and maintenance, financing and insurance, as ESCOs do.

Dubai's and the Philippines accreditation system formalizes ESCO qualifications, while facilitating the access of new ESCOs public projects

In Dubai ESCO accreditation is institutionalized through an official list of accredited entities, and clear requirements for accreditation published by the Regulatory and Supervisory Bureau for the Electricity and Water Sectors. The accreditation scheme also offers two types of accreditation: (1) Full Accreditation for established ESCOs which have carried out successful EPC projects and fulfil the key criteria, and (2) Provisional Accreditation to companies without a sufficient track record of EPC, to encourage new entrants to the ESCO market. The provisional accreditation is valid for one year and can be renewed up to a maximum period of six years.

The Philippines have established a similar approach where ESCOs can apply for two different modalities to the Department of Energy: (1) Registered ESCO for ESCOs that meet the minimum of requirements on legal and technical capacity, but seeking accreditation for the first time, and (2) Certified ESCO for ESCOs with proven performance or results-based projects savings experience and with proven customer experiences, in addition to meeting the requirements of a Registered ESCO. The validity of the Certificate of Certified ESCO is five years, and 3 years for Registered ESCOs.

Similar approaches have been observed in other countries beyond the ones where ESCO associations were interviewed.

6.2.1 Potential Solution

A fit for purpose ESCO definition should ideally be incorporated in the equally crucial ESCO accreditation system. A trustworthy ESCO accreditation scheme can be an effective tool to enhance ESCO professionalism and quality of services and increase confidence in and help promote the ESCO industry. ESCO accreditation could in theory fall under the aegis of both government or non-governmental entities, such as a Ministry of Energy, National Energy Agency, a national super ESCO or any other public entity with the relevant mandate. In the absence of such anchoring, a national or regional trade or ESCO association could be an alternative, but here conflicts of interest may hamper optimal credibility of accreditations, unless peer reviews are allowed in some form.

The accreditation of ESCOs should be structured in such a way to give potential clients an assurance that the accredited ESCO have qualified personnel, the necessary financial resources and a satisfactory track record in delivering ESCO projects. The accreditation scheme should cater for different classes or levels of ESCO accreditation, based on ESCO's capacities to accommodate different project types and sizes, which could be based on the ESCO's compliance with a variety of thresholds within a set of criteria. The following lists a set of criteria that can be applied for ESCO accreditation.

Business criteria

- Longevity - Length of time that the ESCO business has been in operation
- Project completion Investment Amount- Total amount of projects in monetary value that have been completed
- Demonstrate staff capacities - Staff experience, competency, capacity and organizational structure
- Insurance verification – General liability insurance on construction and business maintenance
- References – References from clients to evaluate the perceptions of performance
- Membership – Proven member of the accrediting association
- Ethics agreement - Signature of ESCO Code of Ethics of the accrediting organization
- Legal action description - Monitoring point of ESCO performance and issues with project fulfilment
- Certifications – Potential certification requirements e.g. ISO9000 on quality management systems

Financial criteria

- Financial strength – Documentation of ESCO's profitability and evaluation of debts, timely payments, capital availability, general bookkeeping practices
- Financial statements – Review of audited financial statements

Technical criteria

- Number of projects – The competency of an ESCO to deliver projects
- Demonstrate Ability - The ability of an ESCO (staff) to perform certain aspects of project delivery e.g. in the form of a minimum amount of staff being certified energy auditors or other
- Audit equipment ownership - Availability of energy audit equipment for the staff to utilize in project development phases
- Safety requirements – Conforming with governments safety requirements for workers
- Measurement and Verification Demonstration - Competency to guarantee project's performance as predicted in detailed energy audit

Table 4 illustrates a range of business, financial and technical criteria applied for ESCO accreditation in different countries.

Table 4. Requirements for national ESCO recognition

Business (B) Financial (F) Technical (T)		China	Canada	Dubai	India	Singa-pore	United States
B	Longevity Requirement	x	x	x	x	x	
B	Project Completion Investment Amount	x					
B	Demonstrate Staff*	x	x	x	x	x	x
B	Insurance Verification (General Liability)		x				
B	Reference from Clients			x		x	x
B	Membership in Accreditation Organization						x
B	Ethic Agreement						x
B	Legal Action Description						x
F	Financial Strength	x	x	x	x		x
F	Financial Statements for 2 years		x				
T	Number of Projects	x	x	x	x		x
T	Demonstrate Ability**	x	x	x	x	x	
T	Auditing Equipment Ownership			x		x	
T	Safety Requirements			x		x	
T	M&V Demonstration						x

* Staff refers to the ability to field competent staff to fulfill ability
**Ability refers to the ability to perform energy audits, project design, construction, and performance services
Source: Langlois, P., Unruh, T., 2020

