Innovative energy efficiency instruments for the MENA region

Comprehensive Report

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Innovative Energy Efficiency Instruments for the MENA Region

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Introduction

The MENA region is a particularly interesting region for energy efficiency instruments. Due to high fossil fuel subsidies compared to other regions in the world, energy prices have been historically low. As a result, energy consumption and energy intensity per capita levels are comparatively high in this region and it is expected that population and economic growth will even further increase energy demand. Over the last few years, the energy markets in this region have opened up for private-sector involvement and existing energy subsidies have been reduced, which will increase costs for consumers and the industry. Reducing energy consumption is becoming more and more economically attractive and necessary and has big potential to reduce dependence on fossil fuels.

As a result, almost all the countries have already developed energy-reduction policies. Targeting energy consumption and implementing energy-efficiency measures can free up capital for other infrastructure investments and help these countries achieve national climate targets while minimizing the impact of energy-subsidy reforms. Several countries in the MENA region have set energy efficiency (EE) targets to tap this potential and embedded them in National Energy Efficiency Action Plans (NEEAPs) or included energy efficiency in their Nationally Determined Contributions (NDCs) under the Paris Agreement for climate protection. However, the mix of instruments to reach the EE targets can be enriched to increase effectiveness.

Several innovative EE instruments are already in place worldwide and have proven that they are successful and transferable but are not common in the MENA region. In particular, there is potential to test and adapt instruments that can create market opportunities for private-sector actors according to the conditions of the MENA countries. The DIAPOL-CE project for "Policy dialogue and knowledge management on low emissions development strategies in the Middle East and North Africa region" undertaken by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) commissioned Econoler to conduct a study on innovative EE instruments for the MENA region. The overall objective of this assignment is to identify and assess the potential relevance of innovative instruments for promoting EE in the MENA region, with a focus on five countries for case studies.

The study was carried out to support the implementation of cost-effective EE measures and help achieve a large-scale transformation of the region's economy. The general approach used to conduct the study was as follows: conducting interviews with key experts and a desk study to establish a long list of EE instruments to be considered; establishing a final list of the countries to be included in the study. A set of evaluation criteria was developed and applied to the list of instruments, first from the perspective of the entire region and then for the selected countries. From among the top-ranked policy instruments, four per country were chosen for more in depth study, resulting in ten studied policy instruments.

Definition of the instruments

For this project, we have adopted a broad definition of "energy efficiency instrument" so as to capture many innovative initiatives from around the world that can be relevant to the MENA region. Although some instruments used by particular countries are considered very different from our normal concept of "instrument", we still have included them into our long list of instruments to be examined. In other cases, where we felt that the implementation of an instrument in a specific country was more typical of its ordinary implementation, we have not mentioned it specifically.

There are a wide range of energy efficiency instruments of various characteristics. They are employed at small and large scales. Several attempts have been made to classify and characterize EE instruments.[1] Our study has focused on the following main types or classes to cover most EE instruments known:

- Pricing mechanisms (such as price incentives, discounts for savings, quantity targets, financial instruments, dynamic electricity tariffs, DSM electricity pricing, the carbon pricing system, trading of obligations, and obligation schemes).
- Fiscal measures and tax incentives (tax reductions for energy-efficient products, carbon tax systems, etc.).
- Regulatory and control mechanisms (energy efficiency standards and mandatory or regulatory codes, such as bylaws, frameworks, energy reduction targets, standardized EE improvement measures, etc.).
- Procurement policies (procurement standards for EE, life-cycle cost and energy efficiency analyses, etc.).
- Promotional and market transformation mechanisms (information campaigns, energy efficiency labelling and certification, "Negative-Watt" metering, etc.).
- Technology development (development and demonstration of EE technologies).
- Commercial development and capacity-building (the energy service company market mechanism, training programmes, EE industry development, and EE networks).
- Financial remediation (revolving funds for EE investment, project preparation consulting and financing facilities, etc.).

Our study of the selected countries included not only the instruments implemented in those countries with framework conditions comparable to the MENA region, but also some instruments and mechanisms used by some countries with different characteristics or new and not-yet-tested instruments. A particular focus has been given to market-based instruments and international market mechanisms' requirements for monitoring, verification and reporting, as well as the difficulty and costs associated with trying to gain access to those mechanisms.

1 See, for example, the policy pyramid in the Industrial Efficiency Policy Database, a project of the Institute for Industrial Productivity http://iepd.iipnetwork.org

1 Instrument assessment methodology

1.1 The Assessment Procedure and Criteria

The project began with a brief literature review and brainstorming session with GIZ and Econoler staff, which led to the creation of an initial list of instruments, a list of potential interviewees, and an outline of an interview guide.

The guide supported conversations held with a range of GIZ and Econoler experts around the world, who shared their knowledge of EE instruments that may be relevant to the MENA region. More than 30 staff members from each organization were included in the list of potential contacts and most of them were eventually reached for discussion or input. In some cases, lengthy conversations were held to go through questions highlighted by the interview guide. In other cases, the questions were answered by completed questionnaires or relevant documentation that the project team used to prepare a short description of each instrument.

1.2 Instrument Selection

Following an iterative multi-criterion process and based on professional judgement, the instruments for further study were selected.

1.2.1 Selection of Instruments for the Region

The assessment of the initial instruments' relevance to the MENA region was an iterative process. A short description of each instrument was produced so that all the team members shared a common understanding of each instrument.

An informal selection process resulted in a long list of instruments, including a short description and a summary of the strengths and weakness of each instrument. This list recommends those instruments that, based on the team's professional judgement, are likely to be more or less relevant to the MENA region. By then, the countries to be selected from the MENA region were not yet known because the process for selecting the five countries was not yet completed.

This long list of relevant instruments selected for the MENA region is shown in Appendix I.

Criteria Weighting

With the long list developed, a methodology for selecting the EE instruments for the designated countries is based on a multi-criterion assessment approach.

The team developed a set of seven criteria to assess the instruments for the whole region, that were scored out of five. Regarding each instrument's relevance to the MENA region, the team used their professional judgement to assign a weight to each of those criteria and established a score (on a scale of 1 to 5) for each instrument's relevance to the entire MENA region.

Three additional criteria were used to assess the instruments' relevance to each country. One of these criteria was a Yes or No question and the other two were scored on a scale of 1 to 5. The regional and country assessment scores were weighted 60-40 in favour of the regional score.

The weighted criteria were assessed based on the knowledge and experience of the team. The results produced a shortlist for each country, from which four instruments were chosen to be included in this study for each country.

1.2.2 Selection of the Top 10 Instruments for the Country-specific Assessment

Appendix I is a narrative describing the evaluation process and the criteria applied to Morocco, along with the final results of the selection process and the scores for each of the instruments for each country. The selection of the final instruments for consideration was generally (but not always) made from the top-scoring instruments based on professional judgement.

Table 1: EE Instruments selected for further study
The Energy-efficiency Instruments Selected for Further Study
1. Auction systems for EE
2. Mandatory energy efficiency targets
3. Mandatory EE schemes or energy utility mandatory programmes or utility-managed EE programmes
4. Creating networks with voluntary goals
5. DSM electricity pricing or dynamic electricity tariffs
6. The mechanism for accelerating replacement of the stock of energy-using equipment and appliances
7. The energy savings insurance (ESI) mechanism of an energy performance contract (EPC)
8. The voluntary agreement
9. EE tax-based instruments (non GHG/Carbon-tax but tax benefits for EE savings)
10. The Super ESCO

2 Description of the instruments

In this section, each of the 10 instruments selected as a potential instrument for at least one of the countries under study is briefly described and discussed. More specifically, the description of each of these 10 instruments include: (1) identification of the target sector; (2) one international example illustrating how the instrument is being used; (3) the key aspects involved in the implementation of the instrument, including the stakeholders' roles and responsibilities, the distribution of risks, an assessment of the instrument's sustainability and some key lessons learned from international experiences that may be relevant to the MENA region.

2.1 EEI #1 – Auction systems for EE

2.1.1 Brief Description

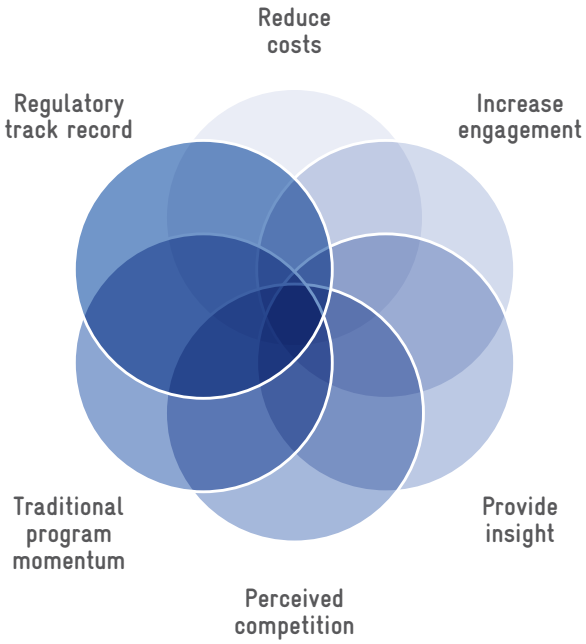
Auctions are one of two main types of market-based instruments (MBIs) commonly used to increase EE. The other main type is an EE obligation.

- There are two main auction mechanisms allowing market actors to submit bids: (1) through competitive tenders whereby the lowest-priced bid wins; (2) within a framework that sets the price for each unit of energy savings and invites key market actors to submit proposals for generating savings at a given unitary price.

- EE obligations (or EEOs for short; also known as energy-saving obligations, energy efficiency resource standards, energy efficiency performance standards or white certificates) require utilities to carry out a defined level of activity to deliver energy savings but allow the utilities the freedom to use the methods that they find most appropriate for doing so.

MBIs in general and EE auctions in particular are "instruments that set a policy framework specifying the outcome (e.g. energy savings, cost-effectiveness) to be delivered by market actors, without prescribing the delivery mechanisms and measures to be used".[2] They reduce programme costs by being integrated within existing programme approaches, as shown in Figure 1, and introduce some key but addressable concerns and risks.

Figure 1: EE Auction Programme Impacts



EE auctions are a policy instrument aimed at achieving energy savings at highly attractive prices. For example, the data available for the EU country auction programmes reveal that the average lifetime cost of saved energy ranges from USD 0.005/kWh to 0.04/kWh.

2 Rosenow, J. Cowart, R. Thomas, S. (December 2018). Market-based instruments for energy efficiency: a global review. Energy Efficiency, Volume 12, Issue 5, pp 1379–1398. https://doi.org/10.1007/s12053-018-9766-x

A commonly used type of auction used is the competitive bidding procurement process. This auction mechanism allows market actors to submit bids to competitive tenders whereby the lowest-priced bid wins or within a framework that sets the price for each unit of energy savings and invites key market actors to submit proposals for generating savings at a given unitary price.

Efficiency-only auctions typically do not predetermine the total amount of energy savings to be generated. Instead, they have a defined budget to be used for achieving the energy-savings outcome. Many auction programmes consist of three stages that are similar to an eBay auction, where participants have to first establish an account (Stage 1 - pre-qualification), then participate in an auction (Stage 2), and, if they win, proceed to implementation (Stage 3). In a typical auction, energy-efficiency project developers act as bidders. They submit bids to gain support for the projects that they intend to construct. This support typically covers only a percentage of the total cost, with the rest coming from energy cost savings realized over time. Bids are ranked according to the bid values and the less expensive bids are awarded first. After the auction, successful bidders are granted a certain time to "realize their bids".

Another way for conducting energy efficiency auctions is through participation in the energy market, including forward capacity auctions. If permitted by the rules, EE bids can be made in the energy market to reduce demand instead constructing new generation facilities or making network upgrades in particular locations. Doing so can generate long-term energy savings and is particularly useful for relieving grid constraints or avoiding the need to make network upgrades. Doing so can increase the demand-response capacity by using specific measures during periods of generation shortfall or other network events, including critical peak events, to prevent outages.

The Target Sector or Technologies

Auctions apply to various types of technologies and sectors. They can be conducted just for EE or be combined with other generation sources in energy auctions if applicable rules permit.

However, it is common to use a range of criteria (quality, technology, location, sector, etc.) for MBIs when energy-efficiency projects are selected. For example, the Portuguese tendering mechanism uses several criteria for ranking bids; compared with the standard tendering procedure, the main difference is the explicit use of the unitary cost/kWh saved as a key criterion.

2.1.2 An Example Illustrating the Use of EE Auctions: Switzerland's Competitive Energy-efficiency Tenders

In Switzerland, the Swiss Federal Office of Energy has conducted competitive energy-efficiency tenders since 2010 under the name ProKilowatt. It is a voluntary instrument that does not obligate the utilities to buy certificates for a certain amount of energy savings. Funds are provided by a levy on the electricity grid, and only energy-efficiency measures involving more efficient use of electricity can be promoted. Competitive tenders are launched annually for projects (for those proposals of measures to be directly submitted by owners) and programmes (for those proposals each consisting of a bundle measures from different owners to be submitted through an intermediary). Projects are aimed at adopting the best available technologies, and programmes focus on overcoming information barriers and encouraging behavioural change.

The main criterion is the cost-benefit ratio (the amount of promotion funding per unit of saved energy). In order to qualify, projects and programmes must meet additional criteria, including a minimum financial contribution towards a project and the funding covers at most 40% of the investment cost.

The scheme aims to fund projects involving appliances and process measures with a payback period longer than five years and infrastructure projects with a payback period longer than nine years. The amount of financial support increases as the estimated payback period lengthens: 20% support for a payback of five years; 40% for a payback of nine years or longer.

Tenders are scrutinized by a panel of experts, who assess the costs and savings of the scheme and select those that have the best cost-benefit ratio. For each bid, they decide the appropriate proportion of the total costs of the project/programme.

2.1.3 Key Aspects Involved in the Implementation of Auctions

Table 2: Stakeholders' Roles	
Auction Stakeholders	**Description of the Stakeholder's Role**
The regulator	Playing its traditional role, the regulator can set out a framework in which the auctioneer can function and work with other stakeholders to define the goals and metrics according to which participants and winners can be selected
The auctioneer	The entity in charge of administering the auction is responsible for establishing a set of clear rules, and ensuring that all participants follow these rules, and that the auction mechanism functions in a transparent and fair manner.
Bidders, including ESCOs	Bidders are expected to understand the auction mechanism, bid competitively and fairly in the process, and accept the outcome once the process is completed. If bidders also aggregate projects, they must be responsible for implementing the measurement, reporting and verification (MRV) system.
Participants and market delivery partners	Those winning the auctions become participants. They typically take part in additional training to get ready for completing the implementation stages of the programme. Key partners include customer associations, trade associations and equipment manufacturers. In some cases, large consumers can directly participate in auctions without passing through any aggregator.
Financial institutions (FIs) / Banks	FIs/Banks could give a minimum financial contribution towards an auction project/programme and the funding could cover a part of the investment cost. FIs/Banks may form part of the bidders and market delivery partners.

Table 3: Stakeholders' Responsibilities					
Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Technical Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
The regulator	+++ A large role in the conducting, the conceptual design of the instrument, drafting the rules for the auctioneer and validating the goals and objectives.	++ Overseeing the role of the auctioneer; playing the role of the arbitration body in case of conflicts.			++ Keeping a close watch on the market and check if there is collusion between the bidders; adjusting the rules and procedures, if necessary; ensuring the auction rules align with the project size.
The auctioneer	+++ A large role in defining the needs, establishing the rules for operations and providing education and raising awareness.	+++ A key role in completing the administrative implementation procedures.	++ As part of the auction procedure, check on the technology proposed for use to determine whether the tender documents have specified the range of technologies.	++ Can play a role in some cases in designing and implementing the financial aspects.	+++ A key role in designing and managing the MRV system.
Bidders, including ESCOs	+ A minimal role. Need to become familiar with the auction mechanism and all its procedures and requirements and stay up to date about the changes.	++ A medium role. Must be pre-qualified and be well informed about the auction procedures.	+++ A key participant in the auction process.	+++ A key role in estimating costs and making realistic bids that conform to the procedures, financing the investment in EE measures.	+ Must not hinder the MRV activities.

Legend: + small, ++ medium, +++ large.

Table 4: Risk Distribution			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
The regulator	+ (++) Depending on MRV's level of stringency, the financial risk can range from low to medium. The main risk is associated with setting the maximum price for each unit of saved energy when it is specified in the bid.	+ The regulator can mitigate most of the technical risks by developing a good programme design.	+ The regulator oversees the auctioneer, who bears more administrative risks.
The auctioneer	++ MRV and the payment system must be linked to reduce the risk. A poor design can increase the risk.	+++ The MRV system must be relevant and reliable for reducing technical risks associated with non-performance.	+++ Must administer the auction according to the rules and monitor for collusion in bids.
Bidders from different sectors	+++ Risks of not getting paid if projects do not deliver enough energy savings or deliver them at higher-than-anticipated costs. Risks of not getting paid if projects do not deliver enough energy savings or deliver them at higher-than-anticipated costs.	+++ Risks of not getting paid if projects do not produce the expected technical performance.	+++ Must maintain awareness about the rules and procedures or risk being unable to complete the bidding procedure.

Legend: + small, ++ medium, +++ large.

Table 5: Sustainability of the Instrument			
Instrument	**Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
Auctions	+++ Strong financial stability because the lowest price is sought by the instrument and risks are largely borne by bidders.	+++ The instrument is designed to find the most economically efficient options. MRV and transaction costs have the potential to reduce this efficiency.	+++ As long as the instrument enables innovation to find lower priced options, it can be considered to have a more positive rating than some other instruments on its SDI.

Legend: + small, ++ medium, +++ large.

Key Lessons Learned from International Experiences

Several lessons can be learned from the experiences with auctions, as summarized below.

> Designing and implementing any type of formal auction system requires a careful and candid assessment of the robustness of the institutional and the regulatory frameworks in each country or state. Particularly, to set up MBIs, countries should first have strong independent energy regulators.

> The auction system is better adapted to large EE markets. However, even in the countries where the market is small and competition is weak, these countries can still benefit from the use of a competitive auction mechanism. In such a situation, aggregators, such as ESCOs, should play a critical role in reducing transaction costs by bundling projects.

> An auction mechanism should be designed in such a way that it does not discriminate against small-scale private investors by favouring large state-owned companies.

> Sometimes regulations may prompt bidders to adopt anti-competitive behaviours.

> Other conditions needed for the success of an auction process include its transparency, as well as investors' perception of the fairness of the process.

> A way to increase transparency is to have a publicly available independent ex-post audit of the process.

> There is no "one-size-fits-all" type of auction as a competitive procurement mechanism for electricity-related products.

> The auction system is more adapted to power-savings than to the other energy products, mainly for the reason of ease with MRV.

Strengths:

> Cost-effectiveness;

> Transparent;

> A price-discovery mechanism.

Weaknesses:

> The existing public procurement codes in developing countries may need changes to allow EE auctions;

> There is the possibility of collusion when competition is weak;

> Seems more complex and can be relatively straightforward;

> Because of the tendering scheme's novelty and complexity, there is much need for communication measures and training of potential stakeholders;

> Need for customization.

2.2 EEI #2 – Mandatory Energy Efficiency Targets

2.2.1 Brief Description

Targets for energy savings or EE improvements have been widely used in in different countries and jurisdictions all over in the world. Targets can support monitoring progress, setting achievable goals and reinforcing political commitment to making EE improvements and increasing energy savings. Many countries publish their national targets or determine their national commitments to emission reductions based on international agreements, including the Paris Agreement. Therefore, national energy savings targets can serve as the basis for determining local and sectoral targets to encourage actions toward achieving national targets.

Mandatory EE targets are one of the EE instruments that can be applied to translate the national targets to local and sectoral targets. The focus of this analysis is mandatory EE targets applied to large industrial sectors and enterprises or other relatively small groups. When large industrial sectors are required to achieve EE targets, the targets are often directly negotiated with energy consumers or sector associations. Setting measurable targets, mandatory or otherwise, serve to clearly identify priorities, allow comparisons and benchmarking and serve as a basis for actions. Although targets are intended to improve performance by challenging those organisations or entities to whom targets apply, they have to be realistic to be motivating. Targets range from being straightforward to more complex and can be partially or fully mandatory. They may be set after audits are conducted to identify those areas where feasible improvements would be cost-effective and achievable within a prescribed timeframe.

At first, certain relatively simple mandatory actions can be implemented in an industrial sector, such as: assigning a qualified energy manager; reporting actions taken; and publishing plans for energy conservation and management standards. The energy audit is a common initial mandatory action that helps firms determine their energy consumption and identify energy saving opportunities. The knowledge gained from an energy audit helps a firm become comfortable with mandatory targets. While regularly audits help establish appropriate and achievable targets, the government and relevant industry often negotiate to set both mandatory EE targets and implementation schedules.[3]

The Target Sector or Technologies

Although this instrument can apply to major sectors such as industrial, commercial and transportation, large energy-intensive industrial sectors are the most commonly targeted by this instrument, including the electricity and oil-refining sectors.

2.2.2 An Example Illustrating the Use of EE Targets: Japan's Mandatory EE Targets for Designated Sectors

The Act on the Rational Use of Energy (2010) introduced mandatory EE targets in Japan.

The Ministry of Economy, Trade and Industry (METI) and the New Energies and Industrial Technology Development (NEDO) are the agencies responsible of implementing the policy instrument.

For the designated sectors (steel, electricity, cement, paper and pulp, oil refinery and chemical), EE targets have been set at the energy efficiency level of the best performing companies (the top 10% to 20%) within each industrial subsector. These targets must be met in the medium (2015) and long term (2020). Higher targets can be set in the future if more energy saving potential is found. The benchmarks are based on relevant sectoral studies and are negotiated between the government and each industrial subsector.

Every year, companies must report the progress they have made against the following targets:

- the benchmarking indicator;
- energy intensity reduction (by at least 1% annually); and
- the status of its energy management system.

The government provides the guidelines, evaluates the monitoring reports, and provides the analytical basis for annually updating the targets.

Based on the companies' reports, the average indicator value and the standard deviation for each subsector will be published by the government.

For those companies that have not achieved their targets, a list of under-performers is also published by the government and fines are imposed.

Those industrial enterprises which have taken early actions and have achieved the benchmark target level can ask for exemption from the annual 1% energy efficiency improvement target by helping small and medium-size companies achieve higher energy efficiency levels.[4]

3 For some examples, see the UNIDO Industrial Energy Efficiency database at http://unido.olbaid.dk and http://iepd.iipnetwork.org

4 Industrial Efficiency Policy Database (IEPD) JP-3: Mandatory energy efficiency benchmarking in industry. Retrieved from http://iepd.iipnetwork.org/policy/mandatory-energy-efficiency-benchmarking-industry

2.2.3 Key Aspects Involved in Implementation the Mandatory Energy Efficiency Targets

Table 6: Stakeholders' Roles	
Stakeholders	**Description of the Stakeholder's Role**
The regulator or a public body	Although each jurisdiction is unique, regulating or governing bodies usually negotiate with large energy-consuming industries to create regulations and rules that are enforceable and economically viable. In certain cases, voluntary targets or measures can be used before mandatory targets are imposed, which can be seen as a heavy-handed means of achieving targets.
Designated energy-intensive consumers	• They are the parties obligated to comply with the mandatory EE targets fixed by the government and report periodically on the achievements made. • In some jurisdictions, companies implement voluntary actions to avoid mandatory targets or reductions, signaling that they are at the forefront of their sector in terms of advanced technology adoption. • The energy-intensive companies in a sector can position themselves as the leaders or laggards in relation to the changes implied by the targets.
ESCOs	In markets where EE expertise and financing is less readily available to enterprises, ESCOs may be useful third parties that can move risks and liabilities from the balance sheet and bring in the expertise that industrial enterprises may lack.
Energy auditors	A competent and well-developed market for energy auditors is vital to the growth in EE services. The market may need support in the early stages.

Table 7: Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Financial Implementation**	**Technical Implementation**	**MRV, Instrument Development and Follow-up**
The regulator or a public body	+++ The public body is responsible for convening stakeholders and establishing the overall targets with them.	+++ Target-setting bodies can assign the task of administrative implementation to existing or specially created entities or take on those responsibilities internally.	++ The regulator may need to establish incentives or penalties to encourage actions and be responsible for their implementation.	++ The regulator provides support and guidelines. Evaluates the periodic monitoring reports and provides the analytical basis for the annual updating of the targets imposed on the obligated parties.	++ Independent MRV systems are vital to the integrity of the targets. The regulator can develop methodologies for monitoring, verifying, and reporting on energy efficiency measures by sector.
Designated energy-intensive consumers	++ Should be an active participant in the negotiation about the targets.		++ Need to make the investment to meet the target, and plan to recover those costs.	+++ Is responsible for the technical implementation of the measures required.	+ Should not obstruct the verification and should report as required.
ESCOs	N/A	N/A	+ May be required to provide financial guarantees on the work completed and the expected savings.	+++ If involved, responsible for technical implementation and may guarantee the savings.	++ Support the companies in implementing MRV.
Energy auditors	N/A	N/A	+ May be required to provide financial guarantees on the work completed and the expected savings.	+++ Responsible for the quality of the audit and the savings achieved by the measures implemented.	++ Support the companies in implementing MRV.

Legend: + small, ++ medium, +++ large.

Table 8: Risk Distribution			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
The regulator or a public body	+ The risk associated with putting in place incentives that are overachieved and cost more than expected is minimal with a good design.	+ The public body has some risk linked to setting realistic targets that are achievable and cost-effective based on technical abilities of the sector.	+++ Have to setup the administrative system that tracks and verifies performance where incentives and penalties are concerned.
Designated energy-intensive consumers	+++ If subject to targets, they have to bear the risk of investments in technologies unknown to them.	++ How consumers decide to proceed with upgrades can influence their technical risk exposure.	++ Responsible for reporting their achievements towards the targets to the public body.
ESCOs	+++ Have the potential to bear the risk of non-performance.	+++ Have the potential to bear most of the technical risk.	+ May have to submit documentation.
Energy auditors	++ May have to offer some assurances on their calculations compared to achieved results.	++ The level of technical risk strongly correlated to their technical skills. May be contractually responsible for technical risks.	+ May have to submit documentation.

Legend: + small, ++ medium, +++ large.

Table 9: Sustainability of the Instrument			
Instrument	**Financial Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
E2: Mandatory energy efficiency targets	+++ Most of the implementation costs are borne by companies under the efficiency obligation and can be considered a cost of doing business.	++ Where mature targets have been in place and when all available low-cost in-house EE improvements were completed, companies have implemented actions at other locations to gain credit for EE reductions. This demonstrates economic efficiency in seeking the lowest-cost improvements.	+++ Targets are a strong means of stating goals and ensuring that incremental progress is made towards them as long as sufficient incentives and penalties are in place for non-compliance.

Legend: + small, ++ medium, +++ large.

Key Lessons Learned from International Experiences

Mandatory EE targets are frequently one element of a larger more comprehensive package of policy solutions. At minimum, political, stakeholder and resource commitments are needed to set proper targets and then translate these into action.

Targets need to balance achievability and ambition. If they are too low, they are meaningless. Conversely, if they are too high, key stakeholders are not likely to participate in the delivery process.[5] Mandatory programmes offer a degree of certainty about results, which is consistent with government aspirations to achieve ambitious targets for reducing greenhouse gas emissions.

This type of incentive is considered extremely cost-effective compared with other programme types and supply-side alternatives; it is also a means of reducing greenhouse gas emissions. The process of introducing regulations and administering these programmes generate considerable data on the energy performance of products and markets. Such detailed information allows scrutiny and analysis, which are often impossible with other programme types.

The following key points should be considered to encourage mandatory EE target programmes in the MENA region:

> Designate a public implementing entity that will be responsible for the design, implementation and follow up of the whole process and rules negotiated with obligated parties;

> Develop regulations and rules that are enforceable and economically viable, in close collaboration with large energy-consuming industries or other obligated parties;

> Inform obligated parties prior to adopting the regulations to ensure that all parties are fully aware of the requirements and have developed strategies to meet them;

> Flexible mechanism design for energy-intensive clients that cannot reach targets;

> Develop incentive mechanisms to support obligated parties in achieving their EE targets;

> A formal and robust measurement, reporting and verification (MRV) system must be incorporated from programme outset;

> Voluntary targets or measures can be used before mandatory targets are imposed since the latter can be seen as a heavy-handed means of achieving targets

Strengths:

> A wide variety of targets in use. Can be applied to various aspects of the economy and various sectors.

> Pressure can be placed on large consumers to make efforts towards EE while minimizing public costs to achieve targets.

Weaknesses:

> Choosing appropriate targets is not always straightforward.

> Lack of flexibility of the mechanism for the consumers that cannot reach the target.

> Needs a designated regulation and system.

> Needs a formal strong MRV system.

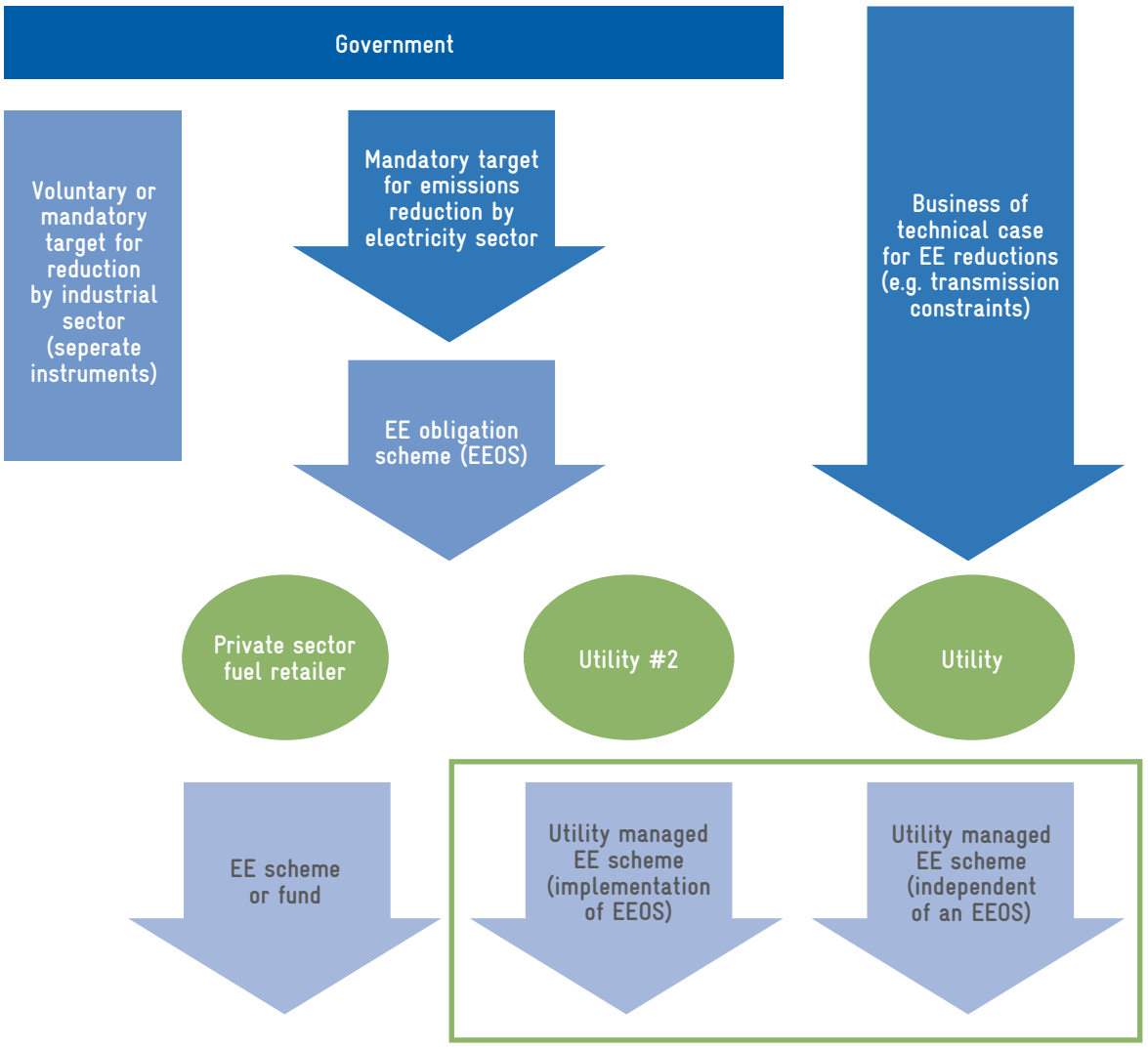
2.3 EEI #3 – Utility-managed EE Programmes

2.3.1 Brief Description

The utility-managed EE programme instrument involves employing relevant regulations to require energy suppliers, distributors or retailers to reduce their customers' consumption by supporting the implementation of EE measures. Targets for energy savings can be mandatory or voluntary, driven by external regulation or for internal reasons such as to defer capital spending on equipment upgrades or for social and environmental responsibility. Utility-managed EE programmes are one way of reaching mandatory EE targets by subsidising the implementation of a portion of an EE intervention at their customer's premises. A utility-managed EE programme is one way of implementing an EEO – discussed in the EEI #1 section above as one of two types of MBIs – and can also be implemented for internal cost-savings reasons. These separate motivations for adopting this instrument are illustrated in Figure 2 next page.

5 Wade, J. et. al. European Council for an Energy Efficient Economy.(2011). "National energy efficiency and energy saving targets". Retrieved from the European Council for an Energy Efficient Economy, 2011. http://hpaba.com/pages/en/energy%20efficiency2.pdf. Consulted on the 18th July 2019. (19-07-18)

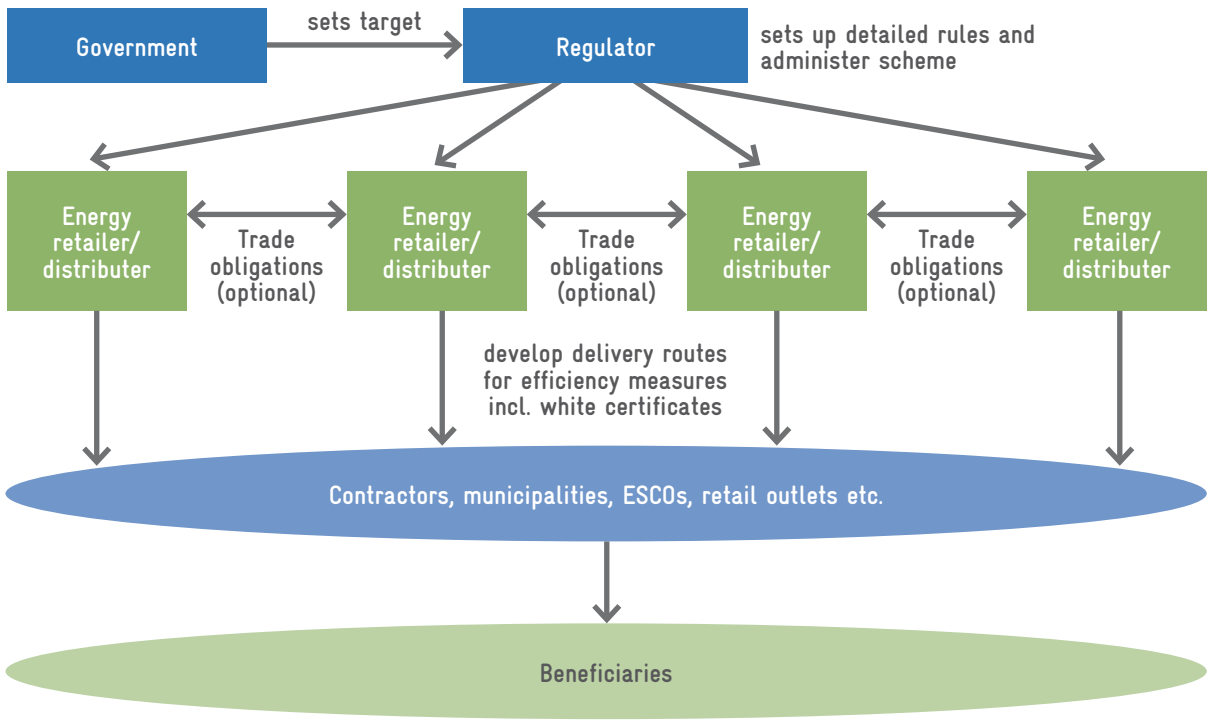
Figure 2: Motivation for Utility-managed EE Schemes



EE programmes are managed by utilities that use various means to attain targets, including directly providing EE improvements to end users, working with contractors to deliver energy savings, and collaborating with third parties such as municipalities, ESCOs, etc.

In most cases, the energy regulator supervises and monitors EE obligation schemes (EEOS) on behalf of the government. Schemes with various characteristics have been applied in many countries including Europe. Some EEOS allow for trading among obligated parties (utilities) and third parties, sometimes through white certificates that represent units of energy savings. A diagram of main stakeholders is presented in Figure 3 below.[6]

Figure 3: Architecture of Utility-managed EE Schemes



6 From Rosenow, J. "Energy Efficiency Obligations – A Global Review." Presentation for ERRA Educational Workshop: Energy Efficiency and Regulation, March 13-14, 2017, Budapest, Hungary.

The cost of EEOS is borne by obligated parties that pass it on to end users, i.e. their customers. Cost recovery is possible through rate increases, government revenues, or other means. However, it should be mentioned that effective EEOS require a robust monitoring and verification system that imposes penalties if targets are not met.

The cost of EEOS is significantly below the price of energy, which makes them highly cost-effective. The cost of the scheme depends on the type of EE measures supported by the EEOS. Furthermore, the administration of the scheme adds to the cost. Thus, the more complex an EEOS (e.g. more complex calculation methods, more sophisticated measures supported, such as deep renovations and industrial EE projects), the higher its administrative cost is likely to be. However, the evidence on administrative costs suggests that they are very small compared to the overall cost of the scheme.[7]

The effectiveness of EEOS depends on the level of the energy savings target (i.e., how ambitious the target is in terms of required energy savings) and whether or not compliance is ensured. An effective EEOS scheme needs to achieve a balance between the rules and procedures, which should be simple enough for obliged parties to work with, yet should also be complex enough to meet requirements for additionality, flexibility, auditability and transparency. Having a catalogue of standardized actions listing best practices in terms of EE measures and deemed savings that can be expected from these measures can be very effective. However, it should be mentioned that the effectiveness of EEOS requires a robust monitoring and verification system, which imposes penalties, if the targets are not met.

Target Sector or Technologies

This instrument can be applied to various types of technologies to achieve significant EE increases in buildings, processes and equipment used in the residential, commercial, industrial, public and institutional sectors. It may include penalties for non-compliance as well as tradable certificates or other flexible means to meet commitments. In practice, most EEOS have targeted low-cost energy-saving measures and small-scale energy consumers for the following reasons:

- A large number of small consumers can be targeted by utilities at low transaction costs, since they are utilities' customers and can be easily reached with marginal management expenditure.
- Low-cost measures (for example, appliances, lighting and loft insulation) usually can be standardized more easily (unlike high-cost or more-complex measures) in terms of technical specifications.
- Standardized measures enable a streamlined monitoring and verification regime; deemed savings (benchmarks) are used based on representative samples.
- Usually, the cost of delivering EE obligations are passed on to customers; delivering expensive measures to a relatively small number of households at high costs paid for by all customers has social-equity implications in that the costs and benefits are shared very unequally.
- Targeting low-cost measures allows policy-makers to argue that because the benefits (of low-cost measures in terms of energy cost savings) outweigh the costs (in the form of increased energy bills due to on-bill recovery of programme costs), overall, customers are better off after the programme is implemented.

7 Forster, D. et. Al. (2016) Study evaluating progress in the implementation of Article 7 of the Energy Efficiency Directive Appendix 4: Policy Case Studies. Ricardo Energy & Environment Reference: Ref: ED60332, Issue Number 2.

2.3.2 An Example Illustrating the Use of EEOS: The Danish Energy Efficiency Obligations

The Danish EEOS began with electricity companies in the 1990s. At the outset, the focus was on raising awareness by carrying out information and education campaigns. The scheme covered private households and the industrial, trade, services and the public sector. In 2006, the scheme was changed by setting savings targets two to three times higher than the savings previously delivered. The focus was moved from raising awareness and providing information to implementing energy-saving measures.

In 2009, more precise requirements for documentation of savings were introduced. As the size of the obligation grew, there was also an increased focus on costs and their documentation. In 2010, the EEOS target was doubled, and it has continued to increase over time. The 2015–2020 target is equivalent to saving 3% of the final energy in Denmark, excluding transport.[8]

The obligated parties in Denmark have a monopoly status and the cost incurred as a result of their EEO activity is financed through the energy bill. Because only the total costs are reported by the obligated parties, the Danish Energy Agency and the Danish Energy Regulatory Authority do not know what the money is spent on. Nor are energy consumers informed of how much they contribute to energy savings financed through the energy bill. The system is designed in this way in order to minimize administration costs.

The Danish system relies on probably a certain degree of self-discipline and a potential shaming effect if an obligated party's failure is caught. It can, however, be argued that the system does not sufficiently encourage cost-minimization and that credibility currently rests on the following assumed favourable factors: the generally low corruption level in the country; that the obligated parties have experience in providing energy savings for end-users and therefore have highly skilled employees; and that the obligated parties support and accept the targets set. If these favourable factors were not present, a cost-recovery system with minimum control imposed on it would not have much credibility as a trustworthy mechanism.

8 Fawcett, T, Rosenow, J, Bertoldi P. (2017). The future of energy efficiency obligation schemes in the EU. ECEEE Industrial summer study proceedings.

2.3.3 Key Aspects Involved in Implementation
Utility-managed EE Programmes

Table 10: Stakeholders' Role	
Stakeholders	**Description of the Stakeholder's Role**
The energy regulator	The energy regulator plays its standard role of protecting consumers, mainly by overseeing how the cost of generating energy savings is passed on to the utility's customers.
Public authorities (generally the administrator)	• Developing the EEO regulations and procedures; • Designing and setting up the EEO market management system; • Defining the criteria for designating the obligated parties; • Setting the overall objective of EEO programmes; • Monitoring the market and the penalties.
Energy suppliers (obligated parties)	In EEO schemes, the obligated parties are mostly energy distributors and retailers, who utilize network energies, or road transport or heating fuel suppliers and energy utilities. The selection of an obligated party should be based on whether a provider has relationships with end-users or has the needed infrastructure and systems to manage the delivery or procurement of eligible energy savings. Another criterion for imposing the obligation is the energy market share taken up by each obligated party. For example, in France, 40 major suppliers of electricity, gas, heating and cooling, more than 2,000 domestic fuel distributors and about 40 suppliers fuel for transport were subject to the EEO to achieve a total target of 700 TWh for the period 2015- 2017.
Large energy consumers, interest groups, consumer champions, chambers of commerce, environmental NGOs, etc.	Although the formal process of policy design and consultation differs the obligated parties are usually involved in the process, along with other interest groups, such as consumer champions and environmental NGOs. All the established EEO schemes have been periodically re-designed to set new energy-savings targets and help adopt innovative technologies, by considering changing technology and energy costs and other factors linked to energy and policies. An effective consultation and stakeholder engagement process at the national or international level can help ensure that successive phases of the EEO scheme meet their objectives by learning from past experiences.
ESCOs, installers, and manufacturers	The role of ESCOs has become very relevant in many EEO schemes, because they can help reach the specified EEO targets. Specifically, ESCOs can play a crucial role in implementing energy-efficiency measures in many EEO schemes, especially in the industrial and public sectors.

Table 11: The Stakeholders' Responsibilities					
Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Financial Implementation**	**Technical Implementation**	**MRV, Instrument Development and Follow-up**
The energy regulator	+++ Introduces the EEO in the energy sector regulations related to utilities.	++ Check whether the administrative procedures are in line with the energy-sector competition regulations.			
Public authorities (generally the administrator)	+++ By introducing the EEO, national governments require energy retailers or distribution companies to deliver energy savings that can be financed through their customers. Use a carefully selected combination of legislation, regulations, and administrative processes to establish and operate the EEO scheme.	+++ As an integral component of the EEO scheme, establish a procedure for obligated parties to report claimed eligible energy savings to an appropriate authority and a process for checking and verifying these savings. Establish an appropriate penalty system targeting obligated parties that fail to meet their individual energy-savings targets.	++ Establish an appropriate mechanism in the EEO scheme to enable recovery of the costs incurred by obligated parties in meeting their individual energy-savings targets.	+++ Consider introducing a list of pre-approved EE measures (with deemed energy savings values) into the EEO scheme, but do not limit the measures that can be implemented to produce eligible energy savings to only those on the list. Consider enabling in the EEO scheme the trading of energy savings among obligated parties and third parties.	+++ As an integral component of the EEO scheme, establish a robust system for measuring, verifying and reporting energy savings and other activities that contribute to scheme targets. Consider whether to also establish procedures to verify whether energy savings are additional to what would have happened in the absence of the EEO scheme.

Legend: + small, ++ medium, +++ large.

Table 11: The Stakeholders' Responsibilities					
Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Financial Implementation**	**Technical Implementation**	**MRV, Instrument Development and Follow-up**
Energy suppliers (obligated parties)	+++ The EEOS changes the relationship between energy companies or distributors and their customers and gives the companies new responsibilities traditionally fulfilled by the government. Companies may resist the imposition of this new role implied by the EEOS, and negotiations and consultations should be an important part of the policy-making process.	+++ Manage the mechanisms of EE measures implementation. Report eligible claimed energy savings to an appropriate authority.	+++ Incur financial costs from implementation and recover those costs through the appropriate channels.	+++ Implement the measures or contract those activities and supervise or purchase certificates if available.	+ Participate without obstructing the process or tampering with the results.
Energy consumers, interest groups, consumer champions, chambers of commerce, environmental NGOs, etc.	++ Although the formal process of policy design and consultation differs, the obligated parties are usually involved in the process, along with other interest groups, such as consumer champions and environmental NGOs. A consultation process does not ensure there will be no conflicts, because different parties have different interests, but it provides the opportunity for the government to gather information and consider different perspectives before finalizing the policy design.	+ Enable results to be reported by the appropriate body.	+++ Pay the cost of the saved energy to the utility.	+ Agree to complete the technical implementation and allow access to the premises.	+ Enable MRV of the energy savings.

Legend: + small, ++ medium, +++ large.

Table 11: The Stakeholders' Responsibilities					
Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Financial Implementation**	**Technical Implementation**	**MRV, Instrument Development and Follow-up**
ESCOs, installers and manufacturers		++ Should keep appropriate records and submit them if required.	+ May pre-finance the investment on behalf of the obligated parties.	+++ Play a crucial role in implementing EE measures in many EEO schemes.	+ Should participate without obstructing the process or tampering with the results.

Legend: + small, ++ medium, +++ large.

Table 12: Stakeholders' Risks			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
Public authorities (generally the administrator)	++ The administrator must set the rules to be followed by obligated parties in recovering costs. If those rules are unclear or can be potentially circumvented, this could entail a risk.	+ The public authority should have the skills to check the technical installations and verify technical issues.	++ The public administrator's weaknesses associated with this instrument may lead to ineffective use of the instrument. In case of tradable EEOs, the public authority bears the risk of lack of transparency related to the certificate registry.
Energy suppliers (obligated parties)	++ The obligated parties are subject to the rules for recovering their costs in a fair manner and compensating themselves for an activity that may not appear to be in their best interests.	+++ The obligated parties bear the full technical risk associated with the EE measures' implementation.	+++ If the procedures of the EEOs are complex and unclear, this may lead to additional cost for generating EE savings. Also, the obligated party is ultimately responsible for submitting the required documents to the appropriate authority and bears the risks if those are not completed correctly.
Energy consumers, interest groups, consumer champions, chambers of commerce, environmental NGOs, etc.	+ Consumers may be insulated from the risks of non-performance of equipment or other problems encountered by the contracts they sign.	++ Consumers are the ultimate end-users. If the equipment does not function as intended, they could bear part of the consequences.	+ If the mechanism for implementing measures are complex, end-users may simply refuse to participate in the programme.
ESCOs, installers and manufacturers	+ In some cases, may share financial risks with the obligated parties..	+++ May have to bear much of the technical risk, depending on the arrangements with the obligated parties.	+ Must report to obligated parties. Any lack may be penalized.

Legend: + small, ++ medium, +++ large.

Table 13: Sustainability of the Instrument			
Instrument	**Financial Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
Utility-managed EE programmes	+++ Cost recovery through various means is well established.	+++ Studies have demonstrated that the cost is below that of energy and that tradeable certificates improve downward pressure on costs across the entire sector.	+++ EEOS are usually used by the government to support consumers who consume small amounts of energy through EE measures in order to fight against fuel poverty.

Legend: + small, ++ medium, +++ large.

Key Lessons Learned from International Experiences

Internationally, a wide range of schemes have been used for several decades, and a large number of them are being used in Europe.[9] Implementing the utility-managed EE programme instrument in the MENA region should factor in the following key lessons learned:

- Keep policy objectives simple, clear and focussed on achieving energy savings;
- Use a carefully selected combination of legislation, regulations and administrative processes to establish and operate the utility-managed EE programme;
- Decide on the types of fuel or energy sources to be covered by the utility-managed EE programme scheme, according to the overall policy objectives of the scheme and estimated energy efficiency potential for the different types of fuel or energy sources. Start with one or two fuels and then expand;
- Decide on the end-use sectors and types of facilities to be covered by the utility-managed EE programme scheme, according to the overall policy objectives of the scheme and estimated energy efficiency potential for different sectors and various types of facilities;
- Set the energy savings targets for the utility-managed EE programme scheme according to the overall policy objectives of the scheme and aim to strike a balance between the targets, costs to be borne by consumers and which savings are achievable based on EE potential assessments;
- Consider restricting obligations to large energy providers. Allocate individual energy savings targets to each obligated party on the basis of market share of energy sales. Consider the possibility of implementing carve-outs for energy-intensive and trade-exposed industries or other specified groups of end users;
- Consider enabling energy savings trading among obligated parties and third parties;
- Utility-managed EE programmes are also a good mechanism to fight against fuel poverty by targeting measures dedicated to low-energy consumers, particularly in the power sector;
- It is difficult to implement this instrument when the country does not have an energy regulator;
- The implementation of this instrument may encounter barriers due the reluctance of utilities when they are private owned. In fact, the utilities do not accept easily to reduce their revenue by making EE for their clients. In this case, the EE target and the instrument should be included in the concession contract.

9 Bengtson, A. (June 2012). Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes. The Regulator Assistance Project.

2.4 EEI #4 – EE Networks with Voluntary Goals

2.4.1 Brief Description

Energy efficiency networks (EENs) are platforms and mechanisms that bring companies together to share experiences, collaborate to increase their EE know-how, and undertake steps together to improve efficiency. EENs can be formed in a region across various sectors, on a sector-specific basis and as internal networks (e.g. different sites of a corporation working together). EENs operate on a voluntary basis but are often incentivised by existing regulatory and policy frameworks. As such, they exist with or without government intervention. Such networks function as platforms for analysing EE potential in sub-sectors, setting and monitoring joint energy consumption targets and jointly implementing EE measures. EENs are flexible, thus allowing them to be implemented in many forms in terms of structure, focus, scope and policy context.

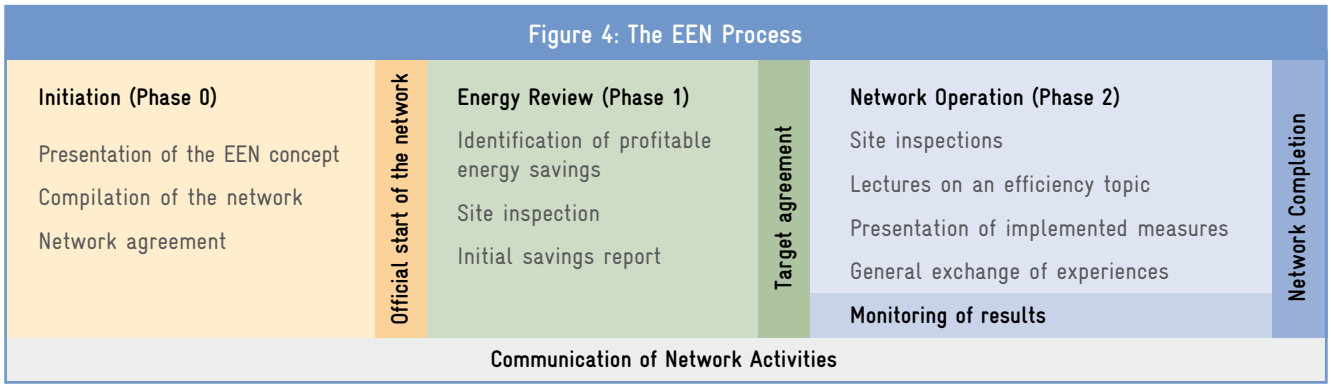
The usual EEN process consists of three phases as illustrated in Figure 4 below.[10] The initiation phase (Phase 0) establishes the network. The EEN process begins with an energy review (Phase 1) whereby participants individually decide on their own efficiency targets, which are confidential, and also commit to a voluntary energy savings target for the whole network and regular experience-sharing among network peers. The targets set in Phase 1 are to be reached in the network operation phase over a period of at least the ensuing three to four years.

Before launching an EEN, enough interested companies (usually between eight and 15 companies) should agree to participate. Once launched, participating companies contract an energy consultant to conduct an energy audit to take stock of their individual energy savings potential. With results in hand, companies then agree on both individual and network-wide, non-binding EE targets. Based on agreed upon target and measures, companies start implementing them and meet regularly to hold discussions, share experiences and insights, conduct site visits, and monitor progress.

Target Sector or Technologies

The "energy efficiency networks" instrument has mainly been applied in the industrial sector to large energy consumers. More recently, EEN activities were also carried out with smaller energy-consuming companies, particularly in areas that have a long history of working with networks, like Germany.

Figure 4: The EEN Process



10 *Schlomann, B. (November 2016). Energy Efficiency Networks. Odyssee - MURE, Policy Brief.*

2.4.2 An Example Illustrating the USE of the EEN: Germany's Learning Energy Efficiency Networks

Germany has pioneered the Learning Energy Efficiency Network (LEEN), in which 10 to 15 companies work together to learn from each other by sharing experience so as to reduce energy consumption. The concept is adapted to the needs of larger companies, while the Mari:e concept was developed for smaller businesses (with 100,000 to 1 million euros in energy costs per year).

The LEEN is today a standard network that enables companies to significantly accelerate their energy cost reduction against the industry average. The main starting points of joint work in the network are efficiency improvements in cross-sectional technologies (for example, the production and distribution of compressed air, heating and cooling as well as electric drives, lighting, and waste heat recovery) and organizational measures.

Following an energy review and the identification of profitable efficiency potential in each company, all participants decide on a joint target. Information regarding new energy efficiency solutions is presented by experts during these meetings, together with experience-sharing about the implemented measures. The performance of each company is constantly monitored and controlled on a yearly basis. The network's operating period is typically three to four years.

The "30 Pilot Networks" programme ran from 2009 to 2014 and more than 350 companies participated in it. It was followed by the LEEN100plus project ending in 2017, which provided a range of support in establishing networks, including work aids, direct financial support for audits in some cases, and technical assistance. Both programmes ere funded by the federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU).

EENs have been proven to be highly cost-effective compared to other EE programmes and can catalyze much more new investments. Overall, participation in EENs has helped increase the competitiveness of the participating companies. In addition to these benefits, EENs also catalyzed new ideas within companies, raising awareness about energy efficiency and driving innovation. In several cases, companies participating in regional networks were so enthusiastic about the results from their EENs that their management decided to create a group called "the internal energy efficiency network" within the company.

11 Energy Efficiency Networks. Benefits of Learning Energy Efficiency Networks (LEEN). Retrieved from https://www.energie-effizienz-netzwerke.de/een-de/netzwerkidee/vorteile.php#anchor_988697770_Accordion-1-30-Pilot-Netzwerke-haben-Energiebedarf-einer-Grossstadt-eingespart

2.4.3 Key Aspects Involved in Implementing EE Networks with Voluntary Goals

Table 14: The Stakeholder's Role	
Stakeholders	**Role**
Members or participating companies	› Setting (non-binding) energy efficiency targets; › Implementing energy efficiency measures; › Meeting regularly to hold discussions, share experience and insights, make site visits, and monitor progress.
Energy consultants	Conducting energy audits to assess the energy-saving potential among the EEN members and advise on the solutions and EE measures.
The network operator	Recruiting members, initiating the network and completing the network process by working together with the members.
The moderator	Organizing, moderating and hosting the network meetings, including supporting the effort to reach consensus on the target.
The government	Providing incentives through an enabling complementary regulatory and policy framework.

Table 15: The Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Technical Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
Members or participating companies	+++ Participate in setting up the network. Identify the energy efficiency potential. Agree to and commit to the voluntary energy saving target (individual and whole network targets)	++ Support administrative implementation	+++ Identify and prioritize the EE measures to be implemented. Implement EE measures. Share the main results and best practices among the network members.	+++ Pay the membership fee.	+++ Monitor progress.
Energy consultants	+++ Conduct a preliminary energy review to assess the energy-saving potential and advise the EE network on the energy-saving target.	N/A	+++ Conduct the energy audit and advises on the solution or measures and energy-savings target. Support the network members in the implementation of the EE measures and in monitoring the progress.		
The network operator or the moderator	+++ Convene participants; perform data collection	+++ Act as a focal point for administrative operations	+++ Ensure the smooth operation of the network among its members. Facilitate and coordinate technical workshops. Provide tools and standardized guidelines to lower implementation and transaction costs.	++ May channel support from funding agencies.	+++ Ensure that the network process is completed. Organize and host the network meetings.
The government	++ Sets up an enabling regulatory and policy framework.	+ Play a minimal role. Can support the administrative set-up of the EE network.	++ May provide technical assistance and support to the participating companies to foster the implementation of the EE measures. Provides training and tools for network operators, consulting engineers and moderators.	+ Offers financial incentives. Subsidizes network participation, particularly during the pilot demonstration phase of the EEN.	+ Be informed about the progress and the results to provide government support to the EEN.

Legend: + small, ++ medium, +++ large.

Table 16: Risk Distribution			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
Members or participating companies	++ Make measured and reasonable investment based on expert advice and network experience.	++ Technical risk is assessed with the help of network experience and external high-quality expertise.	+ Must follow through with procedures of the network, if any, and must follow any funding procedures.
Energy consultants	+ Make EE recommendations to help reduce financial risk for companies. The EE network has to identify highly qualified and experienced energy consultants.	++ Makes technical recommendations; may have to guarantee those recommendations.	N/A
The network operator or the moderator	++ Ensure that all the participants pay their membership fees.	N/A	++ Should maintain the network in good standing and maintain the procedure for tracking and providing support.
The government	+ Limited financial risk for the government. Should maintain procedures for tracking progress in case of any financial support provided to the participants.	N/A	++ Should maintain procedures for tracking progress in case of any incentive support to the network.

Legend: + small, ++ medium, +++ large.

Table 17: Sustainability of the Instrument			
Instrument	**Financial Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
Energy Efficiency Networks (EEN)	++ Networks investing in energy efficiency measures generate important energy cost saving with a shortened pay back period.	++ › Improving competitiveness; › Fostering innovation and creating new market dynamics for energy services; › An important annual energy cost savings per company, significantly outweighing the initial cost of participation in the network; › Additional jobs in consulting, construction, manufacturing, banking, maintenance	++ › As a voluntary tool, the EEN offers a more cost-effective alternative than policy instruments, such as taxes, towards reaching emission reduction targets set by mandatory policies. › Companies have successfully implemented solutions that emerged from the network process. › Improved business-to-business relationships and cooperation among enterprises. › Improvements at the industrial facilities and social environments. › Improved brand image for the industrial facilities. › More research work will be done by raising the demand for energy-efficient solutions and reducing energy imports.

Legend: + small, ++ medium, +++ large.

Key Lessons Learned from International Experiences

EENs offer an effective platform that gathers companies and is a mechanism to share experience and facilitate EE measure planning and implementation in participating companies.

These networks create a positive environment for peer-to-peer learning and allow for sharing good practices and monitoring progress toward agreed upon targets.

EENs exist with or without government intervention. However, one of the key success factors for expanding EENs is the existence of an enabling policy framework. The government can stimulate network generation and activities by providing complementary financial incentives and enabling policy frameworks to foster the achievement of EE potential and targets.

By taking into account basic requirements to ensure the success of the instrument, disseminating the EEN concept in the MENA region is a conceivable and desirable goal to support countries in accelerating and scaling up their EE markets. Nevertheless, the EEN process needs to be adapted to each country according to the dynamic development and demands of local industry.

Strengths:

> Industry EE initiatives and programmes work better in collaborative cooperation and through the exchange of knowledge concerning specific circumstances.

> The industrial enterprises participating in the EEN are committed to realizing the untapped EE potential by doing quicker planning and actions in the implementation of the EE solutions.

> The industrial sector historically saved more energy per programme dollar than other customer classes.

Weakness:

- It requires close cooperation between government and industry to demonstrate the benefits of EENs to companies and establish a culture for EE;
- Since EENs can draw skepticism from companies, for them to participate actively requires trust relationships among all stakeholders;
- Concerted efforts must be made for the network to continue activities over the long term.
- Providing technical support and incentive mechanisms to EEN participants will accelerate the achievement of EE objectives and encourage reluctant stakeholders to join the initiative.

2.5 EEI #5 – DSM Electricity Pricing or Dynamic Electricity Prices

2.5.1 Brief Description

Dynamic electricity pricing is an advanced type of demand response that establishes a link between the retail and wholesale markets via the energy component of a retail bill. Generally, dynamic retail electricity prices correspond to the prices on the electricity wholesale market over a given period of time. As the wholesale prices evolve over time, they create incentives that may influence energy-consumption behaviours. The more closely retail prices follow wholesale prices, the more dynamic they are. There are several different types of pricing schemes used to pass on part of the benefits of the wholesale market dynamism to retail customers.

The most commonly employed options include:

- Time-of-use (ToU) pricing is a rate whereby the price per kWh depends on the time of the day electricity is consumed. It can be a simple day and night price or on-peak and off-peak hours splitting the day into several slack periods. It can also be seasonal. Usually, periods and prices are known well in advance, but the definition of the day/night intervals may change according to day-ahead spot prices;
- Critical peak pricing (CPP) is a kind of top-up rate where electricity prices substantially increase for the few days a year when wholesale prices are the highest, but prices are lower than average during the rest of the year. For example, the French Tempo tariff is a contract with a fixed price for the entire year except for a maximum of 20 days with very high prices. Customers are notified about these days the day before this rate comes into effect;
- With real-time pricing (RTP), wholesale electricity prices are directly passed on to final consumers and bills are calculated based on at least hourly consumption metering or with higher granularity (e.g. 15 minutes). The price of such offers is composed of the wholesale electricity price plus a supplier margin.

Whether highly dynamic or moderately dynamic, dynamic electricity pricing has been particularly effective in moving consumption off the peak periods and reducing peak capacity requirements. Higher levels of dynamism, including fluctuating prices and changing peak periods, typically require "smart" meters or an open communication channel with clients who can react manually to changing prices or peak events.

An alternative is a load control device that prevents high power devices (such as resistance water heaters) from operating during peak periods. For example, this device became popular in Brazil in the 1990s. Brazilian consumers were offered a 20% reduction in their electricity rates if they accepted to have demand limiters installed. High-consuming appliances resume operation in the off-peak periods, thus shifting demand, rather than reducing it overall. This alternative functions as a form of automatic load-scheduling, without needing a smart meter or other advanced technologies and helps protect customers from excessive bills during ToU and potentially also CPP peak periods.

The Target Sector or Technologies

Both dynamic pricing models and peak load control devices can be applied to a range of sectors and technologies. Typically, the acceptance of dynamic pricing and the incentive to offer flexibility differs among different types of customers due to their varying risk aversion levels, i.e. whether they are willing to become exposed to wholesale market price volatility or prefer stable energy prices.

Dynamic pricing combined with RTP has been quite commonly adopted by industrial customers. In a number of countries, households and small commercial customers have been offered simplified forms of ToU and CPP. So far, RTP has only been offered to residential consumers in the Nordic, Estonian and Spanish electricity markets.

12 Eurelectric. (February 2017). Dynamic pricing in electricity supply. Retrieved from https://www3.eurelectric.org/media/309103/dynamic_pricing_in_electricity_supply-2017-2520-0003-01-e.pdf

2.5.2 An Example Illustrating the Use of this Instrument: Brazil's Experience with Load Control Devices

In Brazil in the mid-1990s, the most common device used for residential water-heating was an electric resistance shower, which heated water instantaneously on demand. This device had a nominal capacity ranging from 2 to 6 kW, and there was a clear trend towards a power increase. The cheapest models available cost USD 10 to USD 12 and had a nominal capacity of 2.0 to 4.5 kW. There were a limited range of options that could compete with the electric shower to reduce electricity consumption in domestic water-heating systems in Brazil. Because electric showers contributed heavily to the overall peak load in the early evening in Brazil, the utilities were facing the need to invest USD 800 to USD 1,000 per electric shower to meet demand in the mid-1990s.

A pilot project stimulated the development and commercialization of a load control device for preventing the electric resistance heater (and other high-power appliances) from operating during the peak period. This device reduced peak demand but did not necessarily save electricity due to consumers altering their bathing schedules. Consumers were offered a 20% discount on their electricity rates if they accepted the demand limiters. The pilot project was a success in terms of both consumer acceptance and cost-eDectiveness and was subsequently adopted by several utilities throughout the country.[13]

2.5.3 Key Aspects Involved in Implementing DSM Electricity Pricing and Dynamic Electricity Prices

Table 18: The Stakeholders' Roles

Stakeholders	Description of Stakeholder Role
The Regulator	This instrument should operate as part of the overall regulatory system. Reviewing tariffs and costs is one of the core functions of the regulator. In some cases, specific rules for pilot projects are relevant. The regulator must continue to balance the interests of three stakeholder groups, namely the government, electricity (or energy) service suppliers and customers. Each of these groups has interests that are potentially in conflict with the interests of the other groups.
Electricity distributors (service suppliers)	They play the normal role of passing on and administering the agreed-upon retail tariffs to interested customers and communicating clearly to customers about costs and benefits. May have additional technical tasks to upgrade equipment depending on the tariffs chosen.
Customers	Different types of consumers can be encouraged to participate based on their consumption and DSM potential.

13 Geller, H., Jannuzzi, G. de M., Schaeffer, R., & Tolmasquim, M. T. (1998). "The efficient use of electricity in Brazil: progress and opportunities". Energy Policy, 26(11), pp. 859–872. doi:10.1016/s0301-4215(98)00006-8

Table 19: The Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Financial Implementation**	**Technical Implementation**	**MRV, Instrument Development and Follow-up**
The Regulator	+++ Reviewing the tariffs is a core task of the regulator.		+ Overseeing and backstopping the impact on profitability.		++ Should put in place a system to monitor the implementation or such a system has already been incorporated into normal operations.
Electricity distributors	++ Must provide input into tariff-setting process.	+++ Changes to bills and to back-end systems may be required.	++ Monitoring of profitability.	+++ Must arrange and supervise new equipment on their networks.	
Customers			+ Must decide if interested in the offer.	+++ Must enable technicians to access and potentially modify connections or behaviour.	

Legend: + small, ++ medium, +++ large.

Table 20: Risk Distribution			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
The Regulator	+ Must ensure that profitability of the utilities is not negatively impacted, and that customers are fairly treated.		
Electricity distributors	++ The system may be more vulnerable to being tampered with.	+++ Must allow new devices into the network and ensure compatibility.	+++ Must adjust systems to new tariffs and/or new devices, new information/ data-gathering possibilities.
Industrial customers	+++ Bear risk if switching to new tariffs.	++ Have to allow technicians to access, adjust device usage, ensure compatibility of the devices with automated systems.	++ Have to make an effort to understand the new systems, billing procedures, etc.

Legend: + small, ++ medium, +++ large.

Table 21: Sustainability of the Instrument			
Instrument	**Financial Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
EEI 5	++ Passes risks to end consumers, thus leaving less risk for utilities with the same profitability expected.	+++ Price-based signals to customers are expected to have strong economic efficiency.	+ No clear impact either way.

Legend: + small, ++ medium, +++ large.

Key Lessons Learned from International Experiences

Dynamic tariffs can fit well with the variety of market structures present in the MENA region, and there is a significant amount of experience in the region with varying levels of dynamic pricing. For example, Tunisia has implemented some form of dynamic tariffs since 1974, starting with mandatory time-of-use (ToU) pricing for all medium voltage industrial and commercial customers and eventually implementing mandatory ToU pricing for all high voltage and medium voltage customers by 2003. In the 2005 iteration, different rates changed according to the season and time of day. An interruptible tariff was also offered for more than a decade up to 2003 to reduce evening peak demand, but the voluntary tariff had very low demand and was eventually removed. However, interruptible tariffs for special applications – such as water heater rates on agricultural pumping systems that are curtailed during peak hours – have become popular. Among the lessons learned from the experience in Tunisia is the attractiveness of ToU rates for large customers, whereas medium and smaller enterprises prefer a simpler flat rate.[14]

Experience in the region and from around the world emphasises that consumers can be interested in dynamic pricing and DSM pricing if they are well informed and the schemes are designed in an easy-to-use manner to render energy bill reductions achievable. Without information about their level of exposure to price volatility, i.e. without knowing when electricity prices increase, consumers may potentially face significant bill increases during certain months, which could lead to a backlash. Other important barriers routinely encountered when implementing dynamic pricing, which are likely to be relevant in the region, include utility concerns about reducing sales, the desire not to deprive customers of energy as this appears contradictory to the objectives of electrification, and regulator concerns about programme cost recovery including meters and support for billing software. Solutions to all these barriers are available. For example, in the case of RTP with direct exposure to spot prices, customers should be made aware that they could pay more for their electricity on one anomalous, high-priced day than for the rest of year.

Some pilot projects suggest that consumers engage in the market and adjust their consumption if they have access to advanced information or energy management tools and that ultimately, only automated solutions will be interesting for most customers (including load control devices).

Dynamic pricing is possible as long as smart meters with minimum requirements allowing for reliable consumption readings in specific time slots matching market intervals are available. In addition, corresponding consumption records, data-processing and billing procedures need to be put in place, which requires investment in IT infrastructure. In countries where smart meters have been rolled out, they are mostly unable to dynamically identify a particular time period or set certain hours as critical. Therefore, energy management systems should also be developed to be integrated with the telemetry software to allow for creating multiple tariffs and tariff periods adjusted to different load curves and identifying peak periods and opportunities for reducing consumption.

Strengths:

> Allows for maximizing profits with each customer.

> Ability to adjust prices for service projects or products based on the time period and costs involved or fluctuating demand.

Weaknesses:

> This approach may turn off customers who prefer to know the set price upfront on a purchase.

> Some dynamic pricing models need advanced technology programmes to optimize price adjustments over time.

14 Charles River Associates "Applications of Dynamic Pricing in Developing and Emerging Economies" The World Bank, pp. 47. Available from http://siteresources.worldbank.org/INTENERGY/Resources/ApplicationsofDynamicPricing.pdf. Accessed 19-11-04.

2.6 EEI #6 – Mechanism for Accelerating Replacement of the Stock of Energy-using Equipment and Appliances

2.6.1 Brief Description

The mechanism for accelerating replacement of the stock of energy-using equipment and appliances provides incentives to encourage consumers to upgrade and properly dispose of their aging appliances. Incentives and penalties are essential policy tools to move the market toward energy efficient products.[15] They offer a favourable complement to mandatory standards and labelling policies by accelerating the market penetration of energy efficient products that are above the equipment standard requirements and by preparing the market for increased future mandatory requirements.

Concretely, programmes involving incentives and penalties can sway purchase decisions and, in some cases, production decisions and retail stocking decisions toward energy efficient products. Such programmes are structured according to the local regulatory environment, financing models, how incentives are targeted and who administers them. Any agency can launch such programmes.

This mechanism has to overcome the risks perceived by different stakeholders to facilitate investments in energy efficient equipment and appliance programmes. Efficient equipment and appliances are typically more expensive on a first-cost basis and less expensive throughout the product life cycle. Financing schemes are thus valuable tools for increasing and accelerating market adoption of more efficient products.

The Target Sector or Technologies

This mechanism targets all the sectors and all sorts of high-energy-consuming equipment and appliances.

2.6.2 An Example Illustrating the Use of this Instrument: Utilities' Refrigerator Replacement Programme in Brazil

Brazil has introduced several programmes to increase energy efficiency of appliances. Electricity distribution companies are required to invest part of their revenues in EE programmes. Since 1998, these funds have often been used by the distribution companies to invest in EE programmes to support low-income households.

One kind of the most commonly used programme was the refrigerator-replacement programme. Around 30% of Brazil's refrigerators are over 10 years old. Most of these old refrigerators belong to low-income households and represent 70% of total low-income households' electricity consumption.

The programme aims to help low-income households save money and reduce energy consumption by replacing old, inefficient refrigerators at no cost to them.[16] Replaced appliances are recycled. From 2008 to 2010, 45 electricity distribution companies participated in the programme, replacing more than 380,000 refrigerators, saving 190,000 MWh/year and reducing peak demand by 23,000 kW.

Impacts:

- Achieved 81% of reduction in refrigerator electricity consumption in the north-eastern region and 70–75% in the south-eastern region;
- 28% of the programmes were cost-effective despite high financial incentives (free appliances). The rest were not cost-effective but had social and environment benefits.

15 SEAD Incentives Working Group. (August 2013). A Global Review of Incentive Programs to Accelerate Energy-Efficient Appliances and Equipment. Retrieved from https://ies.lbl.gov/sites/all/files/lbnl-6367e.pdf.

16 BigEE., Policy Examples for Utilities' Refrigerator replacement programme in, Brazil. Retrieved from, http://www.bigee.net/en/policy/guide/appliances/policy_examples/8/#key-information. Consulted on the 08th July 2019.

2.6.3 Key Aspects Involved in Implementing the Mechanism for Accelerating Replacement of the Stock of Energy-using Equipment and Appliances

Preconditions to implementing this instrument include existing test procedures, an implementing agency, a funding scheme and a conducive regulatory environment, as explained in the table below.