6.3 Energy audits requirements

The regulations surrounding energy audit requirements impact ESCO activity throughout the world, as they may determine mandated demand for ESCO-related services by public or private actors. The lack of mandatory audits is correlated with countries where ESCOs struggle to develop, as reported by the national associations EEC in Australia, CCEE in Colombia and MAESCO in Malaysia. Additionally, while several countries encourage or have mandatory audits like Canada, Chile, India, Japan, Philippines, Portugal, Romania and the UK, few of them take the next step of also mandating the implementation of audit recommendations. Hence, although an audit may provide compelling evidence of significant savings, they oftentimes lead to no action at all. This may be the result of many of the traditional reservations towards energy efficiency investments like upfront costs, down-time of production facilities, unknown technologies or just unwillingness to change, but it may also be because audits can be, and are, usually completed by an (accredited) energy auditor, who is not offering an implementation model.

Mandatory audit regulation thus commonly, and paradoxically, impose the cost of the audit, but refrain from imposing the profits from the savings, which are the real objective of the audits. A third step of mandating the use of ESCOs for implementation is probably a step too far, and the ESCOs' value proposition should be able to stand on its own if a market is established through compulsory implementation. The point is that refraining from taking it to the level of mandatory implementation severely hampers the development of a market for ESCO services.

Additionally, in several countries, energy audits are mandatory only above a certain energy consumption threshold, which only targets large industrial energy consumers or solely public buildings. This is limiting mandated demand for energy efficiency measures to a restricted number of potential clients. In addition, large industrial energy consumers, and the public sector might be the entities that have a higher probability of taking care of the technical aspects and investment in the energy efficiency measures themselves, while they could instead be considered a launch pad for the development of a vibrant ESCO market, servicing

various sectors and covering a wide range of technologies. This, however, would require a deliberate inclusion of ESCOs and their expertise in implementation of energy efficiency investments.

6.3.1 Potential solution

Most ESCO markets would benefit from mandatory energy audits and associated mandatory implementation of their findings, but while mandatory audits have gained ground, the mandatory implementation seems to be met with regulatory reluctance. India may be the most advanced country in this regard with a mandatory implementation programme starting in 2014 and where trading in certificates from overachieving efficiency targets set through audits is thriving. Also, Canada has partially introduced mandatory implementation of energy audits recommendations, but only at the federal level. In the Philippines, where establishments with an annual energy consumption above 500,000 kWh/yr are required to conduct energy audits every three years, these entities are also required to set up annual targets and plans for energy efficiency improvements based on the audits.

Obviously, mandatory implementation will commonly be affiliated with (much) higher investment costs than that of the audit and in some instances systems down-time is a crucial issue. For both these reasons, however, the involvement of professional energy services from ESCOs including a financing model is an obvious way forward to remedy such concerns. Also, flexibility in implementation requirements, timewise and technology-wise, are commonly added and compromises may be achieved by applying adequate thresholds to both the kind of size of energy consumers that the mandatory energy audits apply to, and the kind of energy efficiency measures recommended by the audits that should be mandatory to implement. Such thresholds are applied in both India and Philippines as mentioned above.

6.4 The absence of a standardized contract format

The structure of the ESCO business model may be simple at face value, but complex in practice. A common accompaniment is therefore also a complex contract. As it was already introduced in chapter 5.1, the complexity can become disproportionate to the legal task at hand and ultimately evolve into a barrier in itself. It is therefore also obvious that a model contract can be helpful for the supply and demand side alike, if carefully crafted to suit the purpose. This is already lined out in section 5.1. It is thus equally obvious that the absence of a model contract may hamper the development of the market. With no contract standard at hand, the provision of a contract draft typically falls on the ESCO offering to provide its services on a set of terms that a buyer must familiarize itself with. Public entities in particular may be reluctant to enter into unknown contract formats, which cover long periods of time and may offer more or less complex remuneration models based on energy savings. A risk avers public servant may simply refrain from engaging.

The absence of a model contract may thus constitute a significant barrier to a smoothly operating market, and at the same time be a source of needless costs for contract development and scrutiny.

6.4.1 Potential solution

The answer to the absence of a standard contract is naturally to develop one. The task may be approached in different ways. In those markets where no standard ESCO contract exists, the typical approach is to adapt an existing contract format. In the UK, although there is in fact a model contract for ESCOs, adaptations of contracts under different government schemes (the public sector frameworks – RE:FIT, CEF, NDEE and ETL) are more widely used and have been the basis for a strong growth in public sector energy performance contracting. These contracts are already focused on energy renovation and thus may be more fit for purpose than other more generic engineering contract models, and ultimately a case-by-case revision of an existing contract format is likely to end up not only more cumbersome, but also entails the risk of ultimately not serving the purpose of creating trust among the parties.