Table 22: The Stakeholders' Roles

Stakeholders	Role
The Regulator	An agency starts to build the structure to implement incentive and penalty programmes according to the country's regulatory framework, the way such programmes are financed, how the incentives are targeted, and who administers such programmes. The regulator also supervises the EE programme.
Utilities and distributors	Utilities design, manage and implement the programmes. Each utility carries out and manages its own EE programme within its concession area under the supervision of the regulator. Therefore, it is a national, local and regional policy depending on the focus of each utility. Utilities are also in charge of disposal and recycling of the equipment and appliances replaced (see the description of the disposal regulator below).
Financiers and debt recovery services	Financiers and debt recovery services have to finance the EE programmes for accelerating replacement of the stock of energy-using equipment and appliances.
The disposal regulator (old appliances)	The disposal regulator has to properly and safely dispose of the old equipment and appliances replaced covered by the EE programme. Their recycling must be certified.

Table 23: The Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Technical Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
The Regulator	+++ Sets up the structure to implement the incentive and penalty programmes. Develops and validates the procedures manual of the programme implementation by involving the main stakeholders.	++ The agency overseeing appliance subsidies can be outsourced.	++ Ensure the right technical coordination among the main stakeholders.	+++ Financing for this instrument can come from general government revenues.	+++ The regulator should inspect the utilities' programmes to ensure that utilities have their own tracking systems.
Utilities and distributors	+++ Utilities design, manage and implement the programmes.	+++ No state agencies are needed to implement the programmes because this task is assigned to the utilities.	+++ Responsible for the technical implementation.	++ Could be required to invest part of their revenues in EE programmes.	+++ All utilities' EE programmes carry out M&V to quantify the results of EE investments, improving governance and accountability. They should follow the guidelines of the IPMVP (International Performance Measurement and Verification Protocol).

Legend: + small, ++ medium, +++ large.

Table 23: The Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Technical Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
Financiers and debt recovery services	++ Can be involved in the design of the financial mechanism of the programmes.	++ Ensure the compliance with the procedures manual about the programme's implementation.	N/A	Depending on the national regulations, the EE programmes could be fully financed by electricity consumers or partly with the help of the national energy utilities and distributors. If not, the national regulatory agency should ask banks to directly finance the EE programmes.	N/A
The disposal regulator (of old appliances)	+ Can help define the procedures manual about the collection and recycling of the old appliances replaced.		+++ All old equipment and appliances covered by the EE programme must be properly and safely disposed of by utilities and their recycling must be certified.		+++ Utilities have to provide delivery services for new equipment and pick-up services for old appliances.

Legend: + small, ++ medium, +++ large.

Table 24: Risk Distribution			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
The Regulator	++ The programmes' cost-effectiveness depends highly on the appropriateness of the financial incentives to the local market. Without a strong design, the incentives can be unfairly taken advantage of and result in excessive costs.	+++ Needs to ensure that the roles and responsibilities are well defined and distributed among the different stakeholders involved in the technical implementation of the programme.	+++ Supervise the programme and all stakeholders. Must put systems in place to prevent the programme from being unfairly taken advantage of.
Utilities and distributors	+++ If the utilities are financing the EE programme, the initial cost is high because the new equipment and appliances are free to the customers.	+++ There is a risk that consumers complain about the functioning EE appliances to be mandatorily replaced. Needs to implement a strong quality control and test procedure in selecting the EE appliances and the technology providers.	+++ Implement the programme alone at the first stage.
Financiers and debt recovery services	+++ The level of financial risk depends on the mechanism of repayment of the EE programme. If it is fully financed by electricity consumers, there is no risk at all. Otherwise, if it is a bank or national energy utilities and distributors, the risk increases.	No technical risk for the financers. The technical risk is supported by the designated entity in charge of implementing (utilities and distributors).	N/A
The disposal regulator (of old appliances)	N/A	+++ If the recycling branch does not exist in the market, the country will face high technical risks to implement such EE programmes.	++ Their recycling must be certified.

Legend: + small, ++ medium, +++ large.

Table 25: Sustainability of the Instrument			
Instrument	**Financial Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
EEI #6 – Accelerating replacement of the stock of energy-consuming equipment and appliances	+++ A main barrier to investing in energy-efficient equipment is the higher purchase prices. The programme aims to help households save money and reduce energy consumption by replacing old, inefficient appliances at no cost to them or with substantial incentives.	+++ Helps supply energy in the long term for all sectors by reducing the overall consumption of a country. Increases energy-efficient equipment and appliance sales.	+++ Helps accelerate the transformation of the market towards energy-efficient equipment and appliances. Improves the living conditions of low-income consumers by helping reduce the family budget allocated to energy. Jobs are created in the utilities to develop and implement the programme. Helps create jobs by developing disposal and recycling services dealing with old equipment and appliances. Environmental benefits by reducing CO2 emissions related to energy savings of the programme.

Legend: + small, ++ medium, +++ large.

Key Lessons Learned from International Experiences

The instrument is well adapted to being piloted in the MENA region where most old equipment and appliances are over 10 years old. Moreover, there is high energy savings potential in this region because the number of appliances in use (such as refrigerators, air-conditioners, etc.) in developing and emerging economies is projected to increase significantly over the next 15 years.

Some key lessons learned from international experience suggest pre-conditions and requirements are needed to successfully put in place the mechanism in the MENA region:

- Roles and responsibilities should be well defined and distributed among the different stakeholders involved in the technical implementation of the programme;
- The programme and stakeholders should be supervised, and systems must be put in place to prevent the programme from being unfairly taken advantage of;
- A strong quality control and test procedure needs to be implemented for selecting EE appliances and technology providers;
- Programme cost-effectiveness depends highly on the appropriateness of the financial incentives to the local market. Without strong design, incentives can be unfairly taken advantage of, which would result in excessive costs;
- A recycling branch must exist in the market, otherwise the country will face high technical risks to implement such an EE programme.

The main hinderances to putting in place a mechanism for accelerating replacement of the stock of energy-using equipment and appliances include (1) a lack of interest and motivation in energy efficiency-improvement, (2) a low-incentive level for purchasing new EE equipment and appliances and (3) a lack of knowledge and information about the implementation of the programme.

Strengths:

> A combination of incentives and penalties can reach a large number of consumers.

> Such programmes can help low-income households save money and reduce energy consumption by replacing old, inefficient equipment and appliances at no cost to them.

> Financing can be arranged through the electricity bill.

> Refrigerators and lighting programmes should be favoured because of the potential savings available.

Weaknesses:

> The replacement must meet the prescribed efficiency class, which must be available and regulated in the market.

> Better governance is required for the regulated utility programmes. Stronger coordination among the main actors (the regulator, utilities, and the government) would be beneficial.

> It is necessary to clearly establish broad public energy policy goals to guide the regulator's and utilities' efforts to apply available resources more cost-effectively.

> If utilities are to continue to be the main proponents and implementers of energy efficiency projects, regulatory changes should align utility incentives and business plans to reward energy-saving actions.

2.7 EEI #7 – Energy Savings Insurance Mechanism of an Energy Performance Contract

2.7.1 Brief Description

The risks associated with investments in sophisticated EE solutions concern not only financial institutions, but also project developers and their counterparts, who share long-term financial relationships. A risk refers to the possibility that the eventual savings will not materialize due to faults in new technologies or other technical issues. Typically, businesses can address risks by purchasing the right insurance package. However, EE insurance is not common in developing countries.

The energy savings insurance (ESI) instrument is intended to stimulate investments in EE by mitigating the risks associated with the possibility that small and medium enterprise (SME) investments do not pay for themselves if actual energy savings end up being lower than anticipated. The main purpose of this instrument is to provide assurance to investors and their financiers that EE projects will generate projected financial savings.

ESI is implemented as part of an EE project between an energy service provider (ESP) and a SME, and it includes an energy performance contract (EPC). This instrument establishes an energy savings objective and a performance guarantee. An independent external entity validates the project before the parties sign the contract and before equipment is installed; it then verifies the energy savings once the project is implemented. Performing technical validation, which involves validating balances and equations for calculating energy consumption, energy savings and monetary savings for a specific measure, is rather difficult and complex, depending on the measure. Therefore, qualified technical and financial experts are needed. The complexity of this process has led to problems with EPC savings insurance internationally.

In a functioning ESI market, an insurance process for qualified ESPs would include the following main features:

> The contractor installs new equipment in a building or at an industrial facility to reduce annual energy expenditures. Certain measures are much easier to predict and forecast than others. How appliances or rooms are used throughout contract duration has to be very accurately defined in accordance with the given measures. User behaviour is one critical parameter, which may lead to disputes. It is much easier to make predictions about simple measures (e.g. replacement of pumps) because they are easier to verify;

> The contractor guarantees the amount of annual savings expected from installed equipment;

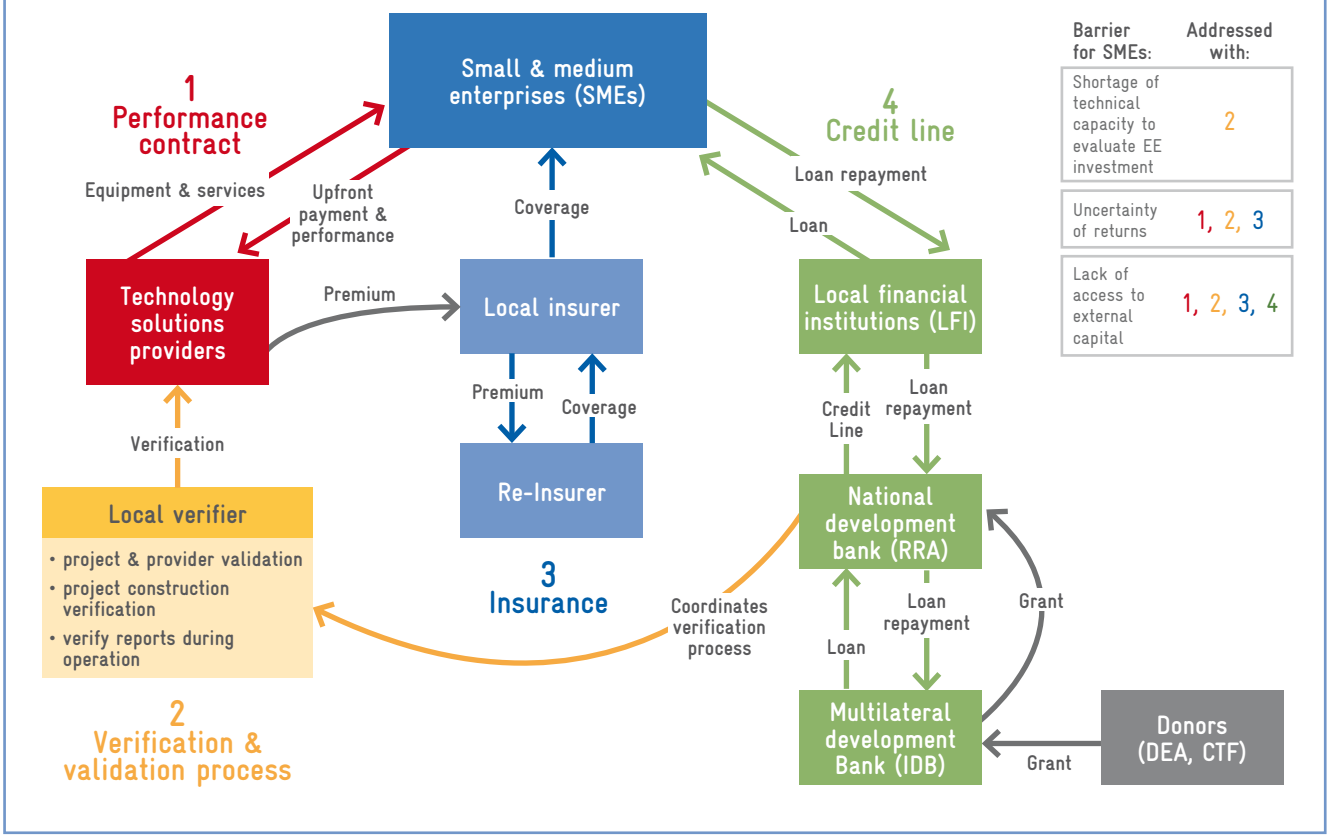
> The insurer is contractually obligated to repay the guaranteed savings in the event that savings do not occur.

Analyses have shown that if the ESI instrument is implemented as part of a programme of activities tailored to a country's actual and specific context, this instrument can absorb up to 80% of such an underperformance risk (according to the Climate Finance Lab studies).

Typically, the main components of this instrument are an insurance product and a package of complementary measures. Figure 5 below illustrates the main actors, roles and services involved and the barriers addressed by actual examples of putting in place this instrument.

The central action is that the technology solution provider (such as an ESCO) purchases the insurance to back its contractual guarantees to its SME client on the performance of its energy-efficient products. In a typical programme set-up, a package of complementary measures addresses other barriers to investment, such as technical capacity and access to capital.

Figure 5: Main Components of an Energy-savings Insurance Instrument
(chart originally created by the Climate Finance Lab[17])



17 Global Innovation Lab for Climate Finance. Energy Savings Insurance. Retrieved from https://www.climatefinancelab.org/project/insurance-for-energy-savings/.

Such measures may include the following:

> A standard energy performance contract (EPC) to reduce transaction costs, including a clause transferring part of the underperformance risk to ESCOs. Standardizing the contract is more difficult with more complicated measures. The most difficult work is developing and applying the exact rules for calculating the savings and monitoring energy consumption during the implementation. All this work needs much technical knowledge and a strong capacity to perform it.

> Third-party verification outsourced to a qualified external body to ensure the quality of energy service providers and their projects. In Europe, after many problems occurred with EPC projects, the industry set up a code of conduct that applies specifically to energy performance contractors.[18]

> Lines of credit provided by development banks to provide long-term capital, thus reducing the cost of financing projects;

> Grant support to sustain market demand.

The Target Sectors or Technologies

The ESI instrument targets SMEs in various sectors and local banks which want to invest in energy efficiency projects. Many sectors are targeted, such as the food production and processing industry, services and commercial sub-sectors, light manufacturing businesses, development banks, hotels, hospitals and clinics, fisheries, and textiles, etc. Some countries have tried to first focus on SMEs that implement rather simple measures (whose energy savings are easier to calculate) in only one selected sector, e.g., replacing old pumps with speed-controlled pumps, replacing old light bulbs with LEDs, etc. More complicated measures (insulation, complex central cooling, etc.) were left out. Usually, only big companies had the necessary experience of serving as energy performance contractors.

2.7.2 An Example Illustrating the Use of this Instrument: Mexico's ESI Pilot Programme

Mexico launched a pilot ESI programme in 2015 with support of the Clean Technology Fund (CTF), the Danish Government through the Danish Energy Agency and the Inter-American Development Bank. In Mexico, a second-tier rural development bank called Fideicomisos Instituidos en Relación con la Agricultura (or FIRA for short) implemented the ESI programme aiming to provide an investment stimulus of USD 25 million in the food production and processing industry to over 190 energy efficiency projects through 2020.[19]

Its mechanisms have been consolidated, a dedicated financing line has been launched and is currently starting to gain traction in local markets. With the help of the ESI programme, it is hoped that the following positive changes will occur: many agri-businesses will substantially lower their energy costs; recurring energy savings can reach up to 40% with paybacks between 2 to 5 years; SMEs will upgrade or replace obsolete equipment, thereby reducing maintenance costs and downtime and significantly increasing their competitiveness.

The ESI programme is highly regarded by various institutions of the Mexican government. ASERTA is participating in the programme as the insurance provider. The Association of Normalization and Certification (ANCE) is serving as the validator and verification entity. With all this support, ESI is overcoming major barriers, such as perception of high technical and financial risks in energy efficiency matters and a lack of know-how and EE project management, among others.

Thanks to FIRA's presence in Mexico's food production and processing industry, this approach has begun promoting the mutual benefits among all the stakeholders, such as SMEs and technology service providers (TSPs).

Other Implementation Efforts Expected

The ESI approach is arousing interest in other regions, such as Asia-Pacific (especially China and Vietnam). The French Development Agency (AFD) is considering the possibility of replicating the approach in Mauritius, Turkey and India.

18 European association of energy service companies. European Code of Conduct for Energy Performance Contracting (EPC Code of Conduct). Available here : https://www.euesco.org/european-code-of-conduct-for-epc/index.html

19 Global Innovation Lab for Climate Finance, Micale, V., Stadelmann, M., Boni. L. (April 2015). Energy Savings Insurance: Pilot Progress, Lessons Learned, and Replication Plan.

2.7.3 Key Aspects Involved in Implementing the ESI Instrument

Table 26: The Stakeholders's Role	
ESI Stakeholders	**Description of Stakeholder Role**
The implementing institution	A facilitator (most likely a multilateral development bank) uses donor funds or its own funds to support an implementer (most likely a local development bank or EE institution) to define and drive an EE financing programme. The implementer uses these funds to specify and assess an EE market, convene and coordinate key players (notably private banks), put in place the financial (investment capital, guarantees, and insurance) elements required to implement the programme.
SMEs	The implementer also uses these funds to put in place the technical (contracting, qualification, validation and verification methodologies and documents) elements required to implement the programme. SMEs are engaged at the stage of contracting and qualification.
Energy service providers (ESCOs)	The estimated energy savings associated with a technology are determined on the basis of the technical analysis performed by the programme's third-party local verifier, whose work is coordinated by the ESCO.
Insurance companies (local insurers and re-insurers)	Identify or establish a verification entity and the procedures aligned with the implementing institution. Establish operational procedures for the contract insurance mechanism.
Banks	Conduct a market study of the potential for undertaking energy efficiency projects. Align the instrument with the other financial products.
The verifier	Estimated energy savings associated with a technology are determined on the basis of technical analysis performed by the programme's third-party local verifier, whose work is coordinated by the ESCO. They validate the project's design, its projected energy savings, and its monitoring and verification (M&V) scheme, according to a technology-specific methodology and notifies the national development bank.

Table 27: The Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Technical Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
The implementing institution	+++ Make a market assessment of the potential for undertaking energy efficiency projects. Develop the profile for targeted sectors and subsectors. Develop the profile for target projects. Identify target markets, mobilize resources, and raise key players' awareness.	+++ Prepare an action plan for implementing the programme. Plan the activities targeting the different actors targeted by the programme. Mobilizing and obtaining the necessary resources.	+++ Setting the rules for operating the programme: Developing a qualification methodology for the energy service providers and equipment suppliers. Developing the validation and verification methodologies (a key issue) for EE projects and technologies. Preparing the standard performance contracts. Developing the qualification methodology for the verifier. Developing the eligibility criteria of EE projects. Enhancing the capacity of the main stakeholders.	+++ Coordinate and facilitate the origination of projects among financial institutions, banks, insurance companies and energy end-users. Select 5 to 10 projects that have end-users, providers, and banks.	+++ Establish criteria for measuring programme success.
SMEs	+++ Make a preliminary assessment of the potential for undertaking energy efficiency projects. Develop the profile for target projects.	+++ Designate a project coordinator to be in charge of concluding agreements, coordinating activities and participants, and ensuring that the project moves forward according to the plan.	+++ Identify, adapt or develop a performance contract with a service provider.	+++ SMEs have to secure the financing of their EE projects from the banking sector or EE financing instruments available in the market.	+++ MRV of the projects' performance KPIs in coordination with the ESCO.

Legend: + small, ++ medium, +++ large.

Table 27: The Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Technical Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
Energy service providers (ESCOs)	+++ ESCOs sign an EPC with the SMEs, or the borrowers of credit, to share the risks in a fairer way. Take an insurance policy for SMEs.	+++ Contractual arrangements between SMEs and ESCOs need to be transparent and standardized.	+++ Installation and commissioning of projects.	+++ ESCOs need to have independent insurance to support implementation of EE projects and provide guarantees.	+++ In each period, as defined in the structure of the insured project, a verification of the savings has to be made (must be made in any case). The periodic verification would be done by monitoring the system and when a savings shortfall has been detected.
Insurance companies (local insurers and re-insurers)	+++ Identify or develop a verification entity and procedures aligned with the instrument provider.	++ Establish operational procedures for the contract "instrument"-credit mechanism.	+ Minimal role/be informed.	+++ Align the instrument with the other financial products.	++ Define the criteria and the methodology.
Banks	+++ Conduct a market study of the potential for undertaking energy efficiency projects.	+++ Designate a project coordinator to be in charge of concluding agreements, coordinating activities and participants, and ensuring that the project moves forward according to the plan.	+ Minimal role/be informed.	+++ Align the instrument with the other financial products.	+++ Establish criteria for measuring programme success.
The verifier	+ Minimal role	+++ Be informed about the qualification procedure to be a third-party verifier of the programme. Submit the candidacy to the implementer to be certified as independent third-party verifier.	+++ Qualify the energy service providers and equipment supplier. - Assess the eligibility criteria for EE projects. - Validate and verify energy-savings potential of the EE projects and technologies.	+++ Provide confirmation to the investor or the end-user, the insurer and the financier that the project will produce the projected energy savings.	+++ In each period, as defined in the structure of the insured project, a verification of the savings should be made. The periodic verification would be through a monitoring system and when a savings shortfall has been detected.

Legend: + small, ++ medium, +++ large.

Table 28: Risk Distribution			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
SMEs	+ Compensation or insurance schemes if the promised financial flows associated with EE savings do not occur.	+++ Contractual arrangements between SMEs and ESCOs need to be transparent and standardized.	+++ Government-made changes may lead to adjustments in regulations and financial incentives, affecting the operation of businesses and repayment of loans.
Energy service providers (ESCOs)	+++ Part of the performance risk is directly borne by ESCOs, linking a portion of the contracted payments to the performance of the project.	+++ Contractual arrangements between SMEs and ESCOs need to be transparent and standardized.	++ Equipment suppliers and technology solution providers may be discouraged from participating in the programme by compliance requirements required by the programmes and higher costs.
Insurance companies	+++ Claims for savings shortfalls: If the project has not generated the guaranteed savings cash flow, an insurance claim should be made, and if proven justified (not a simple task), the insurance should be paid to the financing institution. The insurance companies should have a portfolio with enough projects to spread the risks among projects.	++ Risks of losing money if equipment and services are not as good as expected. Equipment-related responsibility is partially borne by the producer.	++ A workable insurance product needs a liability related to the performance, but defining new types of guarantee contracts may take time.
Banks	+++ The risk that energy savings will not be realized by the project is covered in the broad guarantee that the development bank provides to the local banks.	+ No technical risk.	+++ Government-made changes may lead to adjustments in regulations and financial incentives, affecting the operation of businesses and repayment of loans.

Legend: + small, ++ medium, +++ large.

Table 29: Sustainability of the Instrument			
Instrument	**Financial Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
E7 – The ESI mechanism of an EPC	++ Credit lines provided by development banks, which could provide long-term capital, reducing the cost of financing projects and providing grant support to sustain market demand. But this dependence on credit lines from development banks gives a medium financial sustainability rate.	+++ EPCs to reduce transaction costs, including a clause transferring part of the underperformance risk to ESCOs and third-party verification to ensure the quality of ESCOs and their projects.	+++ The mechanism is expected to help energy end-users realize more untapped energy savings potential and create the following impacts: Reduced GHG emissions at the local and global levels. SMEs' enhanced profitability. Jobs created through the development of services and EE equipment providers by creating a sustainable EE market.

Legend: + small, ++ medium, +++ large.

Key Lessons Learned from International Experiences

This instrument is well adapted to be piloted in the MENA region. The main hindrance to putting in place an ESI mechanism is the poor regional EPC market development as well as the lack of technical experience among the main players in the EPC field. Since the EE market is not very developed in the region, setting up such a programme will require carrying out many awareness-raising and capacity-building activities to foster the involvement of various actors (SMEs, ESPs, banks, insurance companies, etc.).

Strengths:

- Make SMEs more confident about making EE investments: the ESI mechanism can help reduce the risks faced by the energy efficiency project beneficiary, who is compensated if the energy-savings targets are not met.
- Encourage ESCOs to develop EPCs to establish an energy-savings objective and performance guarantee.

Weaknesses:

- Needs open-minded insurance companies that agree to take the risks and develop a new insurance product.
- Difficulty assessing the risk and properly defining the insurance premium.
- Needs a well-developed ESCO market.
- Needs a strong regulation and a strong and steady legal framework to ensure that EPCs are honoured by stakeholders.
- Needs very accurate and well-defined measurement and verification standards for precise calculations of energy savings.

One of the main barriers to the development and large-scale implementation of such insurance products is the fact that EE projects are developed and implemented in a limited number and are insured in an even lesser number. This prevents insurers from:

- Generating enough data and statistical analytics to accurately estimate risk levels;
- Standardising transactions to insure against other risks;
- Developing streamlined (thus inexpensive) processes for claims, verification of damages, etc.

This means that, in the initial implementation period of such products, pricing can be prohibitively expensive, or the insurer might face unknown risk that cannot be quantified.

2.8 EEI #8 – Voluntary Agreement

2.8.1 Brief Description

A voluntary agreement (VA) is a turnkey and negotiated covenant between public authorities and a firm or group of firms. Such voluntary agreements not only include targets and timetables for taking actions aimed at improving EE or reducing GHG emissions, but also outline rewards and penalties. VAs vary in form, legal status, structure and provisions, parties involved and enforceability. The IEA defines the VA as "essentially a contract between the government and industry, or negotiated targets with commitments and time schedules on the part of all participating parties" (IEA, 1997).[20] The Intergovernmental Panel on Climate Change (IPCC) refers to voluntary actions as "actions taken by firms, NGOs, and other actors that go beyond regulatory requirements" and further states that "voluntary agreements represent an evolution from traditional mandatory approaches based on conventional or economic regulations and intend to provide further flexibility to polluters. They are based on the idea that, under certain conditions, polluters can decide collectively to commit themselves to abatement instead of, or beyond the requirements of regulation."[21] The overview provided by the IPCC indicates how voluntary agreements vary substantially in approach, the sectors they address, parties involved, level to which they are fully voluntary or rather aimed at circumventing non-negotiated regulation and how they are integrated with other policy instruments.

In many cases, the introduction of VAs has been a matter of choosing a certain policy style and culture of policy cooperation. Public authorities have not necessarily performed a direct ex-ante quantitative comparison of VAs and legislation, for example, before selecting VAs. Public authorities in some countries that have traditionally applied this policy have stated that one major argument for introducing VAs has been the public authorities' trust that they could cajole industrial enterprises to undertake commitments, which would have otherwise been impossible to legislate.[22]

The Target Sectors or Technologies

VAs can be applied widely to various sectors and technologies thanks to the various types of VAs available. Several types of VAs for improving EE of appliances and equipment have been identified along the spectrum from fully voluntary agreements to government regulations. These include the following:

- **Industry-led VAs to set minimum performance levels** are common for consumer electronics and information and consumer technologies.

20 IEA. 1997. "Voluntary Actions for Energy-Related CO2 Abatement". Paris: OECD/IEA.

21 IPCC. 2014. "Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate", 2014.

22 Rezessy, S. Bertoldi, P. "Voluntary agreements in the field of energy efficiency and emission reduction: Review and analysis of experiences in the European Union". Energy Policy, 39(2011)7121–7129. doi:10.1016/j.enpol.2011.08.030.

> **Industry-led VAs to establish a form of labelling scheme of equipment** are less common. However, these are a clearly identifiable category and relevant for product types for which, at the time when the VA is being promoted, there is no government-mandated S&L in place or under development.

> **Government-defined voluntary energy labels** are quite common, sometimes as stand-alone policy, sometimes as an addition to the regular mandatory energy labelling scheme. Stand-alone VAs in this category typically cover many product categories and may have been running for many years and with products covered changing over the years.

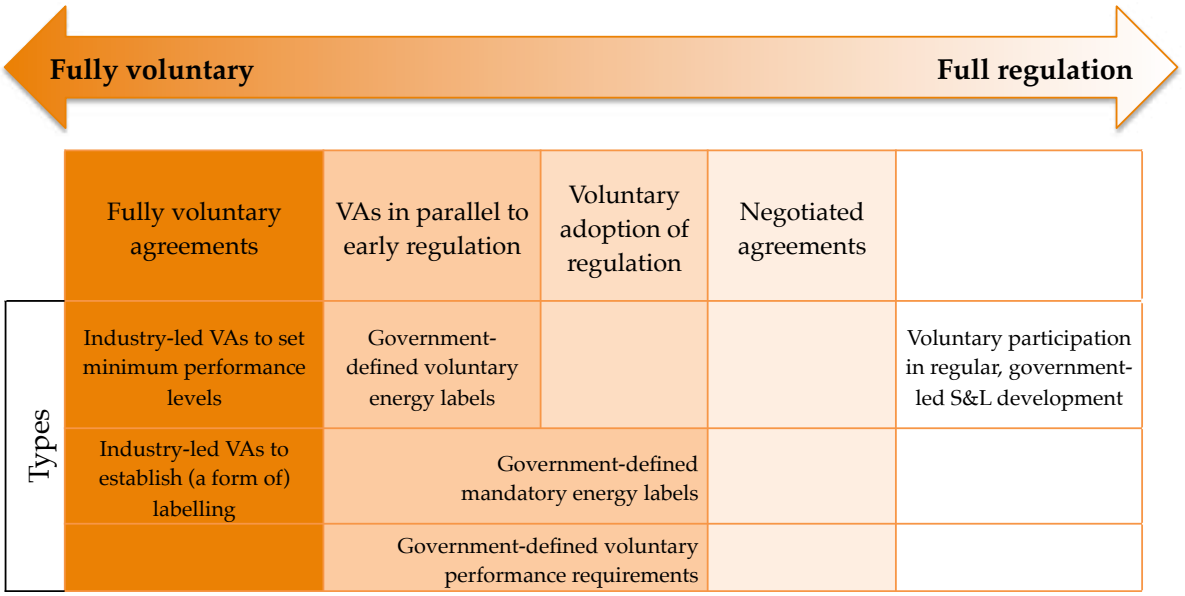
> **Government-defined mandatory energy labels** (categorical or endorsement energy labels) with a voluntary phase before the labels become mandatory. These VAs are more an extension of government-mandated S&L, where an extended voluntary phase is used to overcome market or political barriers to the mandatory implementation of those S&L. The mandatory phase is not always implemented.

> **Government-defined voluntary performance requirements** are sometimes defined as part of other government policies, such as the government procurement or endorsement programmes.

> **Voluntary participation in regular, government-led S&L development.** Voluntary industry participation is quite common in government S&L development, for example, in the development of test procedures or technical requirements.

The main characteristics of these types of VAs in terms of their voluntary nature is summarized in Figure 6 below. In Figure 7 below, the categories of products covered by VAs around the world are highlighted.

Figure 6: Types of VAs Identified (Klinckenberg, 2017)



Source: Klinckenberg, F. Harmelink, M. "Effectiveness of Energy Efficiency Voluntary Agreements". Executive Committee of the 4E Technology Collaboration Programme. December 2017.

Figure 7: Categories and Products Covered by VAs

Category	Products covered	Dom	Com	Ind
Household appliances	Refrigeration appliances; Household clothes washing machines; Household clothes dryers; Household dishwashers	X		
Lighting products	Lighting – General purpose lighting (incandescent, CFLs halogen, LED); Lighting – Directional lighting (Halogen, reflector lamps, LEDs); Lighting - Street lighting (HID lamps, LEDs); Lighting – Commercial / office lighting (Linear Fluorescent Lamps and related systems, including ballasts); Lighting – Other lighting applications	X	X	X
Consumer electronics & ICT equipment, standby and power supplies	Televisions; Displays; Digital television decoders (set top boxes); External power supplies and battery chargers; Audio equipment; PCs and servers; Imaging equipment	X	X	
Air conditioning	Room air conditioners (non ducted air conditioners); Central air conditioners (ducted air conditioners); Chillers	X	X	
Space and water heating	Central heating boiler; Central heating furnaces; Other space heating products; Water heating appliances; Industrial boilers	X	X	X
Commercial refrigeration equipment	Reach-in coolers; Refrigerated vending machines; Walk-in cold rooms		X	
Cooking products	Residential cooking equipment; Commercial cooking equipment; Coffee machines	X	X	
Motors, pumps and fans	Electric motors; Pumps and Circulators; Fans	X	X	X
Transformers	Distribution transformers		X	X
Miscellaneous products	Commercial laundry products; Medical imaging equipment		X	

2.8.2 An Example Illustrating the Use of VAs: Eurovent Certified Performance Mark

Eurovent Certified Performance (ECP) is a major European certification mark currently issued by Eurovent Certita Certification. Over 67% of Heating, Ventilation, Air Conditioning and Refrigeration (HVAC-R) products sold in Europe are ECP-certified. This certification guarantees that the products have been independently checked and that they have been accurately rated. It covers 17 programmes, primarily for the commercial and industrial HVAC technologies.[23]

In the 1960s, the industry association, Eurovent, started defining common test procedures for HVAC products to provide clarity about their energy performance. In the absence of any government policy, Eurovent issued its own energy performance definitions and test procedures, some of which were later adopted in national standards such as DIN. From the early 1990s on, the European Commission started introducing CE-marking for products, based on the European test procedures and energy performance metrics, starting with gas-fired heating products. Around this time, Eurovent at the request of major manufacturers started a certification scheme for HVAC products based on those common test procedures to provide certainty in the market. In the 1998–2005 period, Eurovent certification started to adopt first the European Norms, and then the EU Harmonized Norms, which were then applied to most commercial and industrial HVAC equipment.

Eurovent and its members initiated and provided all resources for developing the test procedures and certification requirements for the certification scheme, and in later years also for label requirements. The industry made considerable efforts to define product criteria, test procedures, performance criteria and label classes.

There has been little to no government involvement in, or contribution to, the certification scheme. In later years, Eurovent assigned its certification scheme to a dedicated third-party test and certification body, Eurovent Certita Certification, which convenes technical working groups for the various product groups covered as well as a board overseeing the scheme. Working groups consist primarily of industry technical experts; the scheme's management board also includes product user and national representatives.

Certification requirements do not specify a required energy performance level (or a performance level for other performance aspects) other than those set by the regulations: Certified products must meet, for example, EU Ecodesign and/or EU Energy Performance of Buildings Directive requirements, where applicable. Certification focuses on informing the market in a uniform and guaranteed way about the energy performance of certified products, instead of achieving a specific performance level. For those products for which Eurovent issues energy labels, it aims to redefine its energy label classes once the (most ambitious) A-class reaches a market share of 5%.

In one study, over a four-year period, there has been a shift in market share of 10% to 15% from the lowest to the highest classes. Given the relatively large differences in energy performance among the label classes that Eurovent uses for this product type, this corresponds to an energy performance improvement of 40% to 50% over 4 years. Since this information relates to a limited period for one product type only, it is impossible to say if similar results have been achieved for other products with a Eurovent certification energy label.[24]

23 Eurovent Certita Certification, http://eurovent-certita-certification.com/marques_en.php

24 Klinckenberg, F. Harmelink, M. "Effectiveness of Energy Efficiency Voluntary Agreements". Executive Committee of the 4E Technology Collaboration Programme. December 2017.

2.8.3 Key Aspects Involved in Implementing the VA Instrument

Table 30: The Stakeholders' Role	
Stakeholders	**Description of Stakeholder Role**
The government	National authorities fulfill several roles in supporting and creating appropriate carrots and sticks to encourage companies and technology providers to enter into VAs. They may provide financial support (carrots) for undertaking certain EE investments, as well as tax rebates, exemptions, public recognition, technical assistance and training. Along with the carrots, most of the VAs use "sticks" too, including some form of penalty mechanisms or other threats of sanctions to discourage non-compliance with VA commitments. In cases where a financial stimulus of some sort is provided, the most common threat is withdrawal of eligibility for the stimulus (e.g., subsidy or tax rebate), often combined with a requirement to retroactively pay back the financial aid already provided after the last compliance period or reporting. The role of the national authority must be to coordinate these aspects and ensure they create the desired environment and the supportive policy to motivate companies to join and to commit to the VAs.
The private sector and market actors	Programme participants (VA signatories) commit to the targets defined and the obligations specified, in particular GHG reductions, energy efficiency improvement or a possibility to choose one of the two options, or other specific targets, such as adopting the best available technology. Most VAs in place are a combination of sectoral agreements and individual agreements, i.e., both individual companies and sectoral associations are allowed to enter into an agreement.
Utilities	Utilities are not major stakeholders in VAs but may have their business bottom-line impacted by reduced consumption and may be engaged to ensure that they are on board and not concerned about lost business. Utilities can also support VAs that will help increase flexibility on the demand side and postpone the additional capacity and network investments.