The purpose of developing a dedicated standard contract for ESCO services essentially is to establish trust between the parties, which first of all speaks against a unilateral venture. A standard contract developed by an ESCO association as a service to its members is of course a step on the way, but in order for it to be generally adopted particularly by the public sector, the involvement of authorities responsible for public procurement is important. It is important for the same reason that a model contract developed alone by the procurement services is likely to generate a format that is biased, as is seen in the case of Portugal (see section 5.1.1).

Even a standard contract format developed in collaboration between the ESCO industry and national public procurement authorities, however, may be at risk of not being used.

In Canada, for instance, although there is a useful format developed for the use at federal level, the use of the contract model is being countermanded at state or local levels, limiting the scope of the contract model. Bringing about a generic and generally applicable model contract may well require both sector-specific and jurisdiction-specific efforts, ultimately requiring a suit of standard contract models that can be applied in different contexts. For this purpose, the Global ESCO Network is gathering examples of contract formats that may be used as inspiration.

6.5 The absence of an ESCO Association

Obviously, in this analysis, the existence of an ESCO association is the point of departure, and thus it is not mapped among the barriers. National ESCO associations exist in 35 countries. Few, if any, are established as a result of a legal mandate, but many are recognized as industry associations and membership considered a sign of status and recognition, implicitly helping to establish trust in the market. In some instances, like India, membership is a requirement when bidding on public contracts.

ESCO associations come in many forms and with more or less integration in national processes for development of legal frameworks that influence the markets for ESCO services. Some are recognized dialogue partners to the government offices, like for instance in Chile; others are not as may be the case in Romania. This obviously points to an opportunity to a push for representation of ESCO associations in national policy development for energy efficiency actions.

It is clear, however, that most countries, do not even have an ESCO association to start with. Such associations typically emerge when there is a critical mass of ESCOs delivering their services in a market and realize a demand for self-qualification, typically in the absence of a publicly recognized definition of an ESCO and/or as a desire to raise common views of the sector, or simply as a wish to share experience. From there, it may be a long way to achieve official recognition and for the public sector to realize the value of collaborating with a professional body with insights into the commercial development of energy efficiency projects. These delays are unnecessary and potentially, at the same time, lead to missed opportunities and ill-informed regulation.

6.5.1 Potential solution

Public sector intervention in the establishment of an ESCO association may be considered a 'self-help' initiative to develop a professional and dependable delivery system of ESCO services. It would start with the definition of a number of requirements that an ESCO must live up to, including a clear definition of an ESCO. It would equally require ESCOs to deliver a track record, which may be a challenge in an embryonic market, but a two-three year build-up period of track records followed by peer review of installation projects and contracts could be a way to start.

Obviously, if membership of an ESCO association is a requirement to participate in public tenders for ESCO services, an association will likely emerge at the initiative of market participants who will complete the institutional set-up on the basis of the fundamental requirements established by the public regulator. In this way, the public sector would have established a professional collaboration partner for the development of a regulatory framework and the provision of advice on the incorporation of ESCO services in public sector driven energy efficiency efforts.

Conclusion - a drive for ESCO-focused regulatory review

Chapter 7

There is no way around accepting that although the ESCO business model is simple in theory, it emerges as complicated in practice. Or maybe, and possibly in most cases, it is only perceived to be complicated. But there are many moving parts that need to fit together, and the absence of only a few may mean that the market doesn't take off. For sure, the idea that it is a private sector business model and therefore it needs no public sector interference is not supported by evidence – in the same way as energy efficiency investments in general do not materialize on their own account. For better or for worse, it is a business model that is intricately linked to public sector initiative – or lack of the same.

At the same time, it is a delivery system for energy efficiency that may deliver immense efficiency gains if all the moving parts are in place. That is why it is justifiable to consider it an 'ESCO ecosystem'. The ESCO ecosystem consists of those elements that need to be in place and thus are mainly linked to barriers in the absence of regulation as described in this chapter. Once the fundamentals are in place – a definition of ESCOs to keep the sector clean from competitors that do not deliver true ESCO services; a mandatory audit system that establishes a basic market; a standard or model contract at least for use in the public sector, and a professional ESCO association – the dialogue on the regulatory barriers that hinder the delivery of the desired services can commence.

In this process, the public sector plays a central role, either because it can speed up activities tremendously, or in essence because there is no other market actor that can take the initiative, for instance in terms of instituting mandatory energy audits. Given the experience among the ESCO associations, it is unlikely that the public sector will consider itself as the driver of ESCO market development. This is, nevertheless, a message that needs to be brought to the forefront of the dialogues on energy efficiency implementation.