Table 31: Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Technical Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
The government	+++ Most of the existing VAs rely on significant involvement of the public sector in creating incentives and creating the framework conditions. Identify and conduct prior consultations with stakeholders.	+++ Prepare the framework agreement after holding the consultations with the parties involved. Coordinating reporting with access to various incentives will involve communication and systems created within the existing administration.	++ Conduct studies to assess technical and market information to determine requirements for a VA (setting the level of ambition). Conduct consultations with stakeholders. Provide technical assistance or support to programme participants. Develop the compliance and MRV protocol.	+++ Must manage any financial incentives and, in some cases, provide funding or tax rebates for the duration of the agreement.	+++ To reduce information asymmetry between the industry and the public sector, a strong MRV system should rely on active involvement of the government.
The private sector and market actors	+++ The agreements are voluntary for the private sector. Despite the incentives or penalties, the private sector must be involved in setting up the VAs.	+++ Adopt and approve the framework agreement. New staff or consultants may be needed during the course of implementation to ensure that the administrative requirements and policies are followed.	+++ Participate and agree on the level of ambition targeted by the VAs. Plan and undertake the necessary activities to comply with the VAs.	++ Responsible for reporting and claiming any financial incentives.	++ Should provide access to MRV activities and support designated parties with access and records.
Utilities	+ The utilities are only moderately involved in the setup, except in cases where particular utility goals (grid congestion, for example) are being pursued.	+ May be involved in monitoring results and reporting those to the appropriate bodies.	+ Minimal role Support by providing access to energy consumption data.	+ May be impacted by reduced sales if the business model relies on consumption.	+ Support by providing access to energy consumption data.

Legend: + small, ++ medium, +++ large.

Table 32: Risk Distribution			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
The government	+ Financial incentives are often paid only after measures are implemented. To further reduce the risk, in some cases, the investments were reclaimed from companies that did not meet targets.	+ Technical risks are largely borne by companies. Incentives (if any) are only granted based on results.	++ If the incentives are taken advantage of, that risk falls to government, which should have systems in place to stop it and reclaim incentives if necessary.
The private sector and market actors	++ Companies need to invest in actions and will reap rewards from reduced energy costs or an increasing market share of their EE products as well as the incentives provided.	+++ VA participants will bear or outsource the technical risk of the actions taken.	++ Programme participants will be required to comply with the administrative systems put in place.
Utilities	+ Utilities may experience reduced sales.	N/A	N/A

Legend: + small, ++ medium, +++ large.

Table 33: Sustainability of the Instrumentt			
Instrument	**Financial Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
E8	++ With much of the support frequently coming from the public purse, and no specific source of revenue, this instrument may have challenges over the long term if strong incentives continue to be required for continued participation.	++ Requiring private-sector investment in the activities is a strong point. Firms will seek out the lowest-cost improvement to invest in. Not clear how to ensure that incentives do not overcompensate private-sector actors and limit waste.	++ The voluntary agreement has the potential to demonstrate the internal benefit of socially beneficial activities to the industrial sector and other consumers. Unclear how deeper changes are sustained and expanded outside of the energy field in the long term.

Legend: + small, ++ medium, +++ large.

Key Lessons Learned from International Experiences

An analysis of previous experiences revealed that VAs have been successful particularly in countries with traditions of close cooperation between government and the industrial sector. In this way, the instrument is well suited to be applied in MENA countries. It requires few preconditions and can be negotiated on an ad hoc basis between government entities and a range of actors, including firms and associations. VAs are frequently and successfully combined with a range of other instruments and can stimulate verifiable and significant energy savings when properly designed and implemented.

Key considerations that have been shown to contribute to a successful VA include:

- Products can be defined in a way that is sufficiently clear to the governments and industrial stakeholders involved and energy performance can be defined in a meaningful way;
- An established test procedure that all parties can agree to or turnkey agreement can be defined easily;
- Signatories agree to share performance data about products covered by the VA to ensure that, even if policy makers are initially at an information disadvantage, they can catch up over time;
- A robust compliance regime with an independent auditor or inspector who not only has the mandate to verify data and test products from individual signatories but also reports to a body representing all parties involved;
- Available energy performance improvement options are introduced at affordable costs and suppliers can pass on those costs to customers;
- Major product manufacturers and suppliers are known and trusted by firms and willing to negotiate.

Strengths:

- Quicker planning and actions when technological EE solutions are largely known but still face uncertainties, although VAs, like other policy instruments, have to balance the ambition level of their targets with the time needed to prepare those instruments.
- Providing an opportunity for learning by doing and sharing experience.
- Creating collaborative cooperation, information exchange and development of common expectations among the industrial enterprises.

Weakness:

- Requires making a concerted effort specifically for the industrial sector in the long term.
- Requires credible mechanisms for dealing with non-compliance.

2.9 EEI #9 – EE TAX-based Instrument

2.9.1 Brief Description

EE tax incentives encourage practices that decrease energy consumption, support an increase in the market share of advanced energy-efficient products and encourage homeowners and business owners to undertake EE improvements. Some well-known examples include tax incentives for vehicles; in 1992, the US federal government first introduced a tax credit for qualified electric vehicles of up to $4,000 or a 10 percent tax deductible on vehicle prices.[25]

In the residential sector, incentives can take the form of a tax credit or rebate:

- A **tax credit** is subtracted from the amount of tax. Credit is claimed when the taxpayer files taxes for the previous year. So, if they made a purchase last year, they would claim their tax credit the year when they file their taxes.

- **Rebates** work differently than tax credits by providing cash back to customers more quickly after they make a purchase. Many state governments, local governments, and utilities offer rebates for energy-efficient equipment purchases. Some manufacturers also sponsor special offers that can make efficient products more affordable.

Tax credits have been introduced in many countries to encourage households to invest in energy efficient retrofits. While several have shown significant results, it has been noted that "they increase the complexity of the tax system and may be less effective than a direct grant programme, the benefits from which do not depend on the time of year when tax returns are filed."[26]

In the commercial sector, corporate tax incentives include corporate tax credits, deductions and exemptions. These incentives are available in some states to corporations that purchase and install eligible renewable energy or energy efficient equipment or construct green buildings. In a few cases, the incentive is based on the amount of energy produced by an eligible facility. Some states allow the tax credit only if a corporation has invested a minimum amount in an eligible project. Typically, there is a maximum limit on the dollar amount of the credit or deduction.

The Target Sectors or Technologies

Energy efficiency tax incentives have been successfully established in the residential, commercial and transportation sectors around the world. It was also commonly used for decentralized renewable-energy facilities, such as rooftop PV systems of solar water-heaters.

2.9.2 An Example Illustrating the Use of this Instrument: France's CITE Scheme

In France, in order to encourage private individuals to renovate their homes and increase energy efficiency, the Energy Transition Tax Credit (Crédit d´impôt pour la transition énergétique – CITE) provides a tax credit as a financial incentive. CITE enables private individuals, regardless of whether they pay taxes, to be reimbursed via their tax declarations for up to 30% of the cost for certain types of renovation work, such as heating system improvements, insulation and RE heating facilities.

More specially, CITE provides a refund of 30% of the total cost of energy renovation work, up to a cap of EUR 8,000 for a single person, EUR 16,000 per couple and an additional EUR 400 for each child in the same household. The tax credit can be granted once for each period of five years. To be eligible for the tax credit, the building in which the equipment is used must be the principal residence of the owner or tenant and at least two years old; for the installation of renewable heating equipment, new buildings are also eligible. Eligible investments include both energy conservation measures, such as opaque and glazed surface insulation, heating system improvements and renewable energy systems, such as wood-burning heating appliances, photovoltaic panels and solar heaters.

CITE should be distinguished from a tax relief. While a tax relief offers only a reduction in the amount of income tax payable ("directly reduces the income on which to pay tax"), a tax credit entitles an individual to a refund by the tax authority, even if the individual does not pay any income tax ("directly reduces the amount of tax to be paid"). If a taxpayer is entitled to receive a greater sum than he or she is obligated to pay, the tax authority must provide a cheque for the balance. If the applicant is not subject to tax, the total amount is paid out.

The tax credit is calculated on the amount of eligible expenditure, after the deduction of aid and subsidies received elsewhere. Thus, if a household receives public aid for the purchase of equipment and materials (e.g., from local authorities or the National Housing Agency, etc.), the calculation will be based on the remaining amount spent by the household (i.e., the cost of the equipment minus the aid received). To claim the tax credit, the individual has to send in the invoice issued by the builder with his or her tax return.[27]

25 Duff, D. "Tax Policy and Global Warming" in Canadian Tax Journal (2003), Volume 51, Issue 6, p. 2,063.

26 Page 2,101 in Duff (2003).

27 Schneller, A. et. Al. "The Energy Transition Tax Credit (CITE) in France", a fact sheet for the Federal Ministry of the Environment, Nature and Nuclear Safety (BMU) of the Federal Republic of Germany (2018).

2.9.3 Key Aspects Involved in Implementing the EE-based Tax Instrument

Table 34: The Stakeholders' Roles

Stakeholders	Role
The government or the regulator	Sets up a legal framework for the tax incentive and calculates the appropriate rate to provide a reasonable stimulus to the sector and promotes growth over time.
The tax administration	Receives a declaration of the beneficiary income as well as the receipts of the expenditures and make the tax reduction or refunds the tax credit.
Manufacturers	Profit from a growing market supported by a tax relief for installing energyefficient appliances.
Homeowners or business-owners	Undertake energy efficiency improvements and buy energy-efficient equipment and materials to obtain benefits from the tax credit or rebate.
Accredited suppliers	Provide energy-efficient retrofitting work and equipment.

Table 35: The Stakeholder's Responsibilities				
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
The government or the regulator	+++ Main developer of the programme; must choose it and offer instructions within the administration.	++ Set up informational programmes and coordinate with stakeholders.	+++ Ultimately responsible for the changes to revenue that may be incurred depending on design and uptake.	+++ Put in place regular reviews of the rates in place or design the rates to be self-adjusting depending on the changing market conditions.
The tax administration	++ Provide the necessary analysis and preconditions for the incentive to be effective.	+++ Play a central role in the implementation of the incentive and ensuring that it is correctly applied and not abused.	+++ Control irregularities, abuse, etc. and report on use of the instrument.	+++ Enable the MRV systems to incorporate new instruments and measure potentially new types of indicators (impact on emissions, etc)
Manufacturers	++ Must be involved in determining the achievable potential within a reasonable timeline for the orderly transformation of the market.	+ May be useful to report sales to check on the use patterns of the instrument.		+ Involved in the negotiations for the extension of the appliance incentives.
Homeowners or business-owners	++ Need for education.	++ Must include the expenses in their taxes and follow the instrument programme rules to participate.	+ Are incentivized to participate for financial benefits.	
Accredited suppliers		+ Apply for the accreditation and submits required documentation to participate.	+ Must participate honestly in the programme without taking unfair advantage of the instrument.	

Legend: + small, ++ medium, +++ large.

Table 36: Risk Distribution			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
The government or the regulator	++ Strong pressure on the public budget if the programme works better than planned. Windfall effects are an issue when it comes to tax incentives for energy-related refurbishment measures.	++ Risk of bad technical rules designed, including certification for approved installers and equipment.	++ Strict administrative procedures must be in place to protect the programmes against fraudulent practices of some players.
Tax administration	++ Must have robust procedures in place to accurately assess approved expenses and adjust the programme in response to the changing market conditions.	++ Must be able to ensure that the technical standards are met and being followed.	++ -Complexity of the tax credit procedures may make end-users reluctant to participate in the programme. Lack of information may also reduce the mobilization of potential investors.
Manufacturers	++ Must be financially capable of increasing production of energy-efficient products within a reasonable timeframe.	+++ Must be able to produce products that meet with technical requirements of the programme. Must have the ability to survive market uncertainty or transformation and be able to implement the technical upgrades needed.	+ Must have the administrative capability to participate in the programme and work through continuous upgrades of their plants as the market transforms.
Homeowners or business-owners	+ Tax incentives target groups that have a corresponding taxable income and so, might at least partially excludes various target groups (e.g., pensioners, persons with a low taxable income, e.g. through unemployment, parental leave, etc.).	+ Must be willing to make the required technical changes to their dwellings or equipment.	+ Must be willing to participate in the programme including to wait until tax-return time for the rebate and, in some cases, to use appropriate installers and equipment, etc.
Accredited suppliers	++ Should honestly participate in the programme without artificially increasing the prices of the equipment. Must continue to invest in improvement in order to stay with a moving market.	++ Must invest to acquire the needed skills and maintain them.	+ Must have the administrative capacity to understand the transformation of the market through regular interventions in the tax system of their customers.

Legend: + small, ++ medium, +++ large.

Table 37: Sustainability of the Instrument			
Instrument	**Financial Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
EE-based tax incentives	+ The expenses for the instrument reduce the overall tax revenue, which may not be the most politically advantageous choice compared to programme expenses in a direct grant. This kind of programmes are exposed to public-budget-related uncertainties and may be stopped if the government's priorities change.	+ -This mechanism may increase complexity of the tax system in comparison to a direct rebate. The instrument is not effective in the countries with a high tax evasion rate or where the informal sector takes up a significant share of the economy.	+ Decreasing activities in the informal economy: households need to document their expenditure for them to be accounted for a tax credit. Professionals carrying out the renovation work must also be recognized. These features allow for greater transparency and traceability of funds. The mechanism cannot reach poor households because their low taxable incomes.

Legend: + small, ++ medium, +++ large.

Key Lessons Learned from International Experiences

Some key lessons learned should be well understood before establishing EE tax instruments in the MENA region. These include:

> The mechanism can increase the complexity of the tax system, which implies additional transaction costs;

> Implementing the mechanism requires robust and well-organised tax administration to deal with this complexity and properly control fraudulent practices on the market;

> The system is not effective in countries with high rates of tax evasion and where the informal sector is strong;

> Such programmes may have an inflationary effect. In fact, there is a risk of artificially increasing equipment prices to saturate tax credit ceilings, which has been observed for the solar water heater market in certain countries such as France;

> The mechanism can increase pressure on public finances in case of an unplanned rapid uptake of the tax incentive by the market;

> This kind of programme is exposed to public budget related uncertainties and may be stopped if the government changes its priorities.

2.10 EEI #10 – The Super ESCO

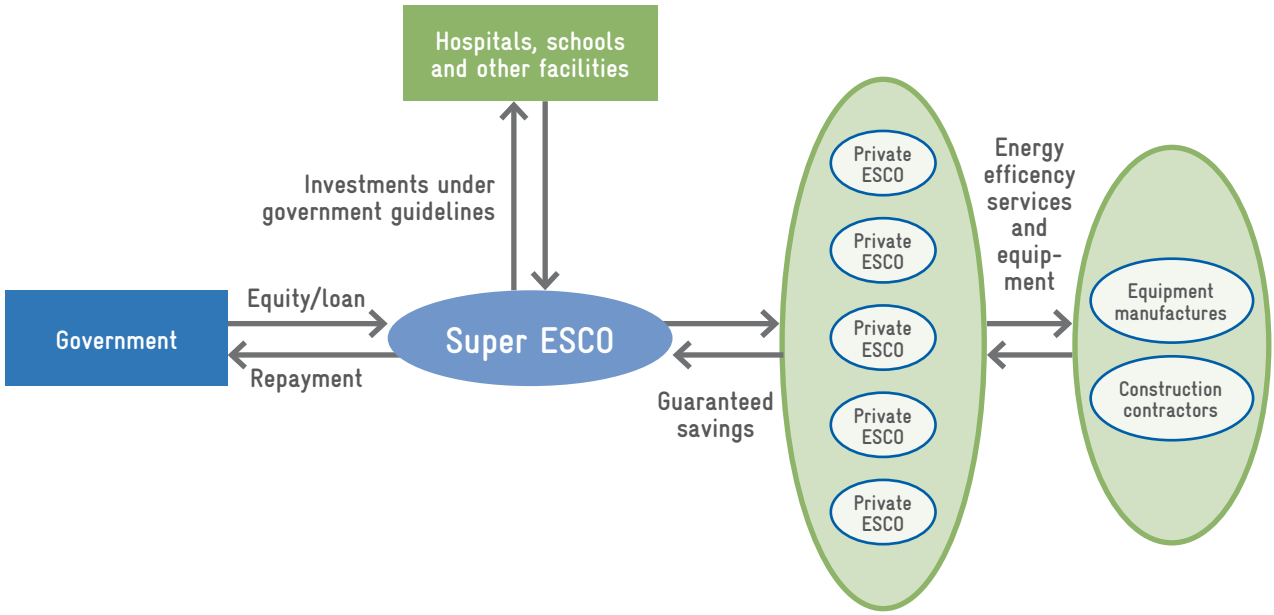
2.10.1 Brief Description

A Super energy service company (ESCO), better known as the Super ESCO, is an entity set up by government[28] that functions as an ESCO mainly or exclusively dedicated to helping the public sector (hospitals, schools, municipalities, public buildings, street lighting and other public facilities) undertake EE projects. A super ESCO always invests under government guidelines for public-sector projects because public funds are their main source of funding.

The Super ESCO uses an energy performance contract (EPC) approach for its large EE projects to obtain energy savings guarantees from private ESCOs. Technically, energy service providers are in charge of supervising and implementing EE measures in the public sector through EPCs that include an energy savings guarantee.

The Super ESCO can also support capacity building and project development in existing private-sector ESCOs and may also help set up new ESCOs. Launching a Super ESCO requires the capacity to develop adapted concepts and produce complete documentation such as an ESCO accreditation scheme, procurement and contract templates, M&V plans, and so on.

Figure 8: Conceptual Model of the Super ESCO



28 Theoretically, a super ESCO may also be established by a private organization, e.g., by an NGO or as part of a public-private partnership, though so far there has been no real example of a super ESCO in the private sector.

As a specialized organization, the Super ESCO must possess all necessary capacities to develop adapted concepts and produce complete documentation (procurement and contract templates, measurement and verification plans, etc.). It must also identify business opportunities in markets based on the current energy rates, available technologies, associated costs, etc. This means that the Super ESCO makes it easier to find the best opportunities for using EPC in targeted markets and implementing bundled projects in order to reduce technical risks and facilitate financing.

The government provides the Super ESCO with sufficient funds to carry out public projects using the EPC approach and leverage commercial financing. This means that the Super ESCO is one of the mechanisms used to overcome barriers hindering the large-scale implementation of EE projects in the public sector. As such, the Super ESCO can achieve the following:

- Helping overcome barriers to launching calls for tenders for projects under the EPC approach in the public sector by negotiating agreements for the implementation of EE projects on a sole-source basis using the EPC concept on their behalf.
- Leveraging its technical capacities to launch calls for tenders for projects to be implemented under the EPC approach.
- Supporting training activities on the market, including for ESCOs.
- Effectively and efficiently managing small-scale projects thanks to its expertise and experience in implementing the concept.
- Taking on the financial and sometimes technical risks, in part or in full, and thus eliminating the financial barrier faced by ESCOs in the private sector.

The Target Sectors or Technologies

All sectors, and mainly public buildings can be targeted. The Super ESCO is mainly or exclusively useful to the public sector (hospitals, schools, municipalities, public buildings, street lighting and other public facilities), but can also be applied to the private sector as a financier for ESCOS or as an ESCO itself given its credibility and financial capacity.

The main beneficiary of this instrument is the public sector through EE measures that improve the energy performance of facilities or buildings and reduce energy costs. All MRV activities and follow-up should be carried out by each ESCO that is directly in contact with equipment manufacturers and construction contractors for EE services and equipment.

2.10.2 An Example Illustrating the Use of the Super ESCO: The United Arab Emirates's Etihad Super ESCO

In the United Arab Emirates, Etihad ESCO is the official Super ESCO. It was established in 2013 as an initiative by the Dubai Electricity and Water Authority (DEWA) under the leadership of the Dubai Supreme Council of Energy. It helps foster an EPC market in Dubai so that building owners can improve energy efficiency in their buildings. Etihad ESCO started operating in the third quarter of 2013 as part of the Dubai Supreme Council of Energy.

As a Super ESCO, Etihad ESCO aims to jumpstart the creation of a viable EPC market for ESCOs by performing building retrofits, increasing penetration of district cooling, building the capacities of local ESCOs in the private sector and facilitating access to project financing. The Dubai ESCO market is expected to provide new business opportunities for joint ventures, international partnerships, and engage UAE national entrepreneurs in a diversified supply chain by involving financial institutions, technology providers, equipment manufacturers and service providers in the project development, management and reporting stages.

Among other measures, it was decided that Dubai needed a regulatory framework for its ESCO market. The Dubai Regulatory and Supervisory Bureau for Electricity and Water (Dubai RSB) was tasked with developing such a framework. In February 2014, the Dubai ESCO framework was officially released and published. It is made up of four main elements developed in 2013 in cooperation with market stakeholders:

- An ESCO Accreditation Scheme
- Standard Contracts for Energy Performance Contracting
- Measurement and Verification (M&V) Guidelines
- A Dispute Resolution Mechanism

2.10.3 Key Aspects Involved in Establishing and Operating the Super ESCO

Table 38: The Stakeholders' Roles	
Stakeholders	**Description of Stakeholder Role**
The government or the Super ESCO	The governmental entity acting as the market and project facilitator to foster EE in the public sector through private ESCOs and under the EPC approach.
The public sector	The main beneficiary from the EE measures allowing for improving the energy performance of the facilities or buildings and reducing energy costs.
Private ESCOs	Energy services providers in charge of supervising and implementing EE measures in the public sector through EPCs with guarantees of energy savings. The Super ESCO have to also count on private ESCO market and the associations of ESCOs, which could guarantee savings and give recommendations on the implementation of this new entity. The private sector may bring visibility to the issues facing the public sector and can provide energy efficiency services and equipment thanks to its close relation with the equipment manufacturers and construction contractors.
Contractors and manufacturers	Private entities that provide and implement EE technologies under the supervision of the ESCO, which guarantees the savings. All the MRV and follow-up should be done by each ESCO, which is directly in contact with equipment manufacturers and construction contractors for EE services and equipment.

Table 39: The Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Technical Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
The government or the Super ESCO	+++ The first step is for the government to choose to establish the Super ESCO. It often tends to be done by the Ministry of Energy or Power Generation, one strongly related to the energy matters or investment in energy efficiency projects. The Super ESCO initiates and develops public-sector projects, sign the contracts and maintain an overall relationship with public-sector entities throughout the whole duration of the project. They also maintain a good relationship with the private ESCO market, depending on their degree of involvement.	+++ The Super ESCO invests in the public sector under government guidelines. Develop adapted concepts and produce complete documentation (procurement procedure and contract templates, measurement & verification plans, etc.).	+++ Responsible for delivering EE services and equipment to fulfill EPCs with the public sector. Build the capacities of ESCOs and create a competitive private market for ESCO services. Assess, evaluate and control the technical quality of the EE projects proposed by the ESCOs.	+++ Play a key role in financial implementation. The government provides the Super ESCO with sufficient funds to carry out public projects under the EPC approach and leverages funds from local and international commercial financial institutions.	+++ Play a major role in following up on the project.

Legend: + small, ++ medium, +++ large.

Table 39: The Stakeholders' Responsibilities					
Distribution of Responsibilities among Stakeholders	**Designing and Developing the Instrument**	**Administrative Implementation**	**Technical Implementation**	**Financial Implementation**	**MRV, Instrument Development and Follow-up**
Public-sector Beneficiaries	+ Minimal role/be informed. Public departments such as the Department of Public Services or the Department of Health need to be consulted on how to establish the Super ESCO.	++ Need to sign agreements with the Super ESCO to implement EE measures (delegated contracting authority agreement, etc.) Adapt their budget and procurement procedures if necessary.	++ Facilitate the technical intervention of the ESCO or the service provider at their sites. Ensure the optimal functioning of the measures implemented over the lifetime.	+ Minimal role/be informed. Limited incentives to lower energy costs, and limited access to the budget or commercial project financing.	+++ Share information about the facilities with the Super ESCO and follow up on all contract documents.
Private ESCO sector	+ Minimal role/be informed. Provide recommendations on the implementation of the Super ESCO.	++ Share its own administrative documents with the Super ESCO.	+++ Responsible for all the technical implementation of the EE measures in the public sector.	+ Can take an insurance policy to provide energy savings guarantees to the Super ESCO.	+++ Private ESCOs guarantee savings for the Super ESCO.
Contractors and manufacturers	+ Minimal role/be informed.	+ Minimal role/be informed.	+++ Deliver EE services and equipment to fulfill EPCs with ESCOs.	+ Minimal role/be informed.	++ Could guarantee project performance in part or in full, depending on the contract signed with the ESCO.

Legend: + small, ++ medium, +++ large.

Table 40: Risk Distribution			
Distribution of Risks among Stakeholders	**Financial**	**Technical**	**Administrative**
The government or the Super ESCO	+++ Risks that the money from the energy savings flow into a different ministry without being injected into EE projects or green projects. Costs of project identification/ development if implementation is not realised.	+++ The government can mitigate the technical risks through strong collaboration with the qualified private ESCOs.	+++ A possible conflict of interest between the government's Super ESCO (acting as an ESCO for the public-sector buildings), and the emerging commercial ESCOs that need public-sector projects to spur their growth and development.
Public-sector beneficiaries	+ No risk because all the financial risk is borne by the Super ESCO and the government.	+ Lack of technical capacities to deliver the best EE equipment and projects.	+ Public agencies' lack of entrepreneurial spirit and drive to achieve better results.
The private ESCO sector	++ Risks of not being paid if projects do not perform technically.	++ Private ESCOs can mitigate the technical risks through strong EPCs.	+++ Must maintain awareness of rules and procedures and the risk overlooked.
Contractors and manufacturers	++ Risks of not being involved in other projects and loss of money if their services are too weak.	++ Must maintain well-performing EE services and equipment to fulfill EPCs.	+ Lack of knowledge of the ESCO market and its processes.

Legend: + small, ++ medium, +++ large.

Table 41: Sustainability of the Instrument			
Instrument	**Financial Sustainability**	**Economic Efficiency**	**Sustainable Development Impacts (economic, social, environmental, etc.)**
E10 – The Super ESCO	+++ Secure financing and implement a sufficient number of projects thanks to its strengthened structure.	+++ Overcome barriers to launching calls for tenders for projects under the EPC approach within the public sector and by negotiating agreements for the implementation of EE projects on a sole-source basis using the EPC concept on their behalf.	+++ The Super ESCO can help scale up and accelerate EE programmes, primarily in the public sector, thereby fostering the development of private ESCOs, usually SMEs. The Super ESCO provides capacity-building and project development in existing private-sector ESCOs and may also help set up new ESCOs. All the activities undertaken by the Super-ESCO may help establish a sustainable EE and ESCO market.

Legend: Low (+), Medium (++), High (+++)

Key Lessons Learned from International Experiences

International experiences demonstrate that the Super ESCO is very effective in upscaling EE services and promoting the private ESCO market in countries where such a market is small or non-existent. In these countries, the Super ESCO can provide one of the most rapid paths to implementing national EE programmes and can overcome most of the market-related barriers identified in most developing countries.

The Super ESCO is well adapted to being piloted in the MENA region and can greatly help tap EE potential in the region and create an enabling environment for a sustainable ESCO market. Moreover, if the instrument receives strong political support and is well designed to meet the specific conditions of countries, it can effect a real transformation of the market and will allow the public sector to play a leading role in promoting EE technologies and practices. As a result, EE services and the ESCO market will take off, thus helping countries progress in their sustainable development efforts.

Some key elements could be put in place before establishing the Super ESCO more broadly in the MENA region:

> National regulations governing ESCOs and EPCs must be in place. The government has to support all steps in the creation of the Super ESCO and EPCs and regulations should cover this engagement and remove legal barriers if they exist. For instance, a possible conflict of interest could arise between the government Super ESCO and emerging commercial ESCOs that need public-sector projects to spur their growth and development;

> After the establishment of a Super ESCO, the government needs to provide the Super ESCO with sufficient funds and human resources to carry out public projects under the EPC approach and leverage commercial financing;

- All implementation procedures between the Super ESCO and its different public and private partners and necessary documentation should be developed, documented and shared. A support and capacity building programme targeting involved actors must also be put in place to ensure main stakeholders are involved. Targeted actors include:
  - Employees from the government Super ESCO entity have to be trained on ESCO and EPC concepts and materials, as well as on reinvesting the energy savings into EE or green projects;
  - Public-sector beneficiaries need capacity building to properly utilise the new equipment;
  - Private-sector ESCOs need technical capacities to deliver the best EE equipment and projects to the Super ESCO;
  - Main actors of the private ESCO sector may require training and support to strengthen their awareness of rules, procedures and risks associated with their market;
  - Contractors and manufacturers have to understand the ESCO market and its processes.

Strengths:

- The Super ESCO with a strong financial capacity can handle large EPCs exceeding the capacity of small ESCOs.
- Encourages the growth of the ESCO market by proposing and implementing concrete measures to remove the barriers to the development of the ESCO market.
- Ensure the guaranteed savings and the quality of services provided to customers.
- The Super ESCO can create and leverage funds from local, international, and commercial financial institutions and international donor agencies to create an energy efficiency financing facility to support EE projects.

Weaknesses:

- Needs proper national regulations governing ESCOs and EPCs.
- Needs the government's strong willingness and support to create the Super ESCO.
- A possible conflict of interest between the government's Super ESCO (acting as an ESCO for the public-sector buildings) and the emerging commercial ESCOs that need public-sector projects to spur their growth and development.

3 Country-specific assessment of the selected instruments

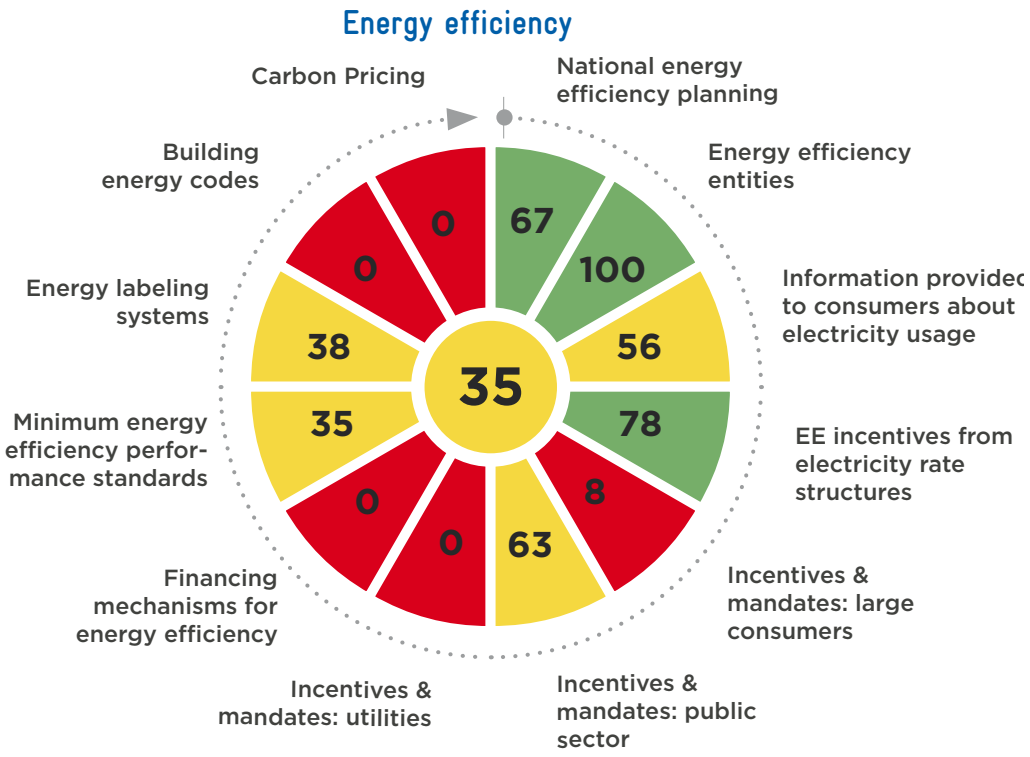
In this section of the report, a brief introduction to each of the countries studied is followed by an evaluation of each of the instruments that was selected for further evaluation. The countries and instruments selected are summarized in the table below.

Table 42: EE instruments selected for each of the five countries

Country	Instruments
Oman	1. Mandatory EE schemes or energy utility mandatory programmes / Utility managed EE programmes 2. Creating networks with voluntary goals 3. Super ESCO 4. Mechanism for accelerating the replacement of the stock of energy-using equipment and appliances
Morocco	1. Auction systems for EE 2. Energy savings insurance (ESI) mechanism of an energy performance contract (EPC) 3. EE Tax based instruments (non GHG-/Carbon-tax but tax benefits for EE/savings) 4. Mandatory EE schemes or energy utility mandatory programmes / Utility managed EE programmes
Saudi Arabia	1. Auction systems for EE 2. Mandatory energy efficiency targets 3. Mechanism for accelerating the replacement of the stock of energy-using equipment and appliances 4. The voluntary agreement
Egypt	1. Auction systems for EE 2. Mandatory EE schemes or energy utility mandatory programmes / Utility managed EE programmes 3. Creating networks with voluntary goals 4. Super ESCO
Jordan	1. Auction systems for EE 2. Mechanism for accelerating the replacement of the stock of energy-using equipment and appliances 3. Mandatory EE schemes or energy utility mandatory programmes / Utility managed EE programmes 4. Electricity pricing depending on DSM or dynamic electricity tariffs

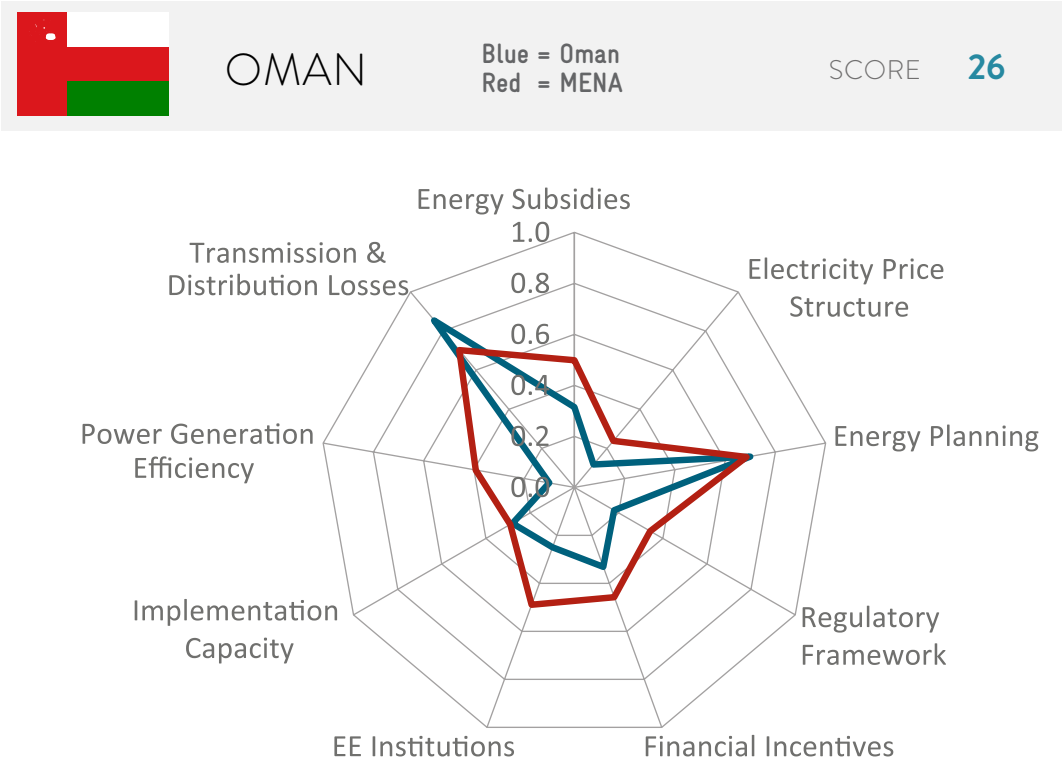
3.1 Oman

Figure 9: RISE 2017 EE Score for Oman



Source: RISE (2017): "Regulatory Indicators for Sustainable Energy (RISE) Country Profile Oman". Energy Sector Management Assistance Program, World Bank Group. Washington, DC. Retrieved from: https://rise.esmap.org/data/files/sections/rise_country_profiles.pdf

Figure 10: AFEX 2017 Spider Chart



Source: AFEX (2017): "Arab Future Energy Index 2017: Energy Efficiency", p. 10. RCREEE and United Nations Development Programme. Retrieved from: https://www.rcreee.org/sites/default/files/afex_ee_2017.pdf

3.1.1 Country Context

General Energy Efficiency Situation and the EEIs in Place or Planned

Energy demand in Oman has been growing rapidly in recent years as a result of the economic and demographic growth. It has been forecasted that Oman's primary energy consumption will probably increase by 4 times by 2025 compared to 2011.[29] The final demand is dominated by three main energy sources, namely natural gas (53% and mainly used by the petrochemical and aluminum industries), petroleum products (34%) and electricity (13%). Among the main economic sectors, the energy demand is mainly accounted for by the industrial sector (59%), the transport sector (26%) and the buildings sector (15%). Primary energy supply and electricity are totally dependent on fossil fuels and this dependence is increasing the energy supply risk of the country.

Oman's endeavour to improve its energy efficiency is still in its infancy. However, the government is aware of the energy issues and developed in 2015 a long-term energy master plan (2040) placing a major focus on EE and RE. Among other things, the master plan includes the following recommendations:

- Centralize Oman's energy policy under a single authority.
- Create, adopt and implement a comprehensive energy action plan that can facilitate the immediate implementation of EE and RE.
- Proceed to a structured removal of subsidies.
- Promote EE in buildings by retrofitting existing edifices and enforcing the building codes and energy standards for appliances.
- Develop small-scale rooftop and hybrid power generation.

As part of the effort to implement the master plan, the government is currently trying to create an EE-enabling environment by developing an EE-related legal framework and establishing an EE agency within its governmental electricity regulatory authority.

A standard for electrical equipment in the buildings sector was introduced in early 2019[30]. An energy-efficiency standard for air-conditioning and lighting is being discussed by several governmental institutions.

The construction sector offers much potential for improving energy efficiency in Oman. However, the market is still not moving, because energy-saving measures are not seen as economical and there is no legal EE requirement. In 2019, the Authority of Electricity Regulation launched the Energy Efficiency Programme for Government Buildings, including energy audits and retrofits. The biggest project with the potential for including an energy-efficient design featuring the use of modern, energy-efficient technologies is the development of the special economic zone, "Duqm".

As for energy-subsidy removal, since January 2017, large consumers (>150MWh p.a.) were paying a higher cost-reflective tariff (CRT) with charges for energy, transmission, distribution and supply.[31] These customers are estimated to represent 1% of all accounts, consume 30% of the total energy and receive 20% of the total subsidies.

General Supportive Framework Conditions and Barriers in the National Context

Oman offers a moderately favourable supportive framework for EE development with no specific incentives to EE. Indeed, there is currently no special tax advantage for EE measures or public financial support. Moreover, financing conditions for energy efficiency in Oman are average compared to the other countries, despite Oman's difficult economic situation. Currently, there is no funding, particularly for decentralized, small-scale solutions. Energy efficiency in the energy sector is predominantly implemented via large-scale projects, whereby the development of special economic zones could lead to an improvement of the general conditions.

Overall, despite much potential of energy efficiency (estimated at 21 million toe by 2025, which represents 28% of the total primary energy consumption)[32], the mobilization of this market comes up against several barriers including the high subsidy to energy prices. In fact, electricity tariffs are subsidized on average at 83% for the residential sector, 73% for the commercial sector and 74% for the industrial sector (RCREEE, 2014). Other barriers are related to a lack of enabling institutional and legal frameworks as well as a lack of awareness and information to consumers.

29 "Delivering Energy Efficiency in the Middle East and North Africa", ESMAP/WB, May 2016.

30 See https://www.aer.om/pdfs/oes/OES4ElectricalInstallationsinBuildings.pdf

31 Albadi, M. H. (2017). "Electricity sector in Oman after 10 years of reform: status, trends and future perspectives". The Electricity Journal, Volume 30, Issue 7, Pages 23-30. http://dx.doi.org/10.1016/j.tej.2017.07.005

32 "Delivering Energy Efficiency in the Middle East and North Africa", ESMAP/WB, May 2016. Table 1.2 pg. 28. Available at http://documents.worldbank.org/curated/en/642001476342367832/pdf/109023-WP-P148222-PUBLIC-DeliveringEEinMENAMayEN.pdf

Expected Future Developments

As mentioned below, the energy demand, particularly for electricity, is growing very quickly in Oman. Currently covered by 97.5% in natural gas and by 2.5% in diesel, peak electricity demand has witnessed a robust compounded annual growth of 8.34% since 2007[33].

By the end of 2018, an Omani energy efficiency strategy was still being discussed without any concrete results. The implementation goals and sectoral ambitions of this planned EE strategy remain unclear. The potential for energy efficiency is still not really part of the public and political sphere, and there is little incentive to invest in energy efficiency technologies.[34]

The Authority of Electricity Regulation launched in 2019, for the first time, a specific awareness programme on energy efficiency targeting electricity consumers. However, the impact of the programme may be limited because of the massive public subsidization of energy prices, which does not provide any real incentives for privately financed measures to save energy.

3.1.2 Utility-managed EE Programmes in Oman

Alignment with the National Strategies and Policies

The electricity sector's sustainability is one of the major concerns of the Oman Sultanate. Given that electricity is generated by natural-gas-fired facilities, this poses a high risk of power shortage in the event that national natural gas resources are significantly reduced in the future. The power sector is consuming currently one quarter of the domestic natural gas production (32.3 billion standard cubic meters) and the consumption level may increase significantly in the future because of the quick growth of electricity demand. In fact, according to the Authority of Electricity Regulation, the electricity peak demand is expected to reach 10,100 MW by 2025 compared to 6,800 MW in 2017.[35]

The Sultanate of Oman is now aware of the country's issues related to energy supply security. The government's National Energy Strategy 2040 seeks to ensure the country's long-term energy sustainability. The strategy envisions a major role for non-hydrocarbon fuels in power generation and has set a target of at least 10% of electricity output from renewables by 2025 and up to 3,000 MW of new coal-fired capacity by 2030. Recently, the National Programme for Enhancing Economic Diversification (Tanfeedh) modified the target to 11% of electricity output from renewables by 2023.

In this context, reducing electricity demand through an obligation imposed on utilities to manage EE programmes should be a good starting point and would be a strong signal and a meaningful step. The implementation of such a mechanism would be facilitated by the state-owned structure of the sector as well as by an independent electricity regulator. Oman currently has three distinct power systems, namely the main interconnected system (MIS), the Dhofar power system (DFS) in the south and a rural area power company elsewhere in the country. In the MIS, three government-owned companies have licences to distribute and supply electricity to customers (MEDC, MZEC and MJEC). In the DFS, the Dhofar Power Company (DPC) has a licence to distribute and supply under a similar regulatory framework to that of the MIS.[36] A vertically integrated company (RAEC) operates in rural areas. In the MIS and DPS, it is conceivable that an obligation could be imposed on the regulated companies and that such an obligation would be in line with the changes being implemented in the sector.

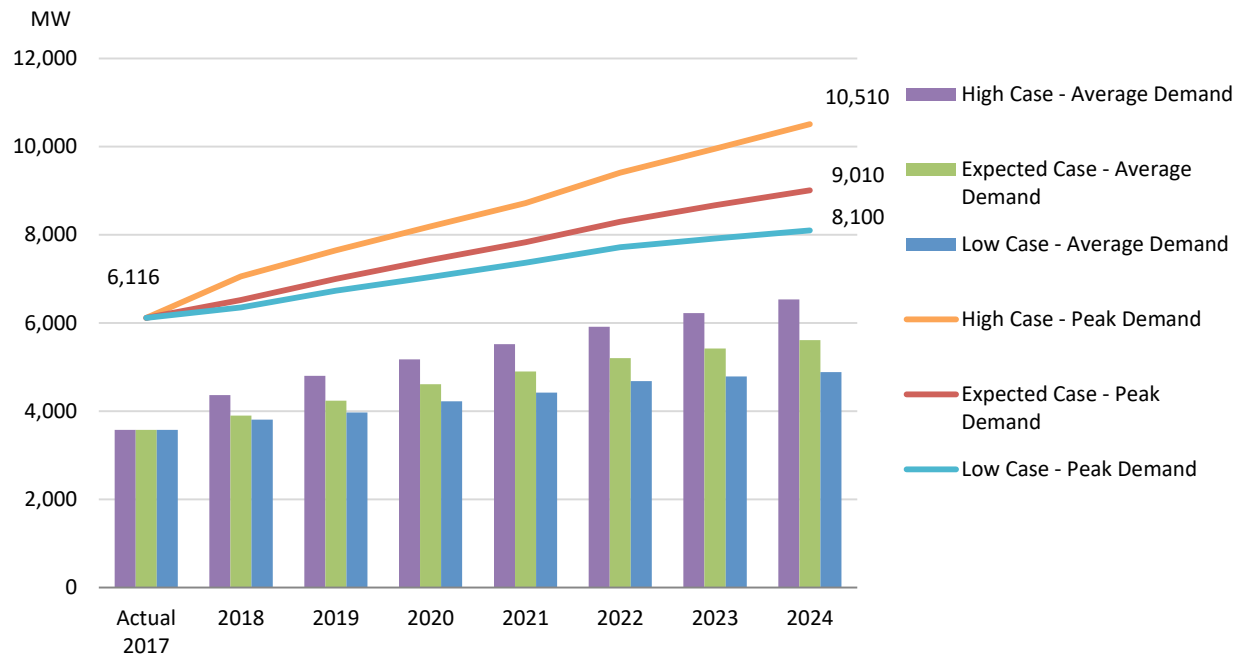
33 Hasan, Shahid et. al. "Oman electricity sector: features, challenges and opportunities for market integration" KAPSARC, 2019. DOI: 10.30573/KS—2019-DP61

34 'This section draws on Neussel, M. from GIZ (2019). "Framework and investment conditions for spreading energy efficiency: Political analysis and ranking of 11 MENA countries".

35 OPWP's 7-Year Statement (2018 – 2024), Oman Power and Water Procurement Co., May 2018.

36 Albadi, M. H. (2017). "Electricity sector in Oman after 10 years of reform: status, trends and future perspectives". The Electricity Journal, Volume 30, Issue 7, Pages 23-30. http://dx.doi.org/10.1016/j.tej.2017.07.005

Figure 11: Scenario of Electricity Demand Growth, OPWPC, 2018



Market Potential

According to the medium scenario of the Oman Power and Water Procurement Corporation (OPWPC), the electricity demand is expected to reach 55 TWh in 2024 compared to 35 TWh in 2017, averaging an annual increase rate of 7%.[37]

In the MIS, the OPWPC has developed 3 scenarios as shown in the following Figure 11:

If we consider the low case as an EE scenario, the energy savings will be around 6 TWh per year in 2024 compared to the medium scenario, which constitutes big potential of energy savings. This savings potential will be mainly in the buildings sector, which accounts for about 70% of the total electricity consumption (46% in the residential sector and 24% in the commercial sector).

In 2017, the total electricity supply was about 31 TWh. Considering the relatively limited progress in Oman, a 0.5% obligation in the first year would offer savings potential of 174 GWh p.a.

Barriers to Implementation

As with other energy efficiency initiatives in Oman, the two biggest barriers are the high subsidies to the electricity tariffs making EE not profitable for end-users and, of course, the political framework. Because government-owned distribution and supply companies are in the largest power system, there is a huge recurring cost of electricity subsidies, and some reforms in the power sector are already being implemented to separate the roles of vertically integrated utilities, the incentives to implement energy efficiency seem clear.

In the case of an obligation imposed on distribution companies, a part of the benefit would enter the government's coffer, which is currently paying for the subsidies. Albadi reported in 2017 that in 2015, the subsidy per unit of energy supplied was USD 35 / MWh and USD 214 /MWh for the MIS and RAEC respectively. The total cost of subsidies to the power sector kept growing and reached USD 1.2 billion in 2015. Because of subsidized tariffs for consumers, relatively fewer benefits may be apparent to consumers or distribution companies in the form of energy savings for consumers and reduced sales for distributors. Among decision-makers, one of the main barriers to implementation may be a lack of awareness of this strong incentive, namely the reduced cost of subsidies as a result of improved energy efficiency.

37 OPWP's 7-Year Statement (2018 – 2024), Oman Power and Water Procurement Co., May 2018.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

The Authority for Electricity Regulation was established in 2005 to regulate the sector as a privatization strategy was being implemented. Recent changes made to the structure of the electricity sector have improved the situation for the implementation of energy efficiency obligations imposed on distribution and supply companies in the two largest power systems. The current market structure of the MIS shown in Figure 12 highlights the central roles of the Oman Power and Water Procurement Company (OPWC) and the Oman Electricity Transmission Company (OETC) in procurement and transmission, and the limited number of distribution companies, which could be the subject to an obligation on their sales to customers.

The implementation of utility-managed EE Programmes may be facilitated by the state-owned structure of distribution companies, if a political will exists. It can also be facilitated by an independent electricity regulator. However, this implementation will require making changes in the electricity law of 2004 to introduce this obligation and releasing bylaws that define the objectives of EE and the related procedures.

The Ministry of Housing Electricity and Water (MHEW) should act as the public authority in charge of utility-managed EE Programmes and fulfill the following duties:

- Developing utility-managed EE Programmes regulations and procedures;
- Designing and setting up utility-managed EE Programmes market management system;
- Defining the criteria for designating the obligated parties;
- Setting the overall objective of utility-managed EE Programmes;
- Monitoring the market and the penalties.

Potential Sources of Financing

Considering the volume of funds currently flowing into subsidies for the electricity sector and the potential savings of those subsidies, the first place to look at is likely at the Ministry of Finance and Economy to gradually remove subsidies to electricity tariffs and redirect these subsidies to EE measures.

Figure 12: Market Structure of the Main Interconnected System in Oman (Albadi, 2017)

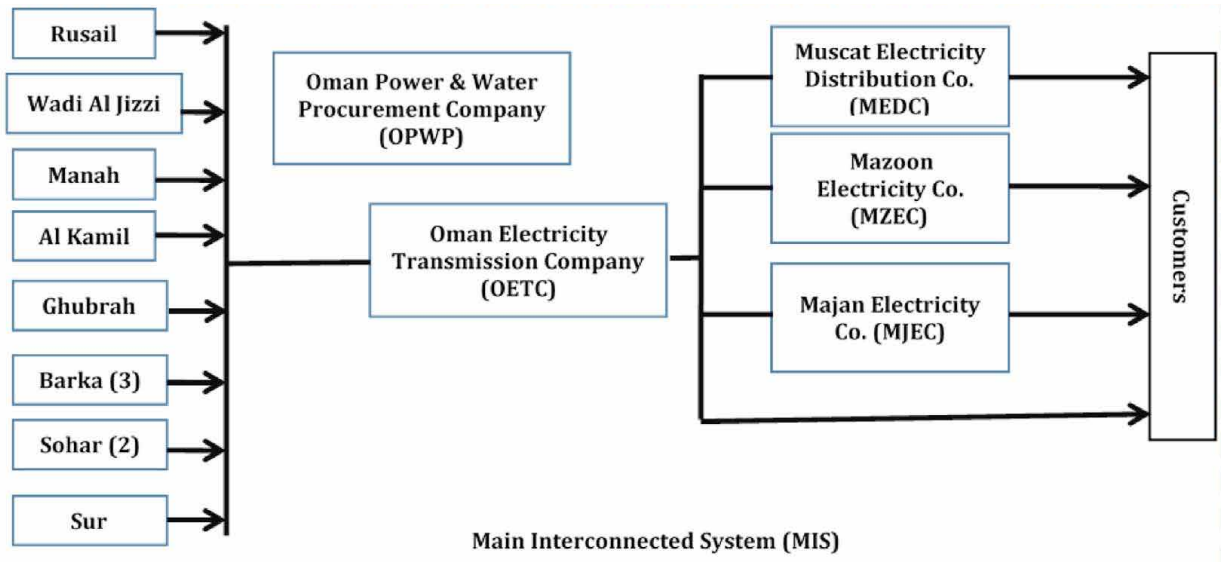
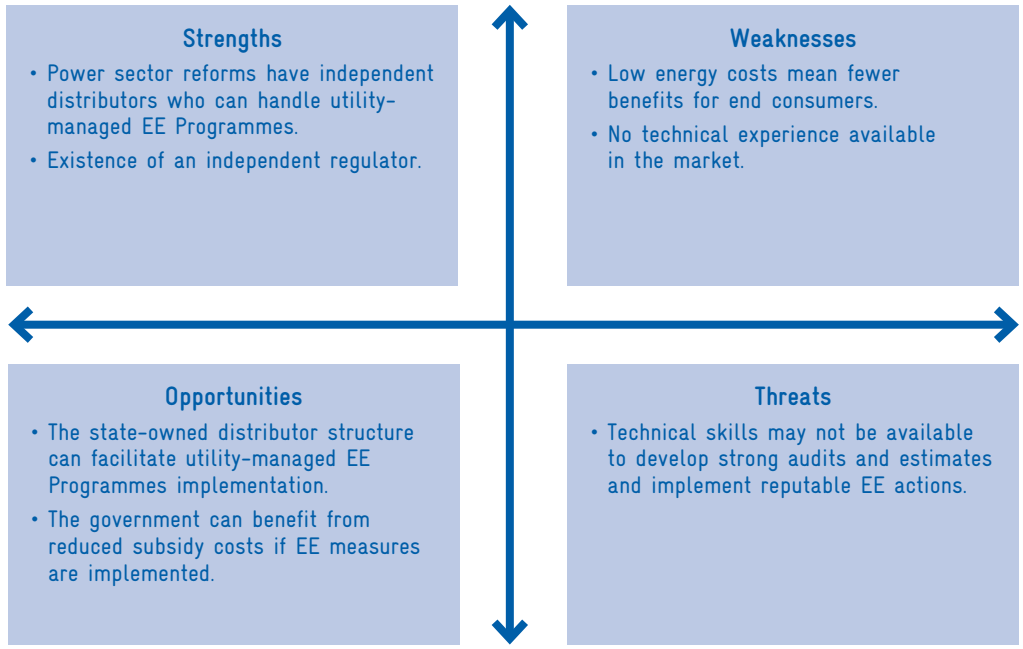


Figure 13: SWOT Analysis



Synergies with Other National EE Instruments, Projects, Approaches, Strategies and Developments

Few EE instruments are in place in Oman at present, and those that may be considered would be unlikely to conflict with utility-managed EE Programmes and be more likely to offer some synergies.

3.1.3 Creating Networks with Voluntary Goals in Oman

Alignment with the National Strategies and Policies

The industrial sector is the largest end-use sector, representing 59 percent of the 2014 energy balance,[38] followed by the transportation sector (26%), building sector (12%), and non-specified sectors (3%). At minimum, the industrial sector should be the focus of EE efforts. Creating networks with voluntary goals in this sector would contribute to reducing industrial energy demand and realising the untapped EE potential.

With Oman's national strategies and policies sending generally weak signals about energy efficiency, the creation of networks with voluntary goals would be a challenging instrument to implement. Indeed, if the regulatory and policy frameworks do not provide any financial incentives or subsidies for network participation, particularly at the beginning of the network's implementation, the instrument could collapse rapidly.

Nonetheless, companies which want to participate in a collaborative network can develop the network together without any help or intervention of the government but would have to bear all the network related costs.

However, there is potential among large consumers in the petrochemical and aluminum industrial sectors, which account for the largest share of energy consumption in the country (59%). In fact, in order to be competitive in the region, they should be interested in reducing their consumption by setting their own EE objective in anticipation of a foreseeable energy price increase. In this sense, it is also worth mentioning that some of them started to implement the ISO 50001 energy standard.

38 International Energy Agency (IEA). (2014). "Oman Energy Balances".

Market Potential

If there is one sector to focus EE efforts on, it is the industrial sector. Indeed, it is the largest end-use sector, representing 59% of Oman's energy balance in 2014[39], followed by the transportation sector (26%), the residential sector (7%), the commercial and public services sector (5%), and non-specified sectors (3%).

In 2017, the Authority for Electricity Regulations (AER) in Oman announced the implementation of a new tariff structure to reduce subsidies for large customers. Large industrial, commercial, and government customers consuming more than 150 MWh per year must pay cost-reflective tariffs (CRT). The AER estimated that these large customers represent 1% of the accounts, consume 30% of the energy, and receive 20% of the total electricity subsidies.[40]

This tariff reform will force large-scale consumers to make efforts to reduce their consumption through EE measures. Involving them into a network of companies with voluntary goals would be a way of helping them in that direction.

Finally, the electricity is important, but a comprehensive national EE plan needs to include natural gas measures. Indeed, natural gas consumption accounts for 53%, consumed mainly by large industrial enterprises, including water desalination.

Barriers to Implementation

The main barriers to implementing such an instrument are mainly:

- The high energy price subsidies that make EE measures non profitable for consumers;
- A lack of cost incentives, from the government or programmes, for conducting energy audits;
- A lack of capacities and skills to conduct energy audits and propose EE solutions to compagnies;
- A lack of awareness about EE;
- A lack of capacity among companies to organize themselves into networks towards achieving EE targets;
- Difficulty organizing a non-binding EE target process.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

EENs would require making almost no major change to the general framework conditions and would be aligned with the major regulatory and legal conditions in place, even if EE is not emphasized in the Oman national strategies and policies.

Nonetheless, if the government provides financial incentives and subsidies for network participation, particularly during an EEN pilot demonstration phase, a strong EE regulatory and policy framework would be set up, including tracking procedures and providing training and tool support to network operators, consulting engineers and moderators.

Potential Sources of Financing

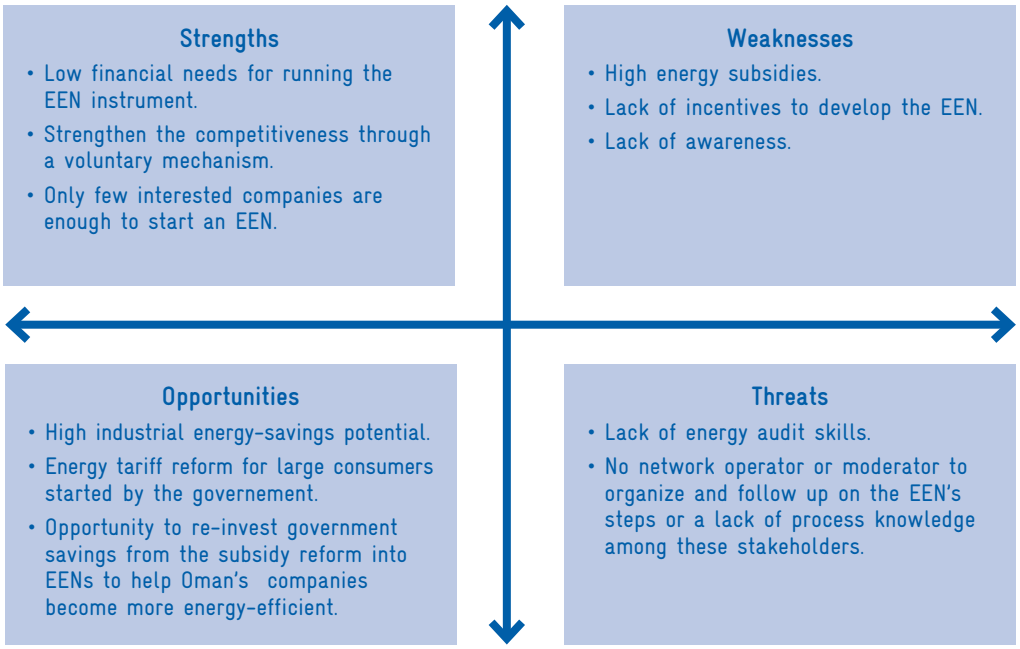
Introducing EEN in the Oman context could factor in the following key lessons learned:

- Since the government budget is restricted, EENs cannot count on governmental incentives to contract energy consultants to conduct energy audits and take stock of energy savings potential and other activities.
- Participating companies would pay a membership fee to address the lack of government incentives and help launch the network.
- The network operator or moderator may channel support from funding agencies such as the United Nations Industrial Development Organization (UNIDO).

39 International Energy Agency (IEA). (2014). "Oman Energy Balances".

40 Albadi, M. H. (2017). "Electricity sector in Oman after 10 years of reform: status, trends and future perspectives". The Electricity Journal, Volume 30, Issue 7, Pages 23-30. http://dx.doi.org/10.1016/j.tej.2017.07.005

Figure 14: SWOT Analysis



Synergies with Other National Energy Efficiency Instruments, Projects, Approaches, Strategies and Developments

The instrument can have strong synergy with EEO if it is implemented since it can be used as a mechanism by the companies to implement large EE measures in cooperation with the utilities.

3.1.4 The Super ESCO in Oman

Alignment with the National Strategies and Policies

The EE market context is not yet mature for the ESCO approach, mainly because of low profitability of EE measures due to high subsidies to energy prices. Moreover, the country still lacks EE laws and bylaws to help facilitate the development of such a market.

However, the decision taken recently by the country to develop energy efficiency in public buildings is clearly in line with the Super ESCO instrument.

By the end 2018, the Authority for Electricity Regulation appointed an international company (Danish Energy Management) as an advisor for the national energy efficiency programme in the public sector. The company will help establish a working model and roll out a programme for ESCOs to carry out auditing and retrofitting for government buildings falling under the cost reflective tariffs (CRT).

The aim of the auditing and retrofitting programme is to enable government institutions to achieve continued reductions in their overall energy consumption by utilizing the innovative solutions provided by specialized ESCOs.

The first phase of the roll-out will start in 2019 and is expected to cover between 50 to 100 government entities or buildings by contracting international ESCOs. These international ESCOs will also be required to enhance the capabilities of Oman's certified energy auditors to undertake the work and promote their employability through the supply of knowledge and skills to match current and future demand in the market.

The programme is expected to cover up to 70% of the government buildings under CRT over the coming five years.

This programme can be a good opportunity to establish a public Super ESCO that will be responsible for developing, implementing and monitoring EE measures in government buildings. The Super ESCO instrument can help develop the ESCO market that Oman needs (see more details in the subsequent heading titled "Synergies with Other Instruments).

Power Sector Issues

A market reform implemented in Oman in 2004 changed the electricity sector from being a vertically integrated system owned and operated by the Ministry of Housing, Electricity and Water to a new unbundled system consisting of a range of companies and an independent regulator. On July 7, 2004, the law regulating and privatizing the electricity and related water sectors in Oman was issued through Royal Decree 78/2004. This change in its power system structure opened the door to fostering the development of the Super ESCO. Indeed, as the electricity tariffs increase, EE projects seem to be the most economic solution to avoid peak demand problems.

Expected Growth of ESCOs

The AER[40] is preparing the groundwork to enable the growth of ESCOs to help support the government's energy efficiency goals. The move was part of the initiatives planned by the AER for development and implementation in 2018. The key priorities and objectives in the plan are also known as the "Forward Work Programme for 2018".

Market Potential

By definition, a Super ESCO follows the government guidelines and is typically concerned with public-sector projects, particularly buildings. According to the AER, the public buildings account for 14% of the electricity consumption, which can be covered by the government EE programme. This programme was undertaken because it was found in the AER audits that most of Oman's government buildings were not energy-efficient. Feedback received from building facility managers over the course of previous building audits was that it was difficult to manage energy demand of government buildings and the pressure to reduce energy use in these buildings had increased since the implementation of the CRT.

Indeed, to reduce subsidies, the AER in Oman recently announced the implementation of a new tariff structure for large customers. Starting in January 2017, large industrial, commercial and government customers consuming more than 150 MWh per year must pay the CRTs.

In further phases, the Super ESCO can penetrate the EE market in the industrial sector, where there are the largest energy consumers in the country accounting for more than 59% of the final energy demand.

Barriers to Implementation

Quite a number of barriers have to be removed before to create the best condition for implementing the Super ESCO. Although reducing subsidies is a positive step, Oman still has some of the lowest prices in the region and should further cut subsidies in the future. Oman's energy price restructuring focuses on non-residential consumers and consumers who use more than 150 MWh. As with most GCC countries, energy prices in Oman are still low and extending these initial policies across the residential and non-residential sectors would increase prices and encourage the rational use of energy. The Super ESCO market development will face some barriers, such as:

- High subsidies to energy prices.
- Non-existent EE regulations and laws.
- A smaller number of public buildings than residential buildings.
- Financial institutions basically have not recognized EE measures as loan collateral (lack of support from banks).
- Lack of capacity and skills for conducting energy audits.
- No technical experience, since there is no ESCO.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

Oman is currently developing an EE agency within its governmental electricity regulatory authority; this new agency will help effectively implement EE policies and measures. The implementation of the Super ESCO will require some legal changes, including:

- The establishment of a legal framework governing ESCOs, including bylaws and standard energy performance contracts;
- The legal creation of the state-owned Super ESCO.

Potential Sources of Financing

Local banks would be reluctant at the beginning to finance ESCOs, because of their lack of knowledge of the EE market and its related risks. Because the Super ESCO is a state-owned entity, public finance will play a major role in financing the EE projects.

41 Oman Daily Observer. "Power sector ESCOs market". Retrieved from http://www.omanobserver.om/power-sector-escos-market-set-take-off-oman/

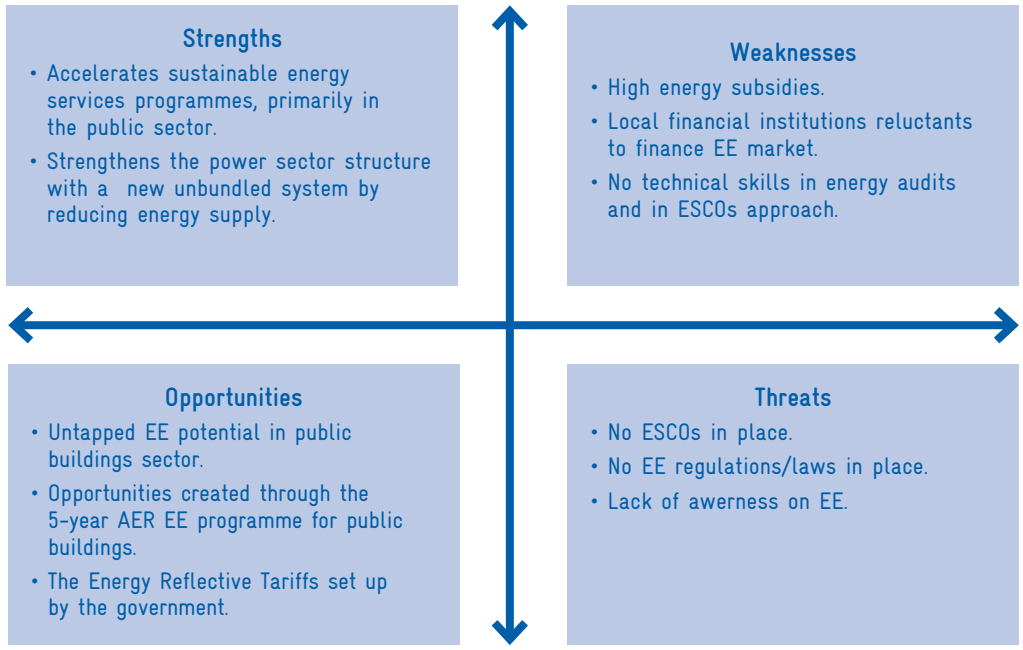
Synergies with Other National EE Instruments, Projects, Approaches, Strategies and Developments

> The Super ESCO can help develop the ESCO market through the AER's EE programme for government buildings by doing the following:
  – Supporting training activities in the market;
  – Taking on the financial and even technical risks, in part or in full, thus eliminating the financial barrier faced by ESCOs in the private sector.

> The Super ESCO can support instruments like the ESI by improving the ESCO market, thereby resulting in better EPCs and energy savings guarantees; Then, the insurers will be more confident to take some risks with the ESI mechanism.

> The Super ESCO instrument is also in line with the EEO instrument, if it is implemented. In fact, the Super ESCO can help utilities meet their obligations by aggregating the implementation of EE projects on their behalf.

Figure 15: SWOT Analysis



3.1.5 A Mechanism for Accelerating Replacement of the Stock of Energy-using Appliances in Oman

Alignment with the National Strategies and Policies

Overall, the mechanism for accelerating replacement of the stock of energy-using appliances fits well with Oman's long-term EE strategy, and improving energy performance of appliances is, in fact, a key measure in Oman's energy action plan.

A standard for air-conditioners is going to be implemented starting from July 2019. Compared to other appliances, air-conditioners are considered the most energy-consuming appliances, according to a report by the Implementation Support and Follow-up (ISFU) unit of the Diwan of Royal Court tasked with accelerating Oman's economic diversification.

Ministerial Decision No. 107/2018[42] adopted GCC Standard GSO 2530/2016 as an obligatory Omani regulation for energy labelling and minimum energy performance standards (MEPS) for air conditioners (ACS). The Oman Ministry of Commerce and Industry (MOCI) has made energy efficiency labels for ACs mandatory since July 2019. Starting from July 25, 2019, suppliers intending to ship products into the Sultanate of Oman must have them tested according to the standard GSO 2530/2016, register these products in the Omani Energy Efficiency Ratio (EER) System and obtain the permit to use the Omani energy-efficiency labels. The conformity assessment requirements and certification path are now being developed by the Directorate General of Standards and Metrology (DGSM).

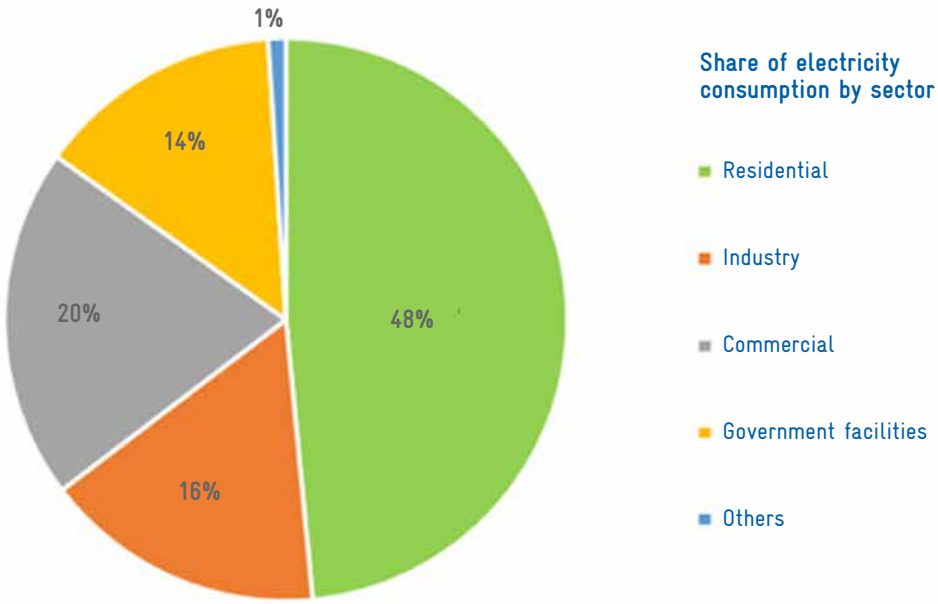
As for the other appliances, according to ISFU[43], the process of setting energy efficiency standards for air-conditioners has been "completed, reviewed and approved" by the Ministry of Commerce and Industry represented by the Directorate General for Specifications and Metrology. Oman is now making efforts to prepare standards for lighting products, among other kinds of devices and equipment.

Market Potential

Due to fast economic development in the Sultanate of Oman, the electricity sector has undergone substantial growth. Rising appliance use in the residential sector means that it now accounts for 48 percent of demand.

According to United for Efficiency (U4E)[44], there is potential of 1.8 TWh in annual savings by 2030 by focussing on only five kinds of appliances (lighting, refrigerators, air-conditioners, transformers and electric motors).

Figure 16: Breakdown of Electricity Consumption by Sector (Albadi 2017)



42 UL. (July 2019). Sultanate of Oman – Energy Efficiency and Labeling Requirements for Air Conditioners, News Story. Retrieved from https://www.ul.com/news/sultanate-oman-energy-efficiency-and-labeling-requirements-air-conditioners-0. Consulted on July 9, 2019.

43 Oman Daily Observer. "Oman to roll out energy efficiency standards for electrical appliances". Retrieved from https://www.omanobserver.om/oman-to-roll-out-energy-efficiency-standards-for-electrical-appliances/. Consulted on July 9, July 2019.

44 United for Efficiency (U4E). "Oman Savings Policy Assessment". Retrieved from https://united4efficiency.org/country-assessments/oman/. Consulted on July 9, 2019.

Barriers to Implementation

Oman has one of the lowest electricity prices of the MENA region because of high fossil-fuel subsidies and a lack of cost incentives to encourage real EE improvements. Under such conditions, it is difficult to foster the penetration of a mechanism for replacing existing stocks. Indeed, because efficient equipment and appliances are typically more expensive on a first-cost basis, the payback period is perceived as long if cost incentives are not offered.

Oman could first choose to implement a set of minimum energy performance standards (MEPS) for electrical appliances before implementing any appliance replacement programme.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

Oman intends to set up an energy performance labelling scheme and a MEPS in 2019. Ministerial Decision No. 107/2018 adopted[45] GCC Standard GSO 2530/2016 as an obligatory Omani regulation for energy labelling and minimum energy performance standards (MEPS) for air conditioners (ACS). The Oman Ministry of Commerce and Industry (MOCI) has made energy efficiency labels for ACs mandatory since July 2019. Implementing the MEPS can be considered as an important prerequisite to introducing the energy-using appliance stock replacement instrument. Now that the prerequisite of the MEPS is in place, implementing the mechanism for accelerating replacement of the stock of energy-using equipment and appliances should include the following key features:

- Financial incentive mechanisms to encourage consumers to replace low performance appliances;
- Eligibility requirements applicable to old appliances;
- A market control and monitoring mechanism;
- Environmental safeguard tools, etc.