It is not that ESCOs are the only implementation modality for energy efficiency. There are many initiatives that are equally public sector driven, but where ESCOs have no role to play, be it in setting of minimum energy performance standards for equipment and for buildings, specifying performance of vehicles or simply phasing out certain technologies like incandescent bulbs. ESCO contracts may also have a lower limit in terms of value, where individual households in many cases may well fall below that limit.

That said, the ESCOs and therefore especially the ESCO ecosystem described in this chapter hold immense potential for realizing the energy efficiency potentials that lay dormant in both the public and private sectors.

The list of regulations that get in the way of the ESCOs business model is long as demonstrated above. Common for all of them is that they are obstacles that need to be considered by regulators and legislators – and only regulators and legislators in their respective roles as such. They can sometimes be circumvented or navigated by ESCOs, but even so they constitute disadvantages that are costly to the sector and costly to society and thus ultimately are paid for in higher energy bills and higher emissions than necessary.

The most important point to make in this context is that remedying (most of) the regulatory barriers is cost free. There are no losers and from that perspective, addressing the misconceptions that underpin the regulatory obstacles

facing ESCOs should be right up the alley of policy makers' agenda, which commonly seek win-win solutions.

Several points can be highlighted from the list of barriers presented in the previous chapters.

- Many countries lack a basic framework defining and regulating ESCO activities, which could in turn produce an environment in which ESCOs could thrive. In the same sense, ESCOs suffer from the common absence of a simple, standardized contract to cover their activities, different from an energy consultant contract.

- Public entities constitute potentially fertile ground as business partners for ESCOs; however, they are often prevented from cooperating as public entities are burdened by inflexible accounting rules, and are limited to annual budgets, which do not fit well with ESCO activities.

- In many countries where ESCOs operate, they are unable to access government funding for their activities due to their status as third-party private sector stakeholders. This, however, is at odds with the energy efficiency policies of multiple countries, which ESCOs could help achieve.

It is also clear, that not all regulatory barriers can be easily addressed as they are more structural than regulatory. Split incentives among different public sector entities, for instance, is an issue that not only interferes with energy efficiency investments, but any kind of investment in the public sector's occupation of buildings, owned or rented.

Finally, in several country scenarios, the dominating barriers are more systemic and overarching. Energy subsidies are a general detriment to investments in energy efficiency, as is the exemption of high-emitters from carbon taxes. Such market distortion is not particularly damaging to ESCOs, but to the energy efficiency agenda per se. In the same category are those countries that generally have moderate climate ambitions as for instance tracked by the Climate Action Tracker (climateactiontracker.org), according to which not a single country is 'Paris Aligned' (with a climate policy that corresponds to the 1.5oC target), but where six (out of 42 assessed countries) have 'critically insufficient' policies, three of which host ESCO associations.

The latter example points towards another category of regulatory barriers: Those that materialize as 'the absence of regulation.'

Interviews with 12 ESCO associations are the prime foundation for the identification of barriers throughout the previous chapters. Even if they are few in numbers, they represent a third of all existing ESCO associations and even if they are from all corners of the world, they paint a relatively uniform picture of an ESCO industry that is generally struggling against an immense bureaucratic obstacle posed by regulations that are either targeted at other purposes or are caused by lack of understanding of the dynamics of the ESCO and energy efficiency markets.

When specifically analysing regulatory barriers for ESCOs – be it in their presence or absence – it is not surprising that the main addressee of the conclusions is the regulator. That means the public sector bodies that are responsible for designing and issuing regulation and legal frameworks, permanent or temporary, that shape the market for energy efficiency investments in general and for ESCOs specifically.

It is strongly recommended that the relevant public sector entities invite the ESCO industry in for a talk about how to design an ESCO-focused regulatory review. Such a dialogue could be held with inspiration from this analysis, possibly under a heading of a Danish proverb saying: 'too much and too little ruins everything', which in essence is the conclusion of this analysis.

From a positive perspective, it is obvious that the public sector is not foreign to the idea of regulating neither the energy efficiency sphere, nor specifically the ESCO industry. The only misfortune is that the regulator is likely to get it wrong. And even this can be excused considering the number of moving parts that need to work together to release the force of the ESCO industry in energy efficiency investment. This, however, should only be an encouragement to get it right.

This analysis therefore ends with an invitation to any public sector entity with responsibility for developing and issuing regulations related to the improvement of national or local energy efficiency to reach out to the Global ESCO Network, or any national ESCO association, to start – or continue – the dialogue on optimizing the regulatory frameworks for engaging ESCOs in a tangible acceleration of energy efficiency actions.

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Perspectives Based on Feedback from National ESCO Associations