Potential Sources of Financing

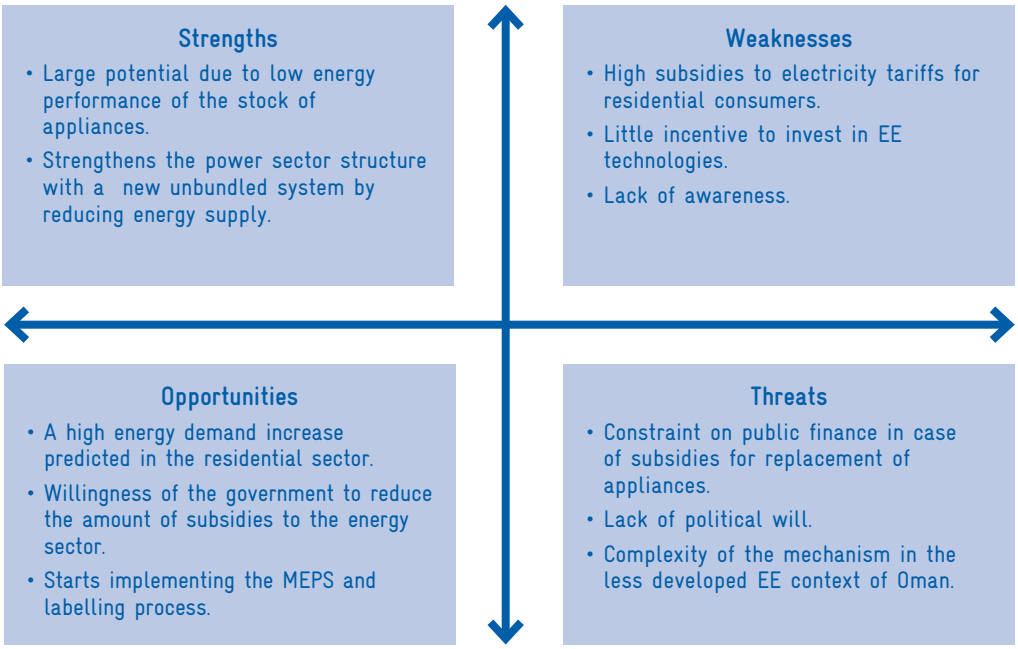
Implementing the instrument will typically require setting up a public subsidy for the purchase of energy efficient appliances to replace low-energy-efficiency units and serve to address the issue of low profitability for end users. To this end, the government should allocate a budget to provide the subsidy. This subsidy may also be profitable for the government thanks to the avoided public subsidies related to saved energy resulting from the programme.

Synergies with Other National Energy Efficiency Instruments, Projects, Approaches, Strategies and Developments

- The energy-using appliance stock replacement mechanism can help develop the ESCO market by creating better opportunities with higher EE incentives to replace large equipment and appliances.
- The energy-using appliance stock replacement mechanism can get help from the mandatory EE targets instrument by pressuring large consumers to make efforts towards EE and replace their high-energy-consuming equipment and appliances.

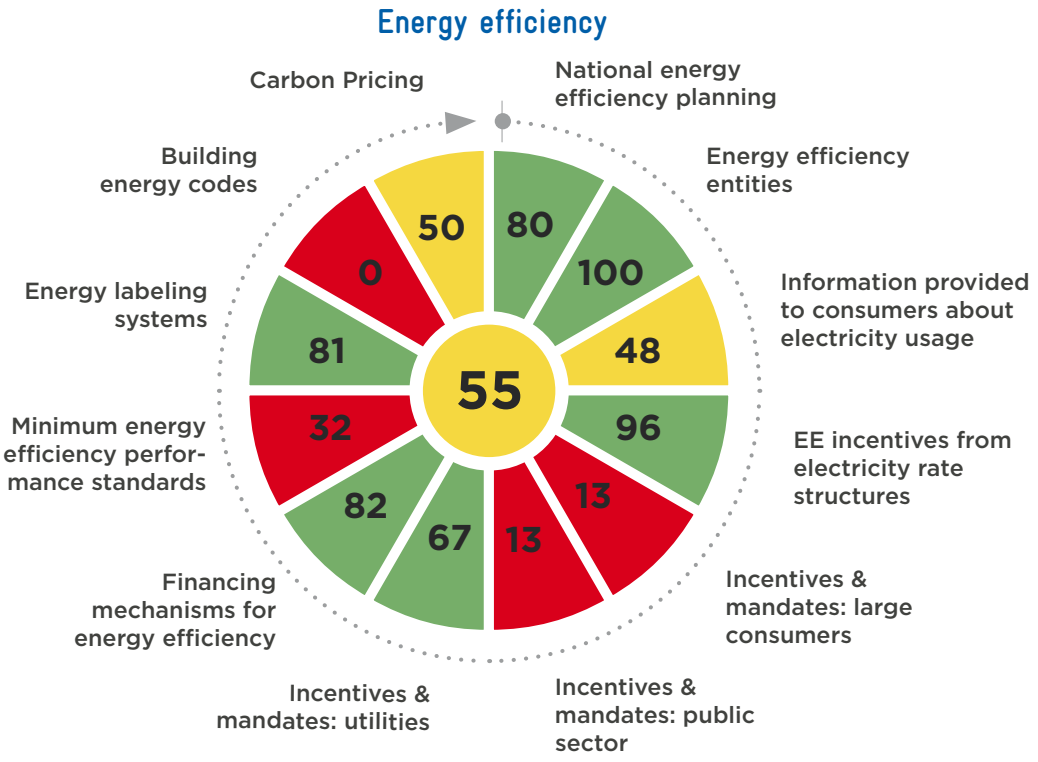
45 UL. (July 2019). Sultanate of Oman – Energy Efficiency and Labeling Requirements for Air Conditioners, News Story. Retrieved from https://www.ul.com/news/sultanate-oman-energy-efficiency-and-labeling-requirements-air-conditioners-0. Consulted on July 9, 2019.

Figure 17: SWOT Analysis



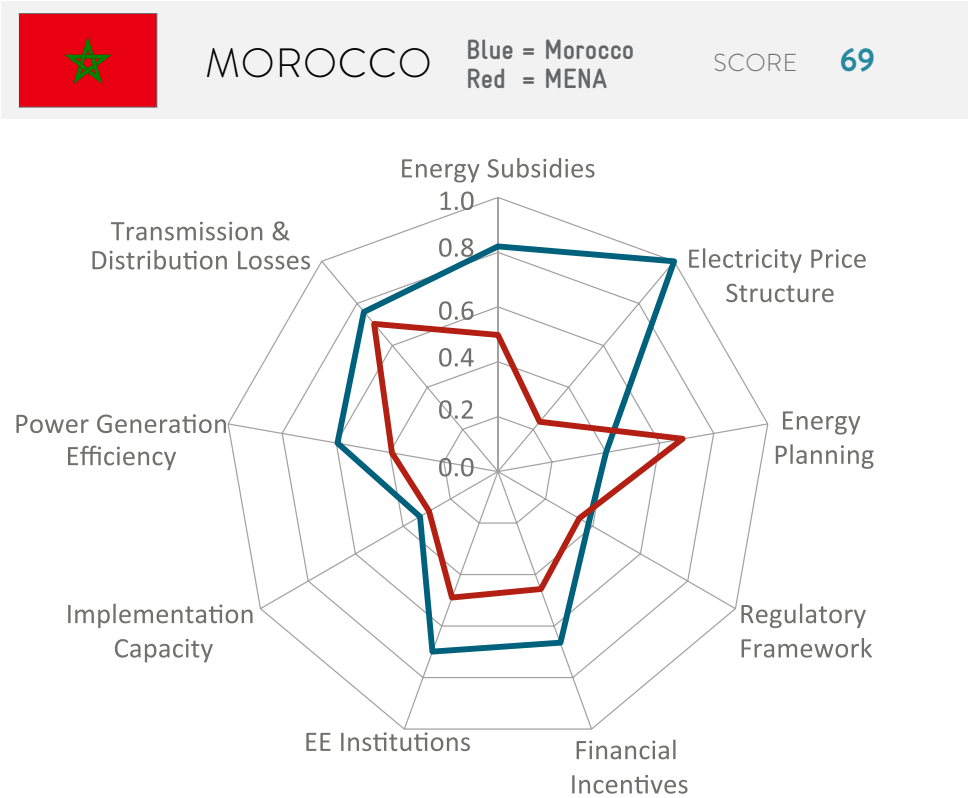
3.2 Morocco

Figure 18: RISE 2017 EE Score of Morocco



Source: RISE (2017): "Regulatory Indicators for Sustainable Energy (RISE) Country Profile Morocco". Energy Sector Management Assistance Program, World Bank Group. Washington, DC. Retrieved from: https://rise.esmap.org/data/files/sections/rise_country_profiles.pdf

Figure 19: AFEX 2017 Spider Chart



Source: AFEX (2017): "Arab Future Energy Index 2017: Energy Efficiency", p. 6. RCREEE and United Nations Development Programme. Retrieved from: https://www.rcreee.org/sites/default/files/afex_ee_2017.pdf

3.2.1 Country Context

The Kingdom of Morocco is almost totally dependent on foreign countries for fossil fuel supply. Morocco has adopted a strategy aimed at not only ensuring security of this supply, but also integrating the aspects associated with sustainable development and protection of the environment.

It is in this context that the 2030 National Strategy for Sustainable Development of Morocco (SNDD)[46] has identified energy transition as a strategic priority for the Kingdom's successful transition to a green economy.

The SNDD has set the goal of significantly increasing renewable energies' share in the national energy mix to 42% of the total installed electric power by 2020 and 52% by 2030. In addition, Morocco has adopted an energy strategy making energy efficiency a priority to be implemented in various productive sectors of the economy.

To this end, Morocco has undertaken a series of actions aimed at introducing EE technologies into all sectoral development programmes in order to achieve 20% energy savings by 2030, which is a strong commitment to implementing a more robust energy efficiency programme. The challenge now is to deliver on it.

General Situation regarding Energy Efficiency: EEIs in Place or Planned

The topic of energy efficiency is becoming increasingly important in Morocco. This trend will continue because of the expected increase in population and economic development. The country is rising to this challenge, but the EE sector is still in its infancy in this area.

Achieving the goal of 20% energy savings by 2030 requires clarifying the relationship between the administration and the operators by establishing an institutionalized system for governing EE, an effective regulatory framework and appropriate standards.

The EE law No. 47-09 of 24/10/2011 adopted in Morocco has defined the fields where the public administration and the economic operators are to take simultaneous actions. This law's main contribution has been the introduction of new concepts allowing the introduction of energy-efficient technologies and practices across various economic sectors.

Since the promulgation of this law, the Moroccan government has undertaken a vast project of legal and institutional reforms to help implement this large-scale strategy involving multiple dimensions (economic, social and environmental). The success of this project depends not only on the commitment of all stakeholders, but also the transformation of national objectives into concrete actions at the sectorial and local levels.

This ambitious goal has resulted in a new institutional configuration of Morocco's energy sector that will create better synergy and complementarity among operators, namely the Moroccan Agency for Sustainable Energy (MASEN), the National Office of the Electricity and Drinking Water (ONEE), the Moroccan Agency for Energy Efficiency (AMEE, formerly the National Agency for the Development of Renewable Energy and Energy Efficiency (ADEREE)) and the SIE.

General Supportive Framework Conditions and Barriers in the National Context

Overall, Morocco offers good framework conditions for the dissemination of energy efficiency.

The overall conditions needed to implement changes in energy use and energy efficiency are excellent, and the political support for transformation is also good in terms of governance. The financing conditions for energy efficiency are also good and there are already various funding systems in place. However, the initial conditions in the industrial and energy sectors are rather difficult to assess.

The Moroccan government supports investment with various funding opportunities for projects related to energy efficiency, as summarized below.

- The Morocco Sustainable Energy Financing Facility (MORSEFF) is a financing mechanism established in 2015 for energy efficiency projects worth EUR 80 million. It is a reserved company under the Moroccan law (similar to a limited liability company). MORSEFF was jointly developed and set up by the EBRD, BEI, KfW and the AFD.
- Founded in 2010, the SIE's mission was to financially support and guide the implementation of Morocco's EE strategies and cover the costs by primarily concentrating on medium and large-scale projects. Project financing from around EUR 250,000 is possible, although the SIE's own contribution can be significantly lower.
- In October 2018, the board of directors and the competent authorities decided to transform the status of the SIE into a Super ESCO to support the public sector's EE programme.

46 "2030 National Strategy for Sustainable Development of Morocco" (SNDD). (October 2017). Summary.

Law 47-09 regulates energy efficiency issues in the buildings sector (residential and office buildings), the transport sector and industrial sector. The measures listed in the framework of the law have primarily targeted the following EEI:

- The introduction of the mandatory energy efficiency building code;
- The introduction of energy labelling and minimum energy performance standards for energy using equipment;
- The introduction of the mandatory energy impact study for major development projects;
- The introduction of the mandatory energy audit for large energy consumers based on a consumption threshold.

All these programmes can only be operationalized by specific application decrees detailing the implementation modalities of the EEI and the roles and responsibilities of the different actors involved in the measure.

To date, only two decrees have been enacted by the MEMDD:

- Mandatory EE building codes for new buildings (which came into force in November 2015).
- Mandatory energy audits for large consumers (adopted in April 2019).

All the other EEI regulations in application of the articles of the EE law No. 47-09 are still under preparation by the MEMDD with the support of all the other ministries involved.

Expected Future Developments

Morocco has demonstrated its commitment to energy efficiency, since the adoption of the energy efficiency strategy with the aim of improving energy efficiency by 20% by 2030 (compared to the business-as-usual or BAU scenario). To implement the energy efficiency strategy adopted by the Council of Ministers in June 2017, an action plan targeting the key energy end use sectors was prepared and consolidated with all the stakeholders concerned.

The Energy Efficiency Agency (AMEE) is in charge of leading the implementation of the action plan across the industrial, transport and buildings sectors. To accelerate the progress, the government is taking actions to continue to develop a legislative, regulatory and compliance framework, while creating an incentive framework for consumers and businesses through energy efficiency subsidy programmes, technology support and ESCOs as well as more cost-reflective energy pricing. The progress will also be aided by supporting actions such as awareness-raising activities and the delivery of appropriate training.

In terms of electricity production, the implementation of the existing Moroccan strategies has so far been carried out almost exclusively through major projects. Decentralized solutions, on the other hand, are used in implementing energy efficiency. For example, financial and individual grants are given to industrial companies to modernize their facilities.

3.2.2 Energy Saving Insurance in Morocco

Alignment with the National Strategies and Policies

Overall, the ESI instrument fits well within Morocco's national strategies, including the 2009 National Energy Strategy and key framework laws with regulations regarding the liberalisation of the electricity market, RE and EE. There is a strong push for EE and RE development in Morocco and the instrument is well placed to support that push. As an instrument that depends on and supports a strong ESCO market in a given country, many factors that make ESI suitable overlap with those supporting the development of a strong ESCO market. As such, key government-supported actors, like the Moroccan Agency for Solar Energy (MASEN) or the Energy Investment Company (SIE), have a potential role to play in offering services or supporting links among market players to support the development of the ESI instrument.

There are already key laws in place that support the development of a strong ESCO market with the characteristics required to secure financing; they have succeeded in reducing the perceived risks of the EE and ESCO market. These include an EE law that mandates energy audits for large energy customers, financial incentives for EE activities and an EE fund.

A state-owned Super ESCO is being created, demonstrating strong potential for growth in the sector. Also, Morocco has a history of putting in place strong systems to encourage specific energy developments (e.g. RE procurement by MASEN).

Market Potential

Morocco demonstrates much EE potential in various sectors. This includes good prospects for industrial development and increased energy demand. The enabling institutional, legal and financial frameworks support that growth potential and existing analyses and projects have demonstrated the high profitability of EE projects.

International surveys have highlighted the high potential for ESCO-type activities in the following sectors in Morocco (Hansen 2012):

> The manufacturing industry;

> Energy-efficient public buildings;

> Energy-efficient housing;

> Public street-lighting.

Currently, Morocco's ESCOs have very limited capacity. Locally owned enterprises do not have much financing capacity[47] or the financial structure allowing them to provide guarantees. The local firms do not have much interest in projects offering performance guarantees because not many businesses promote such projects in their marketing efforts or respond to calls for tenders recently launched.[48] Currently, those Moroccan firms that participate in projects with performance guarantees or financing only participate in such projects in collaboration with large foreign companies.

Currently, the main actor that has been active in Morocco's market of guaranteed performance is ENGIE. This was made possible mainly by the facility-management market, including Renault Tanger's factory and the pilot projects of 100 green mosques launched by the SIE and the Ministry of Religious Endowments and Islamic Affairs.

However, other initiatives supported by the government are becoming mature and will thus allow for creating a true market for EPCs and ESCOs in Morocco. This is mainly related to the transformation of the status of the SIE into a Super ESCO. Such a transformation was decided by the board of directors meeting held in October 2018 and chaired by the minister in charge of energy so as to provide assistance to EE programmes targeting the public sector.

Barriers to Implementation

Implementation of an ESI mechanism in Morocco would require a project to simultaneously solve a number of problems. As with the case of Colombia, as detailed in LaGuardia (2014)[49], the project will have to "a) identify a market for EE equipment and services, b) encourage a new class of equipment and services providers to address that market, c) invent a certification process for the companies and means to vet their projects; d) find an analog to the ESPC on which an insurance product could be based (see Figure 20, below), and e) develop the insurance product, itself."

Figure 20: Elements of the IDB/Bancoldex Energy Savings Insurance Facility (LaGuardia 2014)

Source: LaGuardia (2014): "Energy Savings Insurance: A Design", p. 6.

The above model can help address the following particular characteristics of Morocco:

> Limited existing commercial financing of ESCO activities;

> A nascent ESCO market with limited prospects;

> Risk perception regarding EE investment and benefits that are poorly understood by financiers and SMEs;

> Commercial banks' perception of very high risks associated with clients' payment based on energy savings;

> For public institutions, there are no legal provisions for performance-based contracting and service payments.[50]

47 Several were originally small consulting firms, which usually have few tangible assets to allow them to obtain financing (even interim) during the construction period or allow them to produce letters of guarantee or deposits for the energy savings.

48 No wholly Moroccan-owned enterprise submitted bids for the green mosque project. The project recently launched for the Hassan II Mosque attracted the attention of mostly foreign companies and only a few local ones.

49 LaGuardia (2014): Energy Savings Insurance: A Design.

50 Langlois, P. (2012). World ESCO Outlook.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

Main regulatory, legal framework conditions are in place.
Article 7 of Law No. 47-09 governing EE clearly defines ESCOs and their operating conditions. A draft regulation on ESCO modalities of operation and responsibilities is being prepared and finalised; it is expected to be adopted by the end of 2019. When this decree is put into effect, it will enable the implementation of energy performance contracts (EPCs) with performance guarantees across all the sectors targeted, thereby helping create service offerings in Morocco's EE market that meet quality standards and requirements.

Overall, the economic aspects hindering the ESCO market can be potentially improved by this instrument, which will reduce the risk and support increased lending to ESCOs. The pipeline of projects, other supporting elements and the instrument could be simultaneously developed to create conditions for success.

Potential Sources of Financing

> Donor agencies;

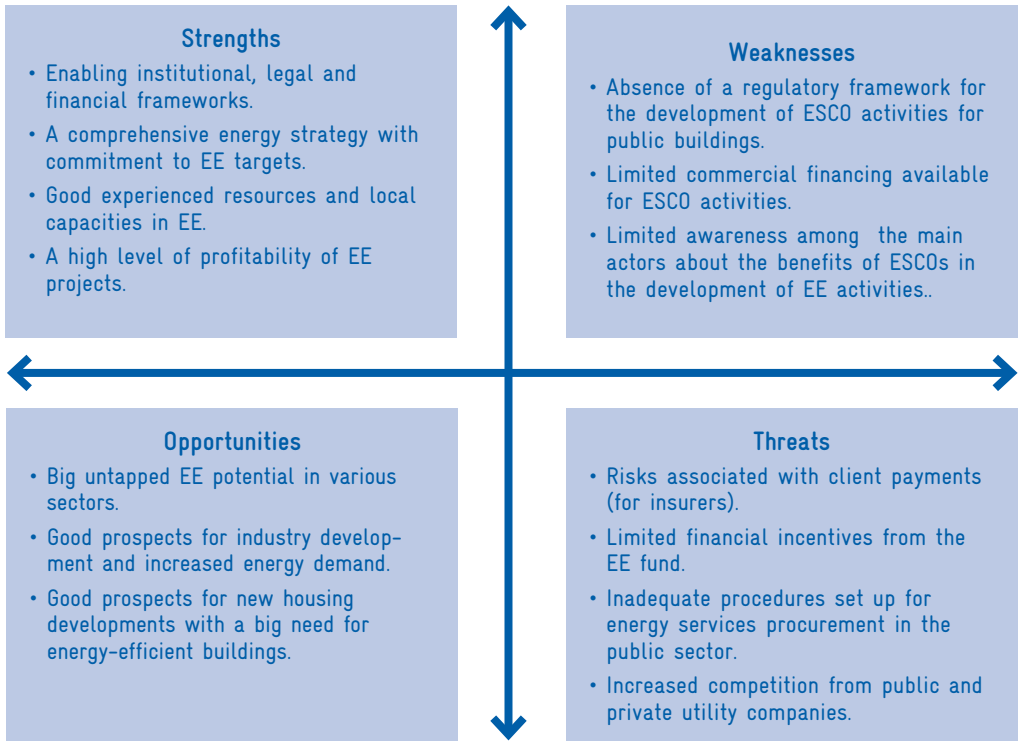
> Multilateral development banks.

Synergies with Other National Energy Efficiency Instruments, Projects, Approaches, Strategies and Developments

> In line with several existing initiatives.

> The law requires certifying the ESCOs that will be allowed to conduct energy audits and energy impact assessments and defines the requirements for such certification.

Figure 21: SWOT Analysis



3.2.3 Auction systems for EE in Morocco

Alignment with the National Strategies and Policies

Morocco already has extensive experience with operating a competitive supply-side mechanism and started a first large-scale renewable energy (RE) development auction in 2012. The auction process was launched by Morocco's national electrical agency (the Office National de l'Electricité et de l'Eau potable or ONEE for short) to develop 850 MW of wind energy generation.[51] The 850 MW wind energy generation has been divided in five batches: 100 MW for each of Tanger and Bonjdour, 150 MW for Midelt, 200 MW JbelLahdid and 300 MW for Tiskrad.

Among the numerous consortia that applied for the programme, five have been shortlisted by ONEE and the price obtained was a considerable success.

Although the national company has successfully managed the project, produced an exemplary bankable power purchase agreement (PPA) and granted concessional financing to the project, the multiple roles that ONEE played in the transaction required developing complex procedures and corporate structures. Therefore, the tendering process took almost 7 years from the announcement of the project to the signing of the agreement.

More recently, the Moroccan Agency for Sustainable Energy (MASEN) announced in May 2019 that the consortium of Masdar, EDF Renewables, and Green of Africa was awarded the tender for the design, financing, construction, operation and maintenance of the Noor Midelt Phase 1 multi-technologies solar power plant. The project, which will have a total installed capacity of 800MW, is the world's first advanced hybridisation of concentrated solar power (CSP) and photovoltaic (PV) technologies. On completion, it will provide dispatchable solar energy during the day and until five hours after sunset for a record-low tariff at peak hours of 0.68 Moroccan dirhams per kilowatt-hour.By building on this learning experience and the progress achieved, it is possible to extend the RE auction mechanism to EE and will allow Morocco to achieve its ambitious EE target by introducing a competitive tender mechanism through which potential project developers can submit measure or project proposals for improving energy efficiency, especially in electricity consumption.

Market Potential

Morocco demonstrates much EE potential in various sectors. This includes good prospects for industrial development and increased energy demand. The enabling institutional, legal and financial frameworks support that growth potential and existing analyses and projects have demonstrated the high profitability of RE auction programmes, and potentially, the high impact of EE auction programmes too.

Indeed, EE auction programmes could help save energy in two common ways, namely competitive bidding procurement processes and participation in energy markets. There is a wonderful opportunity for this instrument because the Ministry of Environment estimated potential 50.9 million tCO2/yr in savings from energy-related "nationally appropriate mitigation actions" (NAMAs)[52], including wind energy, solar energy, solar heating, low energy light bulbs, green cities and EE in buildings, the industrial sector and public lighting.

Barriers to Implementation

- The national development and infrastructure programmes have given less consideration to EE than to RE due to a lack of awareness among the policy-makers regarding the benefits of EE in reducing the energy demand (EE is invisible compared to concentrated RE capacity).
- The implementation of this new process will require a significant effort in taking communication measures and training all the potential stakeholders.
- The novelty of the tendering process and the auction system for EE may make implementation long and complex at the beginning of the process (as part of a learning period).

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

Thanks to the work already done by the auction mechanism for renewable-energy-based power generation, the main regulatory and legal framework conditions are in place for developing and implementing EE auction programmes. Nevertheless, the existing public procurement codes in Morocco may need to be changed to allow for conducting EE-related auctions, especially auctions targeting the public sector.

51 Renewable Energy Solutions for the Mediterranean & Africa (RES4MED&Africa), "Auction Study: Algerian case study, Mechanisms and main factors of a RES auction", April 2018.

52 Renewable Energy Solutions for the Mediterranean & Africa (RES4MED&Africa), "Country Profile: Morocco 2018".

Potential Sources of Financing

> Money from the regular budget, such as the Hassan II Social and Economic Development Fund, the Energy Efficiency Fund (FEE), the Energy Development Fund, the Renewable Energy Fund (FER), SIE and ONEE's own funds.

> Loans borrowed from Moroccan banks (e.g., through the *Banque Centrale Populaire* or the Chaabi International Bank Offshore or BMCE).

> Multilateral development banks, such as the German Bank of Development (KfW), the European Investment Bank (EIB), the European Commission or the African Development Bank (AfDB) and so on.

> The *Société d'Investissement Energétiques (SIE)* financially support and guide the implementation of Morocco's EE strategies. SIE has officially become a Super ESCO that aims to concretely facilitate the implementation of energy performance projects for the benefit of the public and private sectors.

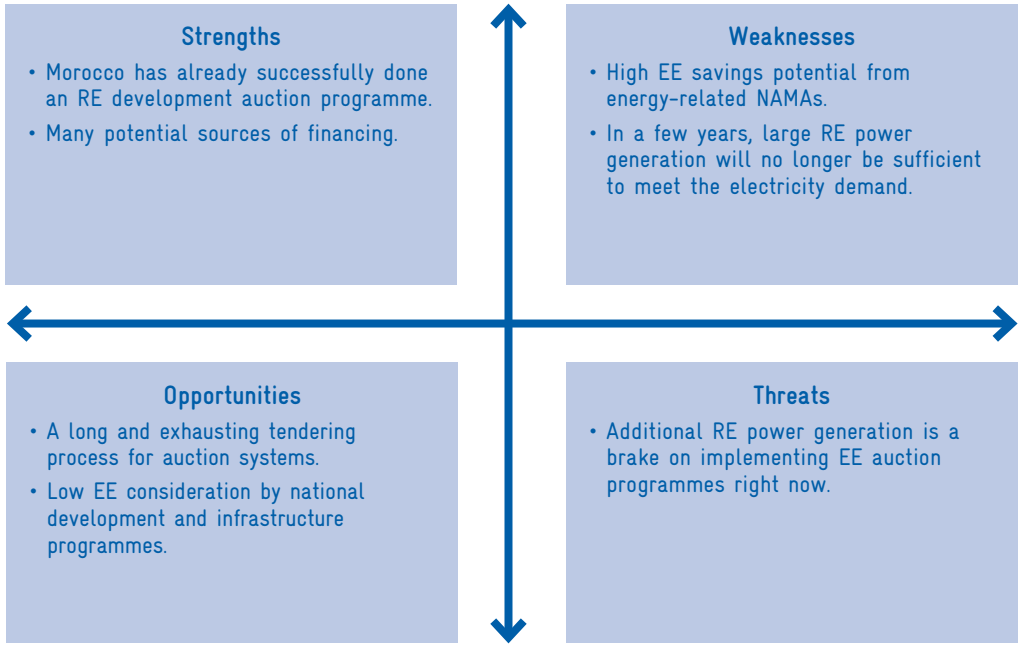
The SIE is particularly interested in supporting pioneering investments in new or previously untapped market segments that companies could not exploit on their own. SIE will play a major role in mobilizing the EE potential in the public sector in the coming years.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

> In line with several existing initiatives.

> Potential to complement the mandatory utility-managed EE programmes.

Figure 22: SWOT Analysis



3.2.4 Utility Managed EE Programmes

Alignment with the National Strategies and Policies

Overall, the EEO instrument fits in well with the national strategies and the key legislative and regulatory framework, mainly those laws that promote environmental protection, sustainable development, and the development and implementation of EE projects across all of Morocco's economic sectors.

The framework law No. 99-12 was adopted on March 6, 2014 and is serving as Morocco's national charter regarding the environment and sustainable development. This law has set the fundamental objectives regarding the government's action in environmental protection and sustainable development and has defined the duties of various public and private-sector actors in achieving these objectives, as required by the principle that these actors should be responsible for and actively participate in implementing the policies, strategies and programmes aimed at environmental protection and sustainable development.

The climate-change-mitigation measures are among the fundamental objectives of the sustainable-development actions.

Additionally, Article 11 of the framework law No. 99-12 clearly states that all the economic sectors are involved in making the efforts and implementing the measures aimed at rationalizing the use of resources, including the energy resources.

"Article 11: The growth of all the sectors and activities is part of the sustainable development. Therefore, continued efforts are being made to reduce the pressure on the natural resources being used, to employ environment-friendly clean-production technologies and to continue improving all social classes' access to the products and services offered by these economic sectors and activities."

Article 12 specifies the economic sectors considered as priorities in meeting the sustainable-development requirements and the energy sector is mentioned as one of these priority sectors.

Law No. 47-09 governing EE was promulgated on September 29, 2011. This framework law applies the notion of energy performance to all the economic sectors and provides a list of actions and obligations to be undertaken by domestic actors to promote EE across the country.

This law presents the definitions of the concepts related to EE (such as energy performance, the energy audit, and the energy service company), describes, in its chapters, the priority EE measures targeting various fields and specifies the sanctions for non-compliance with the requirements detailed in this law.

Articles 12 and 13 of this law stipulate that production, transport and energy distribution facilities and enterprises are obligated to conduct energy audits and implement an energy-saving action plan.

According to these two main laws, especially the articles cited above, a draft decree could be prepared to put these articles into effect to establish the rules and obligations linked to the introduction of obligations to be imposed on energy producers and distributors and specify the modalities of implementation and the roles and responsibilities of various actors concerned by this measure.

Market Potential

Morocco demonstrates great untapped energy-savings potential across different sectors.

According to the National EE strategy[53], the total potential identified by 2030 is approximately 7 Mtoe across different sectors with the following breakdown:

> Transport 55%

> Buildings 24%

> Industry 17%

> Agriculture 5%

Tapping all this potential in different sectors requires involving the commitment of all actors, both public and private.

Through the EEOS, energy suppliers as the obligated parties can play an important role in realizing this potential. The important role of energy suppliers in realizing their energy saving potential is particularly relevant in the buildings sector.

It is difficult to define the energy-saving actions eligible for the system of obligations, because a good balance has to be struck between efficiency and the ease of processing.

Several factors need to be taken into account:

> The sectors of energy consumption concerned: It seems relevant to choose the residential sector and the small-tertiary-buildings sector.

> Types of actions: Efforts should be made to look for simplicity and define clearly characterized typical actions.

53 ADEREE (currently AMEE), Stratégie Nationale d'Efficacité Énergétique à l'horizon 2030, Rabat, Mars 2014.

Barriers to Implementation

Morocco has several key conditions needed for implementing EEOS. The idea of EEOS has been examined by the government, including the introduction of a white certificate scheme, where organizations that can deliver greater savings can trade those savings to obligated organizations who cannot meet their obligations for the period. The main barriers are a lack of knowledge about the instrument, a lack of technical skills to design and supervise it, and a lack of political will to implement it.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

First, a decision must be made to understand the scope of the changes required in selecting the mandatory operators. The simplest and most appropriate choice seems to be the energy suppliers. For the sake of simplicity, an appropriate threshold volume of the energy supplied must be determined to avoid imposing this requirement on small suppliers. The definition of "supplier" is the main question to be examined by considering:

> The case regarding electricity;

> The case regarding suppliers of petroleum products.

The first step involves setting an obligation at the national level to be defined based on the national energy-savings targets by taking into account the breakdown among the different sectors and the various types of energy products. The obligations must be set for every kind of obligated entity concerned according to the criteria to be defined (e.g., the level of sales measured in energy units) by taking into account the mandatory operators chosen.

It seems necessary to set a percentage of the obligation on the energy product sold by the obligated entity concerned.

Furthermore, a national entity (administrator) must be designated to set up the detailed rules and procedures among the different obligated parties and to put in place a monitoring system to ensure consistency between the effort to achieve the targets set for the energy product and the effort to achieve the targets set for the obligated entity.

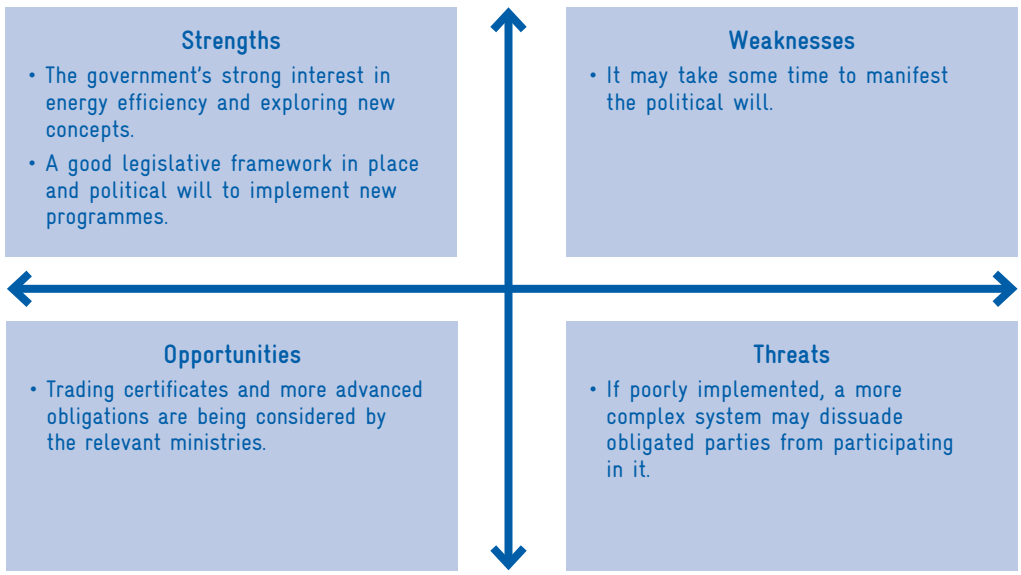
Potential Sources of Financing

In many EEOS, the obligated parties are allowed to recover costs of the activities undertaken through their normal rate adjustments or as a cost of doing business. In other jurisdictions, costs are recovered through general government revenues on a pass-through basis.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

Morocco is implementing a range of projects and developments that coincide with the implementation of EEOS imposed on utilities. Much synergy with the existing projects can be envisaged.

Figure 23: SWOT Analysis



3.2.5 EE Tax-based Instrument

Alignment with the National Strategies and Policies

Overall, the EE tax instrument fits in with Morocco's national strategies and initiatives. Morocco has made EE a priority since the 2009 National Energy Strategy and has set an ambitious EE target for 2030, thus demonstrating a clear long-term commitment. EE tax incentives can contribute to Morocco's effort by encouraging EE practices, supporting an increase in the market share of advanced energy efficient products and encouraging homeowners and business owners to undertake EE improvements.

Several policies have been implemented or are being implemented to improve EE and encourage energy conservation. These include:

- Minimum efficiency standards for energy-using equipment;
- Energy performance standard in new building;
- Energy efficiency in industry;
- Rebates on energy bills:
  - A popular programme that has been successfully implemented is the 20-20 initiative.[54] The initiative offers a 20% rebate on any energy bill that conserves 20% of energy when compared with the same month in the previous year. This initiative has been popular with Moroccans.
- Dedicated loans:
  - The programme to develop Morocco's solar water heater (Shemsi) market aims to encourage the purchase of solar water heaters by providing grants and has set a target of 1.7 million m^2 of solar water heaters installed in households by 2020.[55]
- Morocco has also introduced tax measures mainly in the transport sector, including:
  - A reduction in import duties for hybrid vehicles;
  - The annual taxation of vehicles (vignette) according to the owners' income, although the initial objective is not related to energy efficiency.

Market Potential

Morocco demonstrates huge EE potential in various sectors and, as EE tax incentives have been successfully established in the residential, commercial and transportation sectors in many countries around the world, they could be applied to all those sectors in Morocco.

According to the AMEE, the transport and residential sectors offer considerable potential for improving EE and represent more than 75% of the identified national energy-savings potential by 2030.[56]

A large part of EE potential in Morocco can be mobilised through tax incentive instrument. For that, it will be necessary to set up a legal framework for the tax incentive and calculate the appropriate rate to provide a reasonable stimulus to target sectors in order to increase the market share of EE products and goods. Introducing EE tax incentives or implementing a rebates programme for the purchase of energy efficient appliances (lights, refrigerators, and room air-conditioners) and vehicles could help boost the market for energy efficient equipment and appliances.

Barriers to Implementation

- High initial upfront costs of EE equipment compared to the weak financial capacity of consumers.
- Lack of access to the information about rebates, incentives, and tax credit.
- Few or absence of rebates programmes or tax credit mechanisms in the market.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

It will be necessary to set up a legal framework for the tax incentive and calculate the appropriate rate to provide a reasonable stimulus to the targeted sector and promote growth over time.

Once the legal framework is implemented, it will be advisable to create an online platform in Morocco to raise awareness about the available rebates and incentives.[57] This platform is expected to inform Moroccan homeowners and business owners on not only how to perform energy audits but also the national rebates, local rebates and incentives that would allow them to save money and protect the environment.

54 Worcester Polytechnic Institute (WPI). (October 2015). "Energy Sustainability in Morocco".

55 Moroccan-German Energy Partnership PAREMA. (September 2017). "Renewable energy and energy efficiency in Morocco: Context and market access". Retrieved from https://www.energypartnership.ma/fileadmin/user_upload/morocco/media_elements/PAREMA_-_Brochure_RENEWABLE_ENERGY_AND_ENERGY_EFFICIENCY_IN_MOROCCO.pdf. Consulted on July 17, 2019.

56 Agence Marocaine pour l'Efficacité Énergétique (AMEE). « Programme d'Efficacité Énergétique dans l'Industrie (PEEI) ». Retrieved from http://www.amee.ma/index.php?option=com_content&view=article&id=126&Itemid=199&lang=en. Consulted on July 17, 2019.

57 Worcester Polytechnic Institute (WPI), "Energy Sustainability in Morocco", October 16, 2015.

Potential Sources of Financing

There are two main kinds of incentive, as explained below.

> **Tax credit.** The tax administration is responsible for granting tax credit to consumers. Tax credit is easy to implement because the tax administration only needs to make a simple calculation to subtract a credited amount from the amount of tax.

> **Rebates.** In general, the national government, the local government and utilities offer rebates for energy-efficient purchases. Sometimes, manufacturers also sponsor special offers that can make efficient products more affordable.

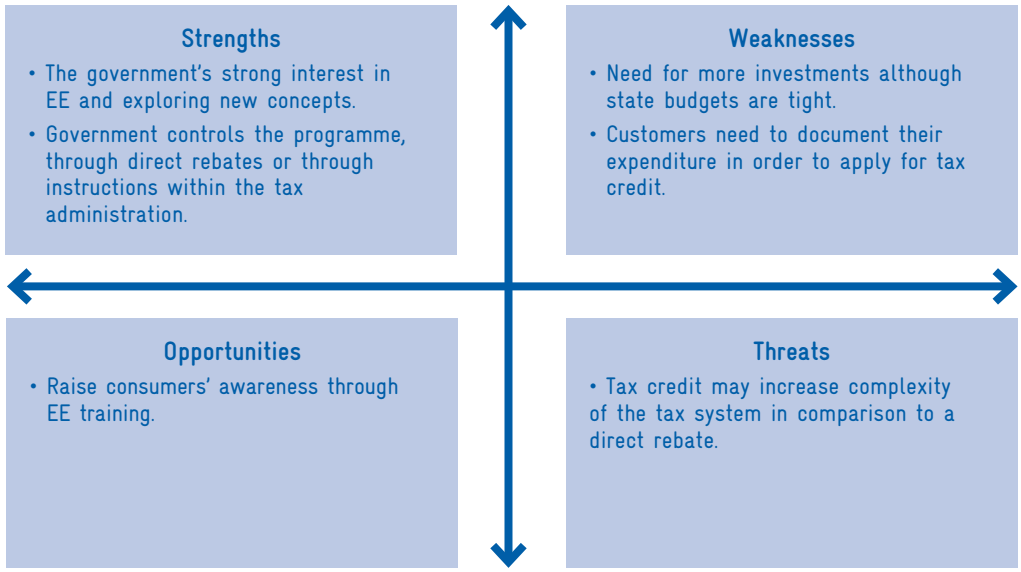
In the case of Morocco, it can be recommended to adopt tax credit system rather than a rebate system, as the latter can be more complex to set up by the fiscal administration

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

Morocco is implementing a range of projects and developments that coincide with the implementation of the EE-based tax instrument. Much synergy with the existing projects can be envisaged.

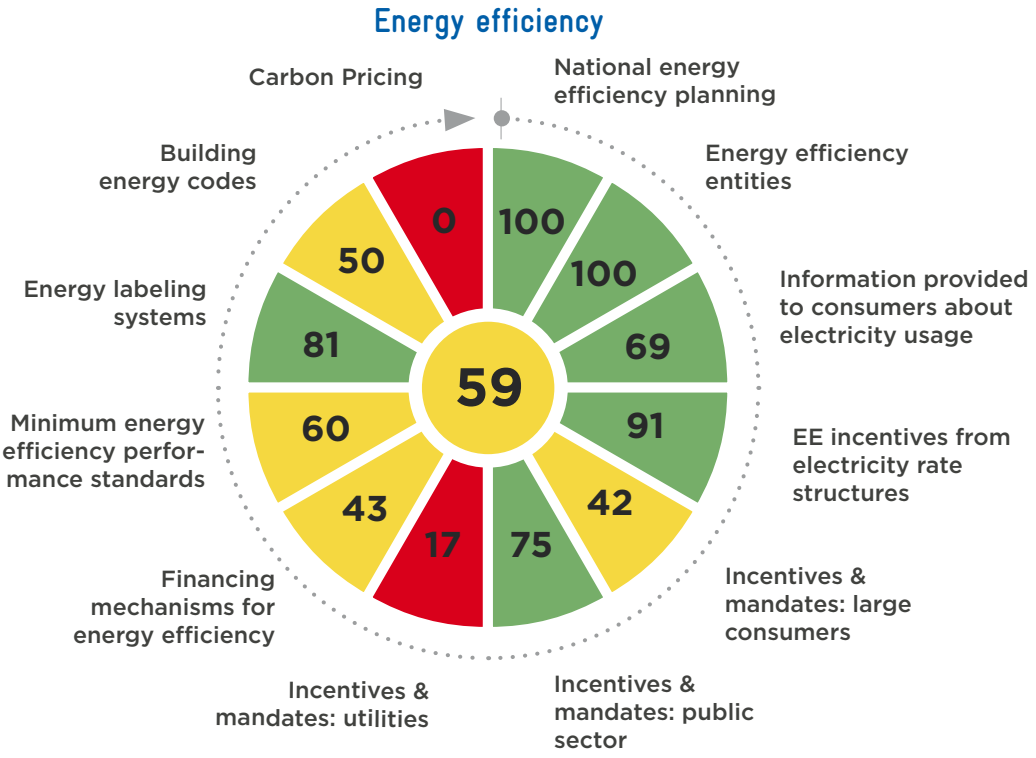
For example, the EE-based tax instrument is one of the mechanisms for accelerating replacement of the stock of energy-using equipment and appliances.

Figure 24: SWOT Analysis



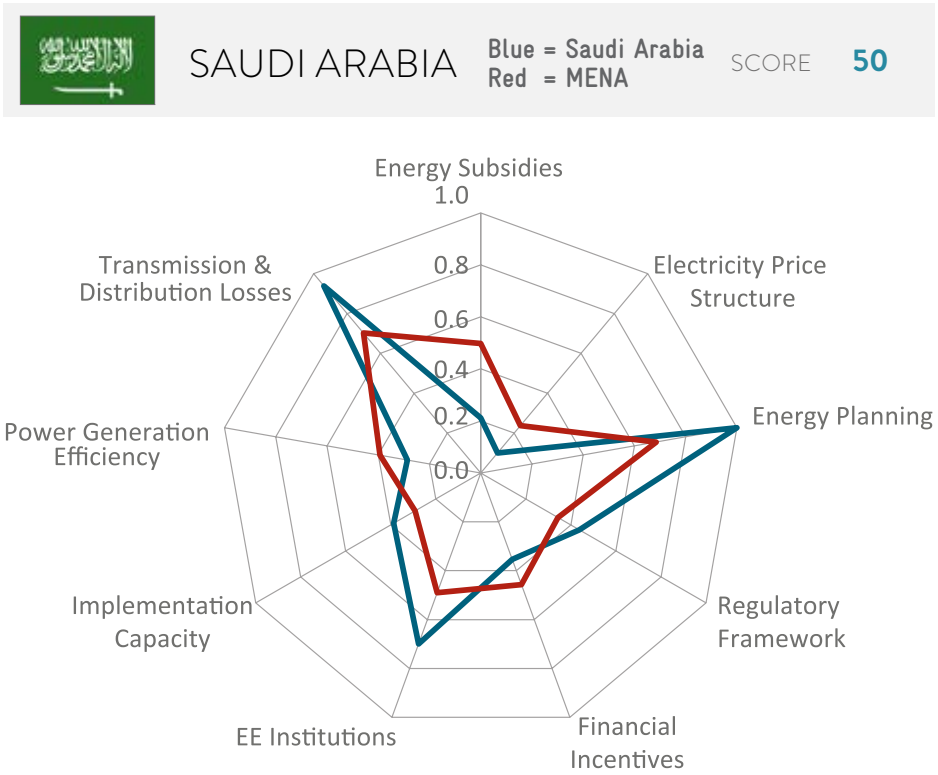
3.3 Saudi Arabia

Figure 25: RISE 2017 EE Score of Saudi Arabia



Source: RISE (2017): Regulatory Indicators for Sustainable Energy (RISE) Country Profile Saudi Arabia. Energy Sector Management Assistance Program, World Bank Group. Washington, DC. Retrieved from: https://rise.esmap.org/data/files/sections/rise_country_profiles.pdf

Figure 26: AFEX 2017 Spider Chart



Source: AFEX (2017): "Arab Future Energy Index 2017: Energy Efficiency", p. 8. RCREEE and United Nations Development Programme. Retrieved from: https://www.rcreee.org/sites/default/files/afex_ee_2017.pdf

3.3.1 Country Context

General Situation regarding Energy Efficiency and the EEIs in Place or Planned

The Kingdom of Saudi Arabia (KSA) used to offer some of the highest energy subsidies in the region, contributing to lower potential for sending pricing signals to impact demand. However, the energy industry is facing several kinds of pressure, including domestic consumption, international climate agreements and export needs, resulting in the potential for continuing to make structural changes to energy costs in the kingdom.

In 2016, the Ministry of Energy was restructured to make this ministry responsible for overseeing both domestic electricity consumption's demand management and energy exports. This restructuring signalled the start of price reforms in earnest, and the results are shown in Table 43.[58] As a key variable, prices will be raised to international levels according to current government plans so as to enable demand-management tools to have a more significant effect. Currently, further steps towards reducing energy subsidies for private customers are being planned in Saudi Arabia. In the construction sector, Saudi Arabia has not yet offered any tax incentives or financing programmes to promote energy efficiency in buildings. The plan announced in 2017 to build an energy-efficient city and establish a special economic zone ("NEOM") could help spread energy efficiency in Saudi Arabia and potentially make energy efficiency a more attractive undertaking by providing more government funding, despite subsidized energy prices.

Table 43: Energy Price Reform that Increases Energy Commidity and Service Prices in the KSA

Product	2015	2016/2017	2018 Implementation	% change (2015–2018)	Current benchmark (US$) (source)	Saudi 2018 price as factor of international benchmark
Crude oil for power generation (US$/bbl)	$4.23	$5.87	$5.87	39%	$54.20 (2017 Brent)	11%
Natural gans (methane) (US$/mmbtu)	$0.75	$1.25	$1.25	67%	$4.69 (2016 NBP)	27%
Gasoline (91 octane) (US$/gallon)	$0.46	$0.77	$1.40	204%	$2.53 (2017 U.S.)	55%
Gasoline (95 octane) (US$/gallon)	$0.61	$0.92	$2.09	240%	$2.53 (2017 U.S.)	82%
Diesel (US$/gallon)	$0.26	$0.48	$0.48	88%	$2.65 (2017 U.S.)	18%
Water (residential) (US$/cubic meter)	$0.03	$0.04	$0.04	50%	$0.61 (2018 Tucson, AZ, U.S.)	7%
Electricity (residential, low consumption) (US$/kWh)	$0.01	$0.01	$0.05	260%	$0.13 (2017 EIA)	37%

bbl, barrels, mmbtu, million British thermal units; NBP, National Balancing Point; EIA, U.S. Energy Information Administration

(Krane 2018)

58 Baker Institute of Public Policy; EIA 2018 in Jim Krane, Ph.D. "Energy Governance in Saudi Arabia: An Assessment of the Kingdom's Resources, Policies, and Climate Approach". Retrieved from https://www.bakerinstitute.org/media/files/research-document/09666564/ces-pub-saudienergy-011819.pdf

The Saudi Energy Efficiency Programme (SEEP) was established in 2012. Since then, it has been supervised by the Saudi Energy Efficiency Center (SEEC), which was created based on a new 2030 vision. As one of the world's largest energy producers, the Kingdom of Saudi Arabia is committed to becoming a highly energy-efficient country to safeguard its resources for future generations.

General Supportive Framework Conditions and Barriers in the National Context

Saudi Arabia offers good conditions for the dissemination and implementation of energy efficiency measures. The high savings potential in several sectors is one of the key aspects covered by this assessment. The financing conditions are also ranked positively due to the good economic and investment situation. Saudi Arabia is not only MENA's largest economy, but also the only G20 member in this region, therefore offering greater capacity for financing energy efficiency measures.

The second phase of the National Energy Efficiency Programme (NEEP) 2005-2030 is being implemented to achieve ambitious objectives, including a 30% reduction in electricity intensity between 2005 and 2030, and a 50% reduction in peak demand growth. Currently, the implementation has been focusing on four priorities:

1 Designing an initial energy-saving law and enforcing measures and regulations for saving energy at the national and local levels

2 The energy information system: Designing and implementing a new national energy information system to provide information, make predictions, and monitor and verify target implementation and achievement.

3 Training energy efficiency managers: Designing and implementing an in-depth training programme for energy efficiency managers from the governmental and private sectors working with and in the key sectors of construction, household devices, heavy industry, transport, and energy and water supply.

4 Raising awareness of energy-saving. Designing and implementing a nationwide campaign to influence energy consumption patterns.

Our assessment of the framework conditions needed for an energy and efficiency transition has revealed a mixed picture. Although there are ambitions and guidelines, the effort to improve energy efficiency is complicated by several factors. These include, for instance, the large energy-subsidy system and the low degree of market liberalization. On the other hand, Saudi Arabia's huge energy consumption and its quick increase offer high energy-saving potential.

Expected Future Developments

In 2016, Prince Mohammed bin Salman Al Saud presented Vision 2030, which also includes energy efficiency targets. This Vision 2030 outlines the key target for Saudi Arabia's economic and social development by 2030. In addition, there is the National Transformation Plan (NTP), which provides a blueprint for a more specific implementation framework and outlines the objectives for all the ministries. According to the Vision 2030 guidelines, energy efficiency should play a role in meeting the increasing energy demand, in addition to increasing production and diversifying energy sources. Private Saudi companies are already active in the field of renewable energy and are successful bidders for photovoltaic projects in the MENA region. A market for companies specializing in energy efficiency is also gradually developing. A trailblazer is the state-owned Super ESCO, which is bringing in expert energy performance contracting (EPC) experience to enable Saudi Arabia to speed up energy efficiency improvement using this tool and government-provided funding.

Saudi Arabia is also expected to continue to make progress in setting international prices of crude oil, diesel and heavy fuel oil used in power generation, and for the industrial sector, this is supposed to take place by 2023. Saudi's acceptance of the climate-change-mitigation goals through its first nationally determined contribution (NDC)and the need to reduce emissions changed in the recent past (2016) and could shift again, depending on its success in negotiations. The initial NDC aspires to avoid up to 130 million tonnes of CO_2-equivalent (CO_2e) emissions per annum by 2030 through economic diversification and adaptation[59]. This climate action may provide opportunities and convenient political support for energy policy changes in the kingdom, including modifications beneficial to the kingdom's economic and environmental sustainability.Within the kingdom, the general public's reaction to the revamping of Saudi's energy social contract constitutes an obstacle because, without the public's support for reforms, the need for the instrument would be limited. The general public's reaction to the subsidy reform has been negative, albeit muted. For further reforms to proceed and full rationalization of energy prices to be achieved, Saudi's general public must understand and accept the changes being pushed by the authorities.

59 King Abdullah Petroleum Studies and Research Center (KAPSARC), Policy Pathways to Meet Saudi Arabia's Contributions to the Paris Agreement report, February 2019, https://www.kapsarc.org/file-download.php?i=27843. Consulted on the 15th October 2019.

3.3.2 Auction systems for EE in Saudi Arabia

Alignment with the National Strategies and Policies

Overall, the auction system for EE fits in well with Saudi Arabia's national strategies. Also, the instrument may also build on the recently implemented ambitious renewable energy (RE) auction programme.

Saudi Arabia's National Strategies

- Founded in 2010, the Saudi Energy Efficiency Center (SEEC) aims to rationalize energy production and consumption in order to increase the kingdom's energy efficiency by unifying the efforts made by governmental and non-governmental organizations in this field.[60]

- The second phase of the NEEP includes designing an initial energy-saving law and enforcing energy-saving measures and regulations at the national and local levels.

Saudi Arabia's Renewable Energy Auction Programme

As part of Vision 2030, the National Renewable Energy Programme (NREP) aims to install 3.45 GW of renewable-energy-based capacity by 2020 and 9.5 GW by 2023 (10% of power generation capacity).[61] Overall, Saudi Arabia plans to produce 70% of its power from natural gas and 30% from renewables and other sources (mainly nuclear power) by 2030 (REPDO, 2018).[62] To reach this goal, the Renewable Energy Project Development Office (REPDO) is conducting a tendering process involving three rounds of auction to procure 3.45 GW in RE-based capacity by 2020 over. Two rounds have already been done, as explained below.

- The Round 1 of auctions began in early 2017, in which the REPDO issued a tender for 700 MW of wind and solar PV power (400 MW of onshore wind and 300 MW of solar PV).

- In 2019, REPDO started Round 2 of Saudi Arabia's National Renewable Energy Programme. Sixty Companies (including 28 Saudi companies and 32 international companies) secured pre-qualifications to bid in Round 2 for a combined capacity of 1.5 GW.[63] The process is still being carried out to choose the winner.

Market Potential

The potential market applications are multiple because Saudi Arabia is facing energy demand problems due to steady growth of energy consumption, particularly electricity. Therefore, there is strong interest in decreasing the energy consumption using energy-efficiency measures. The potential for holding EE auctions is particularly interesting in Saudi because of the existence of large intensive energy-consuming industrial enterprises. In fact, the industrial sector consumes about 44% of the final energy. In the industrial sector's total energy consumption, among the industrial subsectors, petrochemicals account for 38%, cement 21%, steel 11% and aluminium 5%. Saudi's ultimate objective is to reduce its industrial sector's energy intensity by about 2% per year.

Auctions for EE can force bidders to achieve energy savings at highly attractive prices, thereby fostering the implementation of EE and energy-saving projects across Saudi Arabia's economic sectors.

Barriers to Implementation

The implementation of this EE auction instrument can be complex in the context of Saudi Arabia because of the following main factors:

- Additional RE power generation means that EE measures will no longer be as urgent to be implemented in the short term. This is likely to be exacerbated by the introduction of nuclear generation into the energy mix.

- The tendering process for the auction system may be considered long, complex and exhausting.

- There are concerns about the lack of transparency in the evaluation process of auctions, based on the lack of transparency revealed in Round 1 of RE auction in 2017.[64]

60 Saudi Energy Efficiency Center (SEEC) website. Retrieved from https://www.seec.gov.sa/en. Consulted on July 18, 2019.

61 Kingdom of Saudi Arabia. Vision 2030. Retrieved from https://vision2030.gov.sa/sites/default/files/report/Saudi_Vision2030_EN_2017.pdf. Consulted on the 18th 2019.

62 The Saudi energy ministry's Renewable Energy Project Development Office (REPDO). Saudi Arabia 2030 Renewable Energy Targets.

63 National Renewable Energy Programme (NREP). "Pre-Qualifications to Bid in Round Two of the Saudi Arabia NREP". Retrieved from https://www.powersaudiarabia.com.sa/web/attach/news/round-2-pre-qualified-applicants.pdf. Consulted on July 18, 2019.

64 PV Magazine. (January 2018). "Saudi Arabia announces shortlist for 300 MW tender, excludes lowest bid". Retrieved from https://www.pv-magazine.com/2018/01/05/saudi-arabia-announces-shortlist-for-300-mw-tender-excludes-lowest-bid/. Consulted on July 18, 2019.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

Main regulatory and legal framework conditions are in place for developing and implementing EE auction programmes, thanks to the work already done to implement the auction mechanism for renewable-energy-based generation. This could also lay the groundwork for EE-only auctions.

Saudi Arabia's Renewable Energy Auction Programme uses competitive bidding, a relatively common type of auction. It will be relatively the same for EE in terms of the regulations and framework if Saudi Arabia starts to conduct auctions for EE because there is already knowledge about competitive bidding for procurement.

The SEEC should be strengthened to enable it to play the role of EE auctioneer, whose responsibility will be to administer the auction, establish the rules, and ensure that the auction mechanism functions in a transparent and fair way.

The existence of an energy regulator, the Electricity and Cogeneration Regulatory Authority, is a good prerequisite. Its role will be to set up the framework in which the auctioneer can function and work with other stakeholders to define the goals and metrics according to which participants and winners can be selected.

Potential Sources of Financing

> As Saudi Arabia is a G20 member (the only one in the MENA region), it offers great capacity for financing the auction system for EE and has many potential bidders.

> Money from the regular budget (government funding).

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

> In line with several existing initiatives.

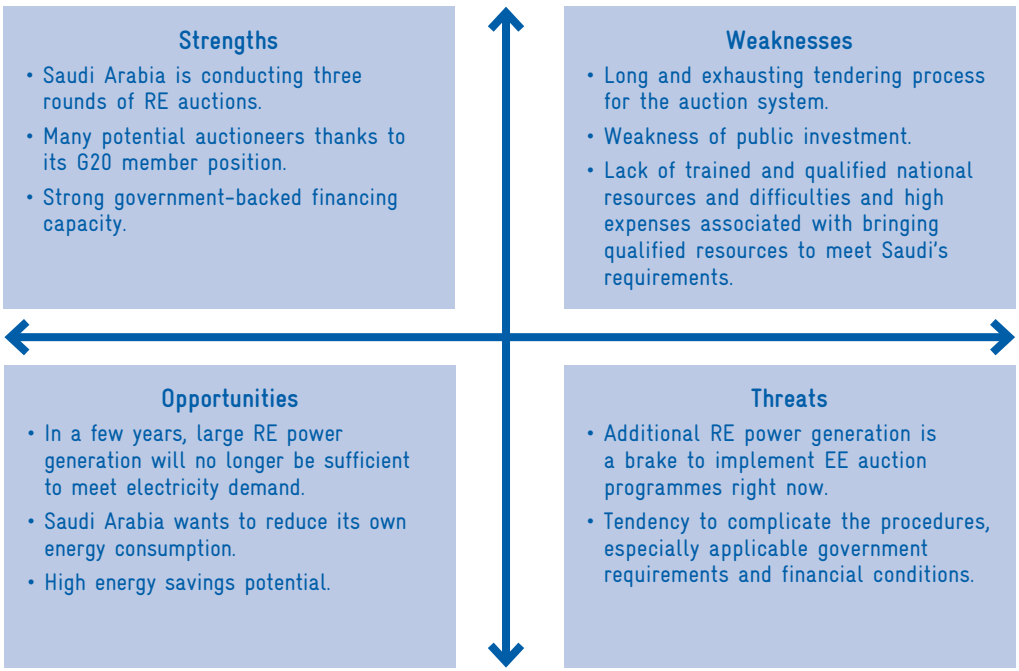
> Complements the mandatory EE target instrument.

The EE auction instrument is in line with other existing or potential instruments, such as:

> The RE auction system already existing in Saudi.

> EE obligations to be imposed on utilities, if implemented.

Figure 27: SWOT Analysis



3.3.3 Mandatory EE Targets in Saudi Arabia

Alignment with the National Strategies and Policies

The Kingdom of Saudi Arabia (KSA) has already set several national targets related to energy consumption and climate change. According to the Vision 2030 guidelines, energy efficiency should play a role in meeting increasing energy demand, in addition to increasing production and diversifying energy sources.

The National Energy Efficiency Action Plan (NEEAP) 2005-2030 is being implemented to achieve ambitious objectives, including a 30 percent reduction in electricity intensity between 2005 and 2030 and a 50 percent reduction in peak demand growth.

Saudi Arabia's high and rapidly increasing energy consumption offers highly untapped energy-saving potential in several sectors that can be mobilised through targeted EE policies.

A mandatory target applied to specific sectors, such as large industrial enterprises, aligns well with the aspirations outlined by the Government of Saudi Arabia in Vision 2030. EE standards (energy intensity targets) for new and existing plants exist but are not effectively enforced.[65] In addition, the existing Super ESCO provides a technical basis for determining and setting realistic targets that can be achieved within reasonable timeframes. Mandatory targets for specific sectors are an effective means of ensuring that high-level targets and plans are achieved, such as the NEEAP. As a new subject for many organisations, limited targets (such as having an energy manager at facilities of a certain size) would align well with the goals of the NEEAP and improve familiarity with mandatory energy efficiency targets.

Feasibility of utility managed EE programmes

As a distinct and particular way of meeting EE targets, utility managed EE schemes have the potential to fit well with the aspirations of the Kingdom to gradually bring energy prices in line with international tariffs and costs and meet emissions reduction targets. An obligation imposed on by the regulator on distribution utilities that required investments at end customer premises is congruous with existing regulations and would be in line with the transition from a monopoly to partially deregulated structure. In-so-far as the EE investments would reduce energy costs for end-users, a utility managed EE program could help ease the transition to higher energy prices and diffuse negative public sentiment.

Market Potential

This instrument could be targeted at large energy consumers such as energy-intensive industrial enterprises, which would align well with the energy consumption patterns in Saudi Arabia. The industrial sector accounts for 44 percent of final energy consumption and 70 percent of the industrial sector's total energy use is consumed by steel, petrochemical and cement factories. These industries have significant EE potential that can be targeted by a mandatory EE instrument.

Barriers to Implementation

The implementation of this EE instrument is complicated by the factors commonly faced by other instruments, including high energy subsidies still in place and relatively limited framework conditions.[66] Specific barriers to this instrument are:

> A lack of awareness of EE among economic operators.

> Lack of capacity and skills on energy audits, particularly in specific energy intensive industries.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

Mandatory EE targets would require a limited number of major changes to the general framework conditions and would be consistent with the broad regulatory and legal conditions in place. Particularly, imposing targets on large industrial enterprises as part of typical requirements associated with operating permits and licences should be relatively straightforward and feasible in the short term once a sub-sector (e.g. steel or petrochemical) is defined and realistic targets are estimated.

Potential Sources of Financing

Although some ambitious targets are implemented with government funding to support them, in many cases with mandatory targets imposed on large emitters, financing of the improvements can be largely left to these emitters to absorb as a cost of doing business. As for difficult targets involving more risks associated with new or unfamiliar technologies, a dedicated fund offering below-market borrowing costs may be appropriate.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

Targets are already in use in Saudi Arabia at the national and sectoral levels (Table 44[67]) and can create synergy among the targets and with other instruments in place.

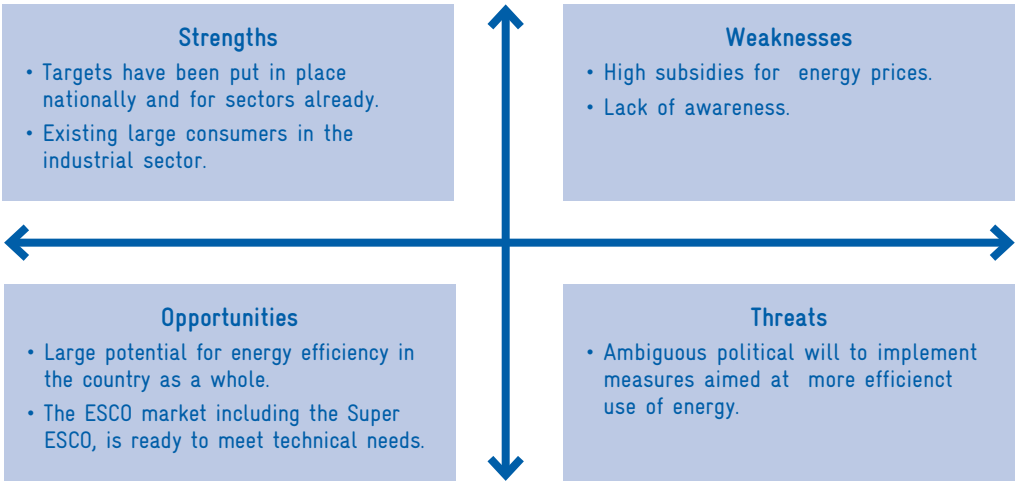
65 Saudi Energy Efficiency Center (SEEC) website. Retrieved from https://www.seec.gov.sa/en. Consulted on July 18, 2019.

66 Regional Center for Renewable Energy and Energy Efficiency (RCREEE) & UNDP. Figure 16 on page 86. Arab Future Energy Index (AFEX), Energy Efficiency 2017.

67 Derived from Lahn, G. (2013). "Targets to promote energy savings in the Gulf Cooperation Council States". Energy Strategy Reviews 2 (2013) 19-30. https://doi.org/10.1016/j.esr.2013.03.003

Table 44: Targets and Standards Affecting Energy Use in the GCC and KSA	
National Targets and Standards	**Status in Saudi Arabia** **(M – mandatory standard at national level** **A – aspirational standard or under proposal** **P – partial/sector-specific)**
Nationwide energy efficiency or conservation target	A
Electricity sector conservation target	A
Electricity sector peak demand reduction target	A
Renewables deployment target	M
Nuclear introduction target	M
Energy efficiency labelling	P
Appliance standards	P
Mandatory efficiency codes for new buildings	M
Efficiency or conservation target for oil and gas sector	P (national oil company target)

Figure 28: SWOT Analysis



3.3.4 The Mechanism for Replacing the Stock of Energy-using Equipment and Appliances in Saudi Arabia

Alignment with the National Strategies and Policies

Overall, the mechanism for accelerating replacement of the stock of energy-using appliances fits in well with the Saudi Arabia's significant efforts to enforce the EE standards and regulations, as explained below.

- Since 2010, the SEEC has been responsible for creating binding EE standards. The EE standards became legally valid upon being published by the Saudi Standards, Metrology and Quality Organization (SASO).[68] The customs office (Saudi Customs, under the Ministry of Finance) and Ministry of Municipal and Rural Affairs (MOMRA) are responsible for implementing the standards. The work of these two agencies is supported by reference laboratories and is a key element in implementing the mechanisms for replacing the stock.

- Since 2013, the SEEP's activities have helped jump-start the EE efforts in KSA by designing a comprehensive integrated framework consisting of several key components and enablers, as summarized below.
  - In 2013, SEEP implemented two initiatives, namely an energy standard for washing machines and refrigerators, and a standard for small air-conditioners.
  - In 2014, 12 initiatives were implemented: a standard for large air-conditioners, standards for residential lighting and commercial facilities, an Open Leaders Initiative, a media campaign, an ESCO accreditation system, a new standard for small air-conditioners, a new standard for washing machines and refrigerators, a sticker for fuel-efficient vehicles, an energy efficiency regulation for existing industrial facilities, and minimum performance specifications for electric motors.
  - In 2015, the initiatives included the following: a standard for state institutions, a grant programme specifically intended for efficient air-conditioning systems, energy efficiency loans for the industrial sector, specifications for new industrial plants, and several measures to effectively enforce the already implemented standards.
  - In 2019, a new EE standard for air-conditioning systems in buildings is currently being discussed. Other standards for lighting in residential buildings and commercial facilities, as well as standards for large household devices such as washing machines, dishwashers and refrigerators and freezers have already been implemented.

- The second phase of the NEEP was supported by the United Nations Development Programme (UNDP) until the end of 2015. It had included drafting an initial energy-saving law and enforcing energy-saving measures and regulations for saving energy at the national and local levels.

- According to state guidelines[69] (Vision 2030), EE should play a role in meeting the increasing energy demand, in addition to meeting the need for increased production and diversification of energy sources.

All these efforts could accelerate the replacement of the stock of energy-using appliances. Saudi Arabia's context is favourable for developing and implementing this mechanism.

Market Potential

The potential market applications are multiple because Saudi Arabia is facing energy demand problems due to steady growth of energy demand in the buildings sector, which accounts for 29% of the final consumption. Therefore, there is strong interest in decreasing energy consumption by replacing old energy-consuming equipment with new energy-efficient ones, for example.

The main sector of application should be the residential sector, which accounts for 49.6% of the country's electricity consumption[70], far more than the commercial, industrial and governmental sectors (16.7%, 16.4% and 13.3% respectively).

In the residential sector, with regard to air-conditioning, the SASO has made great efforts in developing the SASO 2663 standard with energy labelling and minimum energy performance requirements for air conditioners (phase 1, 2013; and phase 2, 2015). The next step is to develop a residential air conditioning incentive programme to complement the standards and labelling procedures, speed up the market penetration of more energy-efficient products, based on the *Energy Savings Analysis of a Recommended Residential Air Conditioning Incentive Programme in Saudi Arabia.*[71]

68 Saudi Standards, Metrology and Quality Organization (SASO) website. Retrieved from https://www.saso.gov.sa/en/pages/default.aspx. Consulted on July 11, 2019.

69 The Kingdom of Saudi Arabia. Vision 2030. Retrieved from https://vision2030.gov.sa/en/node/94. Consulted on July 11, 2019.

70 King Abdullah Petroleum Studies and Research Center (KAPSARC). (2017). "Electricity Consumption by Sectors". Retrieved from https://datasource.kapsarc.org/explore/dataset/electricity-consumption-by-sectors/analyze/. Consulted on July 15, 2019.

71 Faisal Fahad Al-Musa. (2018). "Energy Savings Analysis of a Recommended Residential Air Conditioning Incentive Programme in Saudi Arabia". IntechOpen.

Barriers to Implementation

The implementation of this EE instrument could face the following main barriers:

> High subsidies for electricity tariffs, which make replacement of existing appliances by more efficient ones not quite profitable or attractive for end-users.

> Lack of information and awareness among consumers.

> Quite high upfront prices of efficient products.

> Complexity associated with implementing the instrument, particularly the control and the monitoring.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

The SEEC and the SASO jointly issued air-conditioning labelling requirements preventing all non-efficient air-conditioners from being sold in the country several years ago. This quite successful programme has laid the foundation for this instrument, which can be considered a similar type of activity. In this case, a limited number of changes to the legal and regulatory framework conditions would be needed.

Potential Sources of Financing

The mechanism could be financed as follows:

> The government, utilities and distributors can invest part of their revenues (which basically come from taxpayers) into incentives and penalties programmes.

> Loans from national banks.

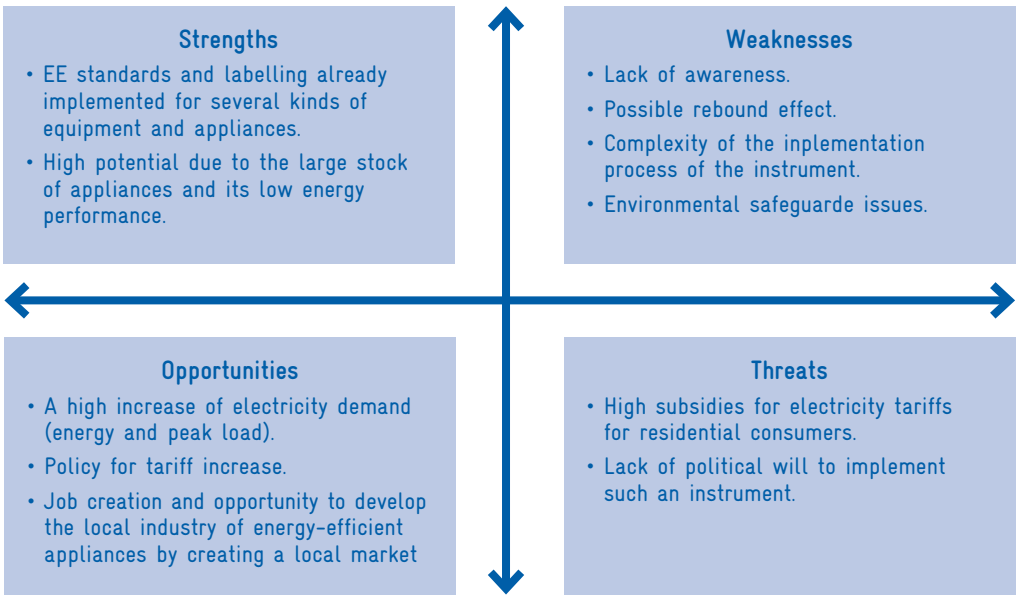
Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

> Strong synergy with the existing SEEC-SASO joint equipment labelling programme, which is likely to help simplify the process of defining the kinds of eligible equipment in the market and the kinds that should be replaced through a programme.

> Strong synergy with the EE obligations to be imposed on utilities.

> This instrument could strongly complement the existing national aspirational programmes and the 2030 vision in addition to the commitment to the international climate agreements.

Figure 29: SWOT Analysis



3.3.5 The Voluntary Agreement in Saudi Arabia

Alignment with the National Strategies and Policies

VAs are often adopted by energy-intensive sectors to contribute to the national effort while reducing business energy costs. This fits in well with the energy consumption structure of Saudi Arabia whose industrial sector accounts for 44 percent of final energy consumption; in the industrial sector's total energy consumption, 70 percent is consumed by a few main energy-intensive subsectors, such as steel, petrochemicals, cement and aluminium. Taking into account the relatively small number of companies in these subsectors, it would be straightforward for them to enter into a collective VA and establishing EE targets.

Some of these companies belong to international groups (cement, for example), are familiar with such approaches, and can play a leadership role in launching an agreement process. Hence, VAs are in line with the current context in Saudi Arabia.

Market Potential

The scope of actions by major large industrial enterprises in Saudi Arabia through VAs could be significant. The changes made to energy prices since 2016 were discussed in Section 3.3.1. Continued progress in pricing reforms is expected to create increasing opportunities for this instrument to be applied to improve EE throughout the economy. The very high carbon intensity of the Saudi economy also means that simple measures could have large impacts at low costs. Prices are the key variable because as prices are raised to international levels according to the government's current plans, demand management tools can produce positive effects.

Barriers to Implementation

The low energy tariffs and lack of awareness and information are the main barriers to the implementation of this instrument. Despite these barriers, this instrument could be adapted to the circumstances. The lack of political desire to take EE actions to address climate change or petroleum export needs appears to be the biggest potential hurdle.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

This flexible and turnkey instrument can potentially fit well into the existing framework conditions and would require few major changes. As demonstrated by many examples around the world, industrial enterprises identify funding from their operating budgets to implement cost-effective EE actions and, in so doing, become leaders in their industry. Considering the foreseeable changes expected in energy systems in the KSA, some forward-looking sectors may consider setting a good example. Government support could be required to address the lack of time and resources needed to develop and implement a VA.

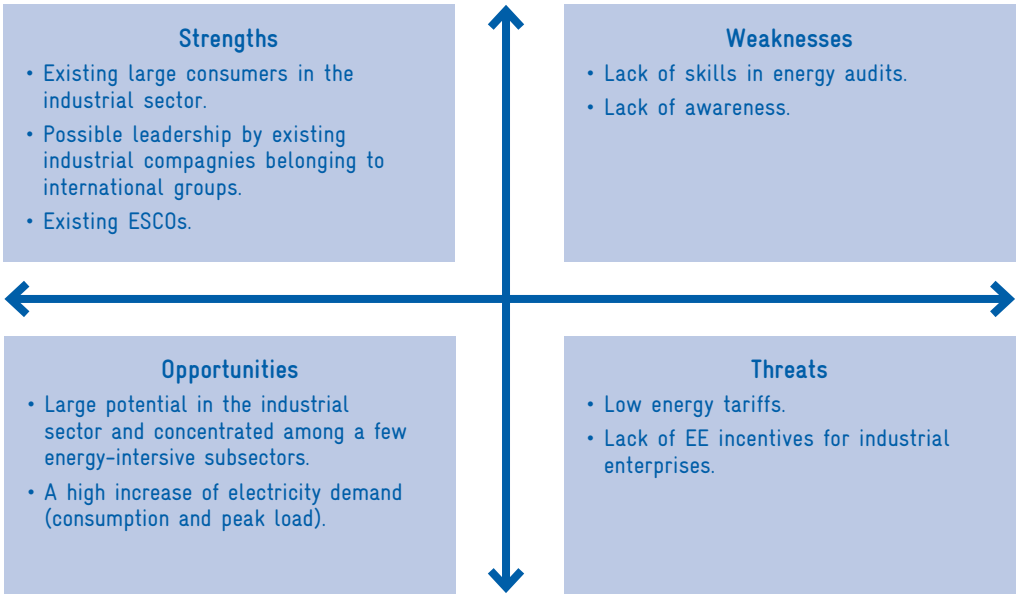
Potential Sources of Financing

As shown by many examples around the world, industrial enterprises find funding from their operating budgets in order to become leaders in their industry. Considering the foreseeable changes expected in the energy systems in the KSA, some forward-looking sectors may consider setting a good example. Probably, government support will be required to address the lack of time and resources needed to develop and implement a VA.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

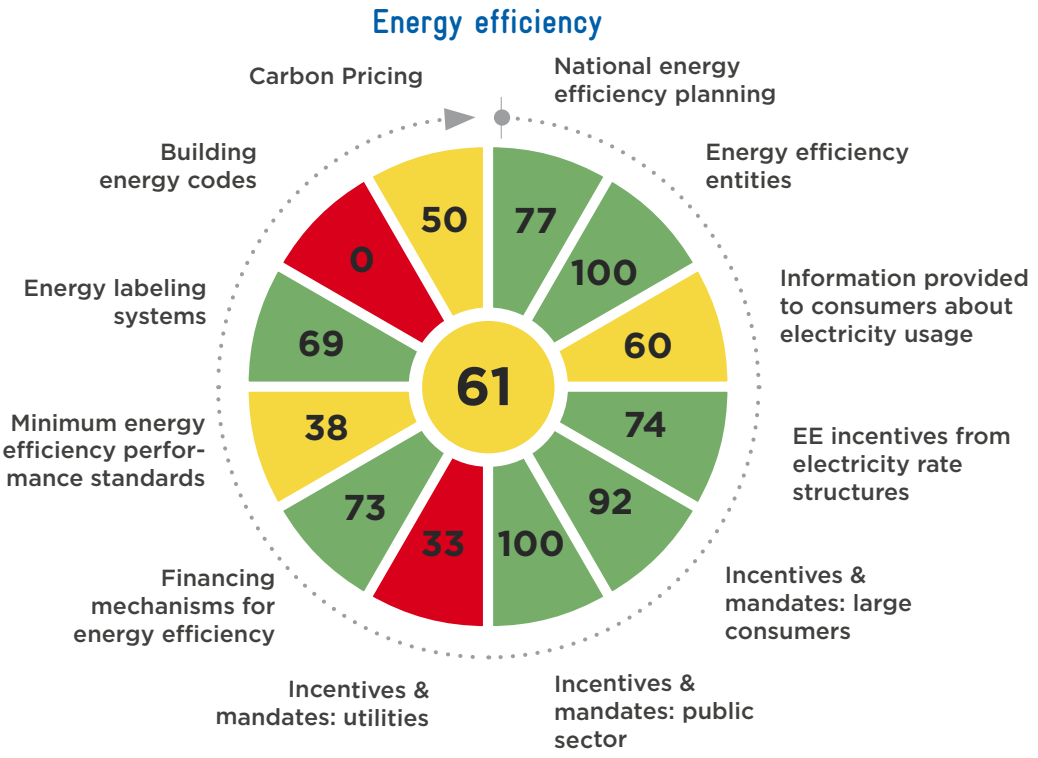
The voluntary agreement can be a first step in preparing for the implementation of the other instruments in KSA, such as mandatory energy-efficiency targets and EE obligations to be imposed on utilities.

Figure 30: SWOT Analysis



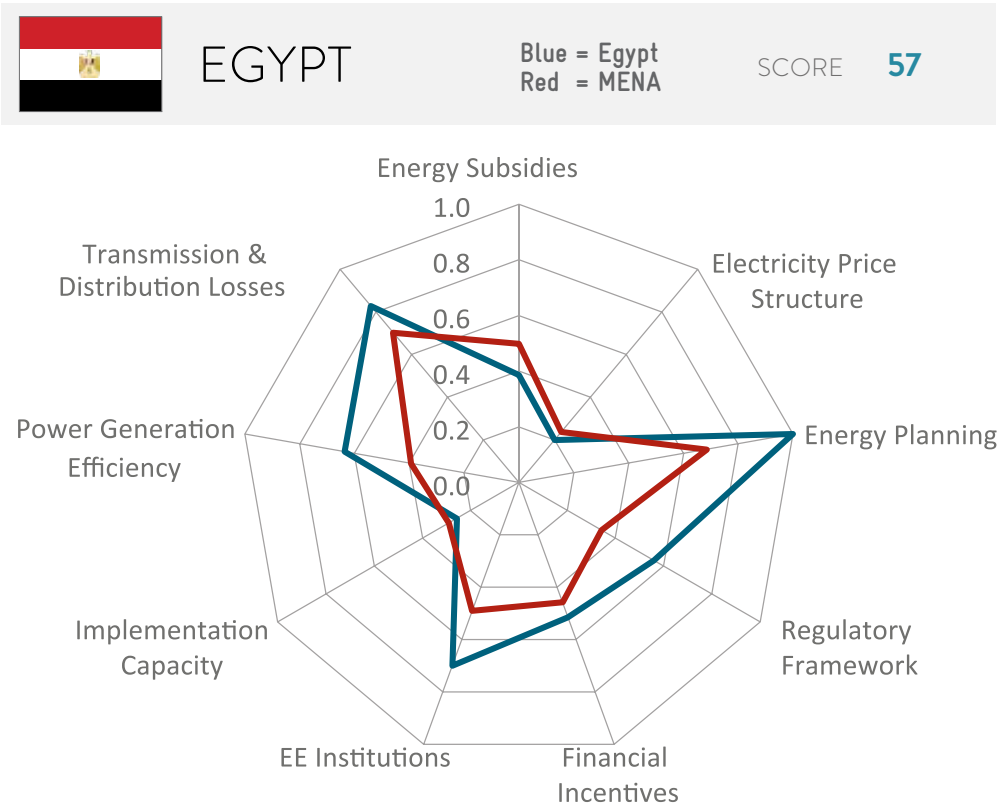
3.4 Egypt

Figure 31: RISE 2017 EE Score for Egypt



Source: RISE (2017): Regulatory Indicators for Sustainable Energy (RISE) Country Profile Egypt. Energy Sector Management Assistance Program, World Bank Group. Washington, DC. Retrieved from: https://rise.esmap.org/data/files/sections/rise_country_profiles.pdf

Figure 32: AFEX 2017 Spider Chart



Source: AFEX (2017): "Arab Future Energy Index 2017: Energy Efficiency", p. 7. RCREEE and United Nations Development Programme. Retrieved from: https://www.rcreee.org/sites/default/files/afex_ee_2017.pdf

3.4.1 Country Context

General Situation on Energy Efficiency and EEIs in Place or Planned

Egypt offers relatively poor general conditions for comprehensive implementation of energy efficiency policies, despite having enormous savings potential, particularly within the industrial sector. On the other hand, residential, commercial and public buildings account for almost 50% of the total electricity consumption. Oil imports and government subsidies have been a burden on the national budget. However, the effort to reduce subsidies for energy and electricity prices have begun (albeit with delays) and are being pursued by policy-makers, who expect to eliminate them by 2021. Overall, energy subsidies remain very high in Egypt and they account for 10% of the GDP. Subsidy cuts are also expected in 2019.

Electricity consumption is predicted to increase, creating a need for fast deployment of new power generation capacities.

In order to meet these challenges, the Egyptian government has taken some initial steps to improve energy efficiency. A summary of EEIs in place and their year of introduction is shown in Figure 33 below.

Figure 33: Energy Efficiency Policies and Regulations

Type	Description	Status	Year of introduction
Financial and/or technical assistance for voluntary energy audits	Several initiatives offer energy audits either free-of-charge or with partial contribution, including the Greenhouse Gas Reduction project, Industrial Modernization Centre and the Clean Production Centre.	Yes	Since 2000
Tax allowances	Various forms of tax deductions, allowances or rebates related to the purchase of EE equipment..	None	
Custom duties	Reduction and sometimes annulations of custom duty for energy efficiency components (customs duty on importing solar water heaters 2.5% and on importing compact florescent lamps 17%).	Yes	2006
Grants	Limited financial support for EE applications from the Industrial modernization Centre to medium and large industrial entities.	Yes	2010
Labels and standards	Minimum energy performance standards with mandatory labeling schemes have been adopted for refrigerators, freezers, washing machines, air conditioners, CFLs, and electric water heaters.	Yes	Since 2004
EE codes for new buildings	National building codes that include EE considerations issued for residential, commercial and administrative buildings.	Yes However, they are not yet applied.	Since 2007
EE fund	A fund to be financed by the government, donors and banks to give soft loans for bankable EE projects.	Under study	Not defined
Reduction of conventional energy subsidies	Prime minister's decree N. 2010/1953 concerning natural gas prices and decree N.2010/2130 concerning electricity prices.	Tariffs have been gradually increased particularly for energy-intensive industries.	Different years
Complimentary approaches	Incentives to encourage taxis to switch to natural gas, primarily for air pollution reasons. Progressive tax rate for car license renewal based on engine volume to encourage small cars. Vehicle emission limitations including CO2.	Yes	2002

Source: Leach, L. et. Al. (April 2014). "Overview of Egypt's Energy Efficiency Regulations". Egypt oil & gas newspaper.

The Egyptian government also adopted a new electricity law in 2015 (No. 87), which introduced articles aimed at improving energy efficiency and demand management in the electricity sector. These innovative articles include:

- Introducing the development of cogeneration through the obligation to purchase the excess electricity produced by the network operators according to a preferential tariff set by the regulatory agency.
- Introducing the obligation for large energy consumers (with contractual capacity exceeding 500 KW) to appoint an energy manager and keep a record of monitoring consumption and measures undertaken for their reduction.
- Introducing the obligation to Network Operators or Electricity Distribution Licensees to develop an annual plan to be approved by the regulatory agency to implement EE and DSM projects and programmes targeting electricity end-users.
- The enforcement of the labeling and MEPS for energy-using equipment.

Furthermore, the concept of ESCO has been applied in the country with mixed results. This dates back in the 2000s, together with Tunisia, Egypt was originally considered a pioneer of the first ESCO initiatives in the MENA region. However, the local ESCO market remains underdeveloped, partly because electricity consumers are hesitant about EPCs and partly because financial institutions generally do not recognize EE measures as loan collateral. High energy subsidies and a lack of technical experience also contribute to weak market development.

In terms of capacity-building, back in 2012, Egypt was introduced to the European Energy Manager Programme (EUREM). EUREM is a standardized programme with a network platform offering practical occupational training in the field of industrial energy efficiency.

Egypt has also introduced the Pan Arab Certified Energy Management Professionals programme (PA-CEMP), a professional certification programme for energy managers tailored to the Arab region. This PA-CEMP programme was developed by the RCREEE in collaboration with the League of Arab States Energy Department.

In May 2015, the former Egyptian Minister for the Environment, Dr. Khaled Fahmy, in cooperation with the UNIDO, launched the national "Kafa'a" initiative with the aim of raising awareness of the benefits of energy efficiency measures in the industrial sector.

General Supportive Framework Conditions and Barriers in the National Context

From a historical perspective, major barriers for EE market solutions and instruments in Egypt have included difficult state regulations, complex decision-making processes and the inefficient bureaucracy within the government. However, in recent years, Egypt has made progress in implementing sustainable energy policies, including EE. These include several legislative packages and national long-term strategies, such as the National Energy Efficiency Action Plan (NEEAP) 1 & 2, Vision 2030, and the Sustainable Energy Strategy 2035. The second edition of the NEEAP (2018-2022) includes more sector-specific savings targets. Reform packages in the energy sector were partly linked to the generous allocation of international loans worth billions of U.S. dollars.

On the other hand, there is a mixed picture regarding the financing conditions for EE in Egypt. In general, there is willingness to implement measures and Egypt offers great efficiency potential, particularly in the industrial sector, but financing conditions for EE from the government and banks are fraught with risks. For international investors, the high, falling inflation rate (20.1% in 2018) and high interest rates (16.75% key interest rate) make it a less attractive market than other countries in the region.

Although the Egyptian economy is slowly recovering, the high level of national debt (103% of the GDP in 2018), dependence on and vulnerability to global energy prices, and the fragile tourism industry pose risks to future development.

Despite the barriers to the energy efficiency market described above, Egypt is one of the most important countries in the region for investment in EE because of the political will for transformation, the size of the country, its high level of industrialization, its high energy-saving and modernization potential and, last but not least, because of Egypt's huge geopolitical and economic importance.

Expected Future Developments

The implementation of the energy efficiency framework and strategies adopted by Egypt is progressing slowly and is uncertain in many areas. Despite relatively high savings ambitions, there is little desire to implement energy efficiency measures in the industrial, commercial and residential sectors. Nevertheless, the development of an EE unit within the Ministry of Electricity and Renewable Energy is expected to enable the government to carry out the plans being drafted for Egypt's second NEEAP.

When it comes to investment decisions, energy efficiency plays virtually no role, although a change in this type of thinking is slowly becoming noticeable. All activities are subordinate to the goal of economic stability and governmental authority. However, reduction of fuel subsidies has been implemented and it is expected that 2019 will see another cut.

3.4.2 Auction systems for EE in Egypt

Alignment with the National Strategies and Policies

As summarized below, overall, the auction system for EE fits in well with Egypt's national strategies and its previous experience with auctions, although the auction scheme has been only applied to the implementation of renewable energy (RE) projects

Egypt's National Strategies

- In February 2008, Egypt's Supreme Council of Energy announced an ambitious plan to increase renewable energy generation by up to 20% of the total mix by 2020, including a 12% contribution from wind energy, translating into 7,200 MW of capacity from grid-connected wind farms.[72]

- In 2015, a new National Renewable Energy Strategy was adopted and stipulated that a renewable-energy auction mechanism shall be introduced in Egypt for future renewable energy capacity procurement. In 2014, a Presidential Decree was released to enact the Renewable Energy Law (Decree No. 203/2014), which gives the permission to establish a competitive bidding mechanism for granting build-own-operate (BOO) contracts.[73]

- In May 2015, the former Egyptian Minister for the Environment, Dr. Khaled Fahmy, in cooperation with the UNIDO, launched the national "Kafa'a" initiative[74] with the aim of raising awareness of the benefits of EE measures in the industrial sector. This initiative could help raise awareness of the huge potential for improving EE in the industrial sector and developing and using EE auction programmes.

Previous Experiences with Auctions

In the early 1990s, the National Renewable Energy Authority (NREA) started the competitive bidding process for developing government-owned renewable-energy-based power generation capacity projects.

In 2009, the Egyptian Electricity Transmission Company (EETC) launched the first auctions for large-scale private projects using the BOO scheme, where the NREA secured the land and provided data on the available resource. In the following years, a number of other tenders were launched by EETC, including the following: 200 MW solar PV in 2013; 250 MW wind power; 200 MW solar PV and 100 MW concentrated solar power (CSP) in 2015 (Eversheds and PricewaterhouseCoopers, 2016).[75]

Today, the EETC is seeking to utilize auctions for procurement of solar and wind power plants, employing competitive bidding for large-scale solar and wind projects with the support of the European Bank for Reconstruction and Development (EBRD). The designed policy is expected to provide bid winners with engineering-procurement-construction or BOO contracts to help lower the perceived investment risks.

Market Potential

The industrial sector is the largest energy consumer, accounting for about 43% of the total energy consumption. The specific average energy consumption level for each unit of production exceeds the global average, which could amount to 20% energy savings, representing almost 10% of the country's energy needs. These savings could in turn help solve the current energy crisis faced by the country and caused by the lack of energy supplies.

Barriers to Implementation

- A long and exhausting tendering process of the auction system due to:
  - The Egyptian authorities' intention to carefully organize its first ambitious RE auction process, considering its lack of experience in this domain.

- A lack of will to implement and a lack of technical expertise and awareness regarding many energy-intensive sectors.

- There is insufficient capacity among local EE service providers or ESCOs to bid and effectively and efficiently implement and manage complex EE auction projects.

- EE has been a low priority of the industry due to low energy prices supported by subsidies and preference for second-hand equipment.

- No designated EE agency is responsible for developing, promoting and implementing EE measures and policies. However, now an EE unit at the Council of Ministers' secretariat has been identified as the entity mandated to develop and implement the NEEAP.

72 IEA. (2008). "New National Renewable Energy Strategy". Retrieved from https://www.iea.org/policiesandmeasures/pams/egypt/name-24583-en.php. Consulted on July 17, 2019.

73 IEA. (2014). Egypt Renewable Energy Law (Decree No. 203/2014). Retrieved from https://www.iea.org/policiesandmeasures/pams/egypt/name-157164-en.php. Consulted on July 17, 2019.

74 IEE Egypt. (May 2016)."Minister of Environment Launched "Kafa'a", the First Industrial Energy Efficiency Campaign in Egypt". Retrieved from http://ieeegypt.org/minister-of-environment-launched-kafaa-the-first-industrial-energy-efficiency-campaign-in-egypt/. Consulted on July 17, 2019.

75 International Renewable Energy Agency (IRENA) / National Renewable Energy Authority (NREA). (2018). "Renewable Energy Outlook Egypt".

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

Few regulatory and legal framework conditions are in place. In fact, in terms of regulations, Egypt needs to develop the legislation for supporting auction systems for not only RE but also EE.

Egypt should take the following main measures to facilitate the development of the auctions system for EE:

> Creating an EE-regulatory agency or a similar institutional framework fulfilling the same function.

> Implementing energy policies and EE targets, for example, through NEEAPs.

> Creating a dedicated EE fund, EE revolving funds or EE credit lines in domestic financial institutions.

> Training potential stakeholders and educating and informing them about potential EE auction programmes to be implemented in various sectors.

Potential Sources of Financing

> The Egyptian government through budgetary requests for EE.

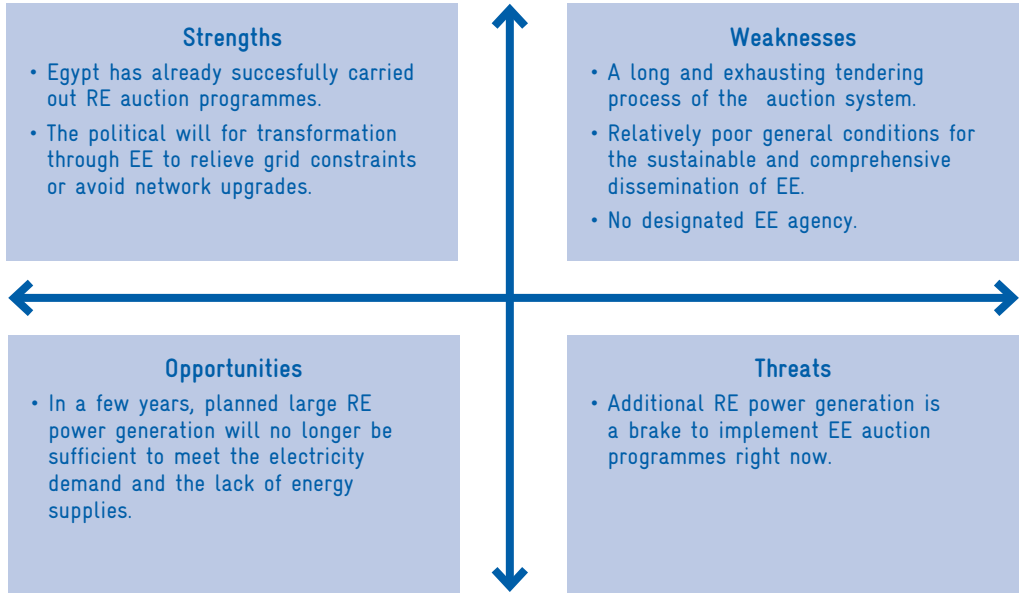
> International development organizations and banks, such as the EBI, the KfW, the *Agence Française de Développement,* the European Commission, etc.

> Funding programmes:
  – The Global Energy Efficiency and Renewable Energy Fund (GEEREF), which provides venture capital and loans for EE and RE investments, and technical support.
  – The Green Economy Financing Facility (GEFF) programmes, which invest in EE projects.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

> Complements the mandatory the EE target instrument and the mandatory EE scheme instruments.

Figure 34: SWOT Analysis



3.4.3 Utility-managed EE programmes in Egypt

Alignment with the National Strategies and Policies

Since the 1970s, Egyptian officials have been talking about phasing out fuel and electricity subsidies to private consumers and the industrial sector. Finally, in July 2014, the Egyptian government introduced a five-year plan to phase out electricity subsidies by 2019 and announced an increase in fossil fuel prices. This plan has been delayed and the deadline is now 2021; there is pressure from government officials to delay it even more due to possible civil unrest and fragile government stability. The market's financial incentives to implement energy efficiency measures are expected to improve in line with Egypt's subsidy reform programme.[76] Phasing out energy subsidies will cost consumers. EE incentive programmes like utility obligations can help consumers reduce their energy use and, consequently, the financial burden of the subsidy reform. It is also important to include social safety net programmes and other mitigation mechanisms to support the poor and vulnerable.

Like many countries in the region, electricity shortage is often due to the cost and availability of imported fuel and is therefore a key motivator for improving EE. Relieving the energy shortage requires balancing more expensive supplies with the demand of sectors most responsible for increasing electricity use, i.e. the industrial, residential and service sectors. Obligating utilities to invest in EE in those sectors would be well aligned with existing policy needs.

The new Egyptian Electricity Law (No. 87) adopted in 2015 introduced the obligation for network operators and electricity distribution licensees to submit an annual plan to be approved by the regulatory agency for the purposes of implementing EE projects and demand-side management (DSM) programmes targeting electricity end users. When issuing a licence validity certificate, the agency should verify the extent to which the annual plan has been implemented.

Egypt has implemented a limited energy-using equipment replacement programme for CFL light bulbs. This programme was implemented by distribution companies and achieved measurable success.[77]

Market Potential

Utility-managed EE Programmes are a way to finance and run activities to promote the implementation of EE measures for end-users. The customer bases targeted by utilities depend on factors including local regulations, customers' energy demand patterns, objectives of the utility in curtailing or shifting demand for electricity, incentive programmes, financing and customers' incentives to manage their electricity demand.

Figure 35 below shows the size of the sectors, their estimated potential savings, and the targets set by the government by 2022.[78] Significant potential can be observed in the industrial, residential, commercial and tourism sectors, which are all well suited for the programme. Governmental and public sector EE project implementation can also serve as important demonstration projects and help move the market forward at the initial stage.

Figure 35: Estimated Percentages of Energy Savings and Targeted Percentages of Reduction by 2022 Set by the Egyptian Government

Sector	Percentage of energy use (%)	Estimated saving percentage (%)	Saving percentage of the total use (%)
Industry	47	20	9.4
Transportation	29	15	4.5
Residential, commercial and tourism	20	15	3
Governmental and public uses	3	15	0.45
Agriculture and irrigation	1	5	0.05

76 Sakr, D., & Abo Sena, A. (2017). "Cleaner production status in the Middle East and North Africa region with special focus on Egypt". Journal of Cleaner Production, 141, 1074–1086. doi:10.1016/j.jclepro.2016.09.160

77 See UNDP Project Document, "Improving the energy efficiency of lighting and other building appliances". Retrieved from https://info.undp.org/docs/pdc/Documents/EGY/00060162_Final%20Draft%20-%20Project%20Document.pdf

78 Figure 34 includes fuel products, natural gas and electricity, El-Sobki, 2014 in Sakr (2017).

Industrial companies in Egypt are in an early phase of the clean production process. They were generally reactive to government-sponsored and international donor-sponsored programmes over the last 20 years. These programmes were typically based on the belief that if financing and technical support through audits was available, then company leaders would appreciate the benefits and emulate early adopters of EE initiatives. Current research and experience show that without strong financial incentives the market does not move forward.

Barriers to Implementation

As discussed above, the main barrier has been the continued subsidies. Increasing energy costs may cause more consumers to be interested in energy-efficiency measures and projects that involve direct spending on EE measures targeting consumers.

Other barriers include the following: 1) difficulty in making EE-related corporate and management decisions; 2) a lack of data to inform policy-making; 3) a general lack of awareness of EE as a cost saving solution with reasonable paybacks; 4) a lack of capacity to design, evaluate, implement, manage and optimize EE projects and programmes.

In addition, Egypt is also facing the barriers commonly faced by many countries in the region, including weak recognition of energy savings from efficiency investments, the small size of projects, and a lack of information and capacity to manage EE project financing.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

To launch a mandatory EE scheme, the Egyptian government will need to establish an EEOS regulation and procedures, design and set up an EEOS accounting and monitoring system and, above all, approve policies that render EEOS mandatory. The EEOS regulation could be based on Article 49 of the Electricity Law (No. 87).

Network Operator or Electricity Distribution Licensee shall apply a proposed annual plan to be approved by the Agency for the purpose of implementing projects and programmes serving the Consumers in the following fields:

> *Management of Electric power demand.*

> *Improvement of electric power usage efficiency.*

> *Promotion for renewable energy uses.*

> *Raising awareness of power usage efficiency.*

In the course of issuance of a license validity certificate, the Agency shall verify the scope of applying the annual plan.

Once the system is in place, eligible actions and obligation levels for each actor need to be defined. A top-down approach can be used by first setting obligations at the national level based on the government's EE targets. Then, obligations can be set for every kind of entity in each sector. These obligations are defined according to the method chosen for accounting for and measuring energy savings. Obligations can be set for a period of two years to allow the mechanism to become firmly established. A monitoring system should be used to help ensure consistency between achieving targets for both energy efficient products and obligated entities.

Potential Sources of Finance

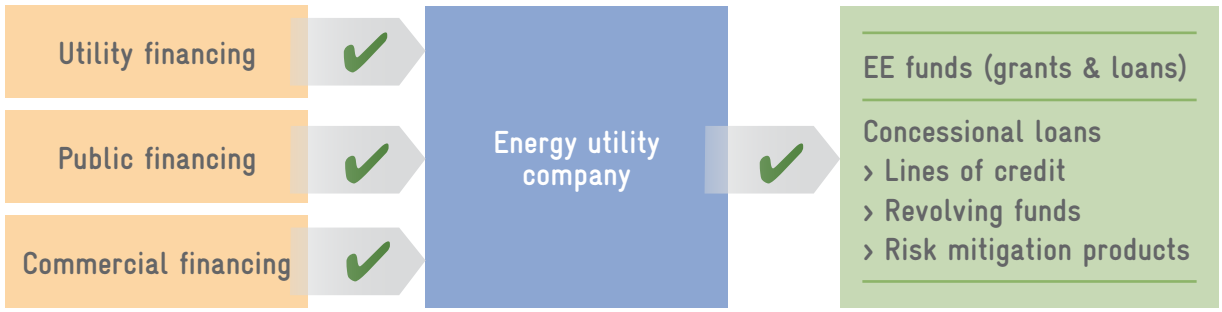
The financing needed for the EE obligation scheme can be provided by the utility directly through a public fund (often raised through public benefit charges) or through commercial financing by a third party, such as a local or international financial institution (see Figure 36[79]).

Ratepayer-funded EE programmes have been successful in regulated electricity markets, allowing regulators to mandate utilities to undertake EE programmes on a cost-recoverable basis. A system-benefits charge, such as those used in Brazil and the United States, is collected from all ratepayers to fund EE programmes. In the United States, this varies from state to state and is generally a fixed amount added to each kWh charged to customers. A regulator or state agency serves as the administrator of the funds, which are allocated to utilities or other public and private agencies, including ESCOs, to undertake EE programmes.[80]

79 Sinton, J. et. Al. (2016). The World Bank Group. "Delivering Energy Efficiency in the Middle East and North Africa Achieving Energy Efficiency Potential in the Industry, Services and Residential Sectors", pp. 46. Retrieved from http://documents.worldbank.org/curated/en/642001476342367832/pdf/109023-WP-P148222-PUBLIC-DeliveringEEinMENAMayEN.pdf

80 Sinton, J. et. Al. (2016) "Delivering Energy Efficiency in the Middle East and North Africa Achieving Energy Efficiency Potential in the Industry, Services and Residential Sectors". The World Bank Group http://documents.worldbank.org/curated/en/642001476342367832/pdf/109023-WP-P148222-PUBLIC-DeliveringEEinMENAMayEN.pdf

Figure 36: Sources of Utility Financing and Available Financing Options

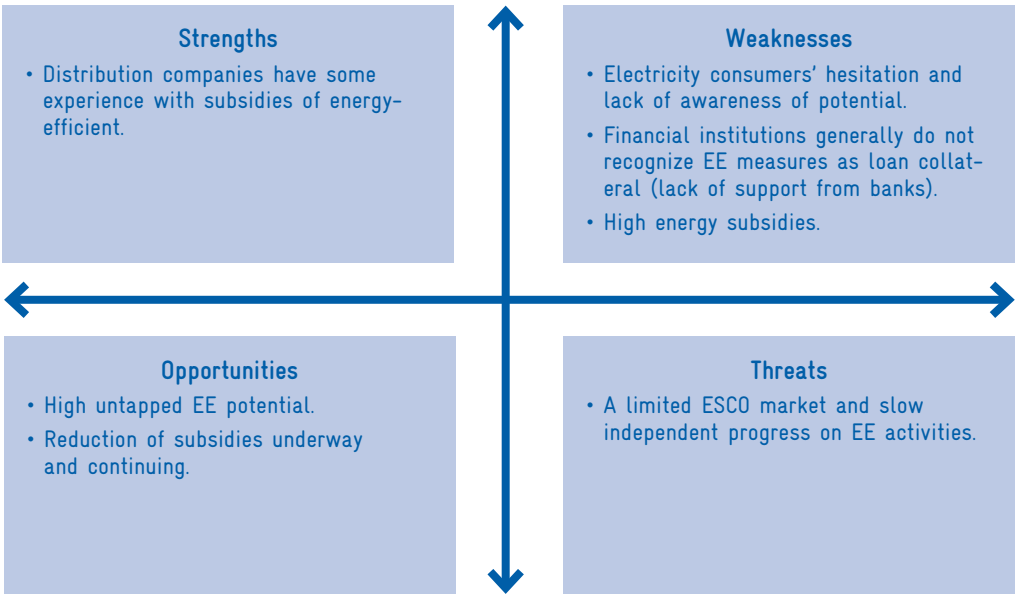


Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

If Egypt choses to use utility-managed EE Programmes as a policy instrument, it can be implemented in only the industrial sector or also in other sectors (such as residential and commercial sectors). The obligated parties shall not be allowed to receive subsidies, except for energy audits and technical assistance. The use of subsidies can be relevant at a later stage, when Egypt's domestic energy prices have reached the average level of international energy prices.[81]

Utilities can benefit directly from EE programmes, because the reduction in peak demand will reduce or delay the need to invest in additional generation capacity. But an awareness-raising or capacity-building programme may be required to encourage participation among the utilities.

Figure 37: SWOT Analysis



81 Togeby, M. et. Al. (2014) "Industrial Energy Efficiency Policy International practice and experience analyzed for application in Egypt". UNIDO. Retrieved from https://open.unido.org/api/documents/4676973/download/Industrial%20Energy%20Efficiency%20Policy%20International%20practice%20and%20experience%20analyzed%20for%20application%20in%20Egypt

3.4.4 Creating Networks with Voluntary Goals in Egypt

Alignment with National Strategies and Policies

Egypt has already set several national targets related to energy consumption and climate change mitigation. Overall, creating networks with voluntary goals are in line with Egypt's national strategies and initiatives. Basically, the sustainable energy strategy of Egypt aims to reduce energy consumption by 18% by 2035. The Sustainable Development Strategy and Egypt's Vision 2030 serves as a roadmap for the country to achieve its desired sustainable development goals over the next 15 years.[82]

Implementation of these strategies can be supported by creating networks with voluntary goals in each industrial sub-sector, commercial or the public buildings sectors.

Market Potential

Although EE did not play a prominent role in Egypt's past energy strategy, it has now become a high priority. Egypt is now trying to address EE on both the demand and the supply sides and the EEN instrument will help them to reach this goal. Indeed, EENs can involve large consumers in a collaborative process to analyze EE potential in sub-sectors, set and monitor joint energy consumption targets and jointly implement EE measures. As the industrial sector is the largest energy consumer, EENs can be an effective and efficient means of ensuring that higher-level targets and plans are achieved.

Because there is little reliable data and information about energy use by various subsectors, key industries, categories of equipment and appliances, EENs would be a great opportunity to improve the data and information reliability through energy audits and monitoring processes.

Barriers to Implementation

Egypt is facing the following main barriers that need to be addressed in order to have the best condition needed to create networks with voluntary goals in the country. (These barriers may also be relevant to other instruments):[83]

- Energy prices are well below costs and do not encourage consumers to implement EE at their facilities.
- There is little reliable data and information on energy use by various subsectors, key industries, categories of equipment and appliances;
- There are no incentives to support EEN activities because of a very tight government budget.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

EENs will require making almost no major changes to the general framework conditions and will be consistent with the major regulatory and legal conditions in place.

Nonetheless, if the government provides financial incentives and subsidies for network participation, particularly during the pilot demonstration phase of EENs, a complementary regulatory and policy framework can be set up, including the procedures for tracking and support for training and tools for network operators, consulting engineers and moderators.

Potential Sources of Financing

Although the EEN operates on a voluntary basis, it is often incentivized by existing regulatory and policy frameworks. As such, they can exist with or without government intervention. In the Egyptian context:

- Because the government budget is tight, the EEN cannot count on incentives to contract an energy consultant to conduct an energy audit to take stock of their individual energy- saving potential and other activities.
- The participating companies pay a membership fee, which can address the lack of incentives from the government.
- The network operator or moderator may channel support from funding agencies, such as the EBRD, the *Agence Française de Développement (AFD),* the European Investment Bank (EIB), etc.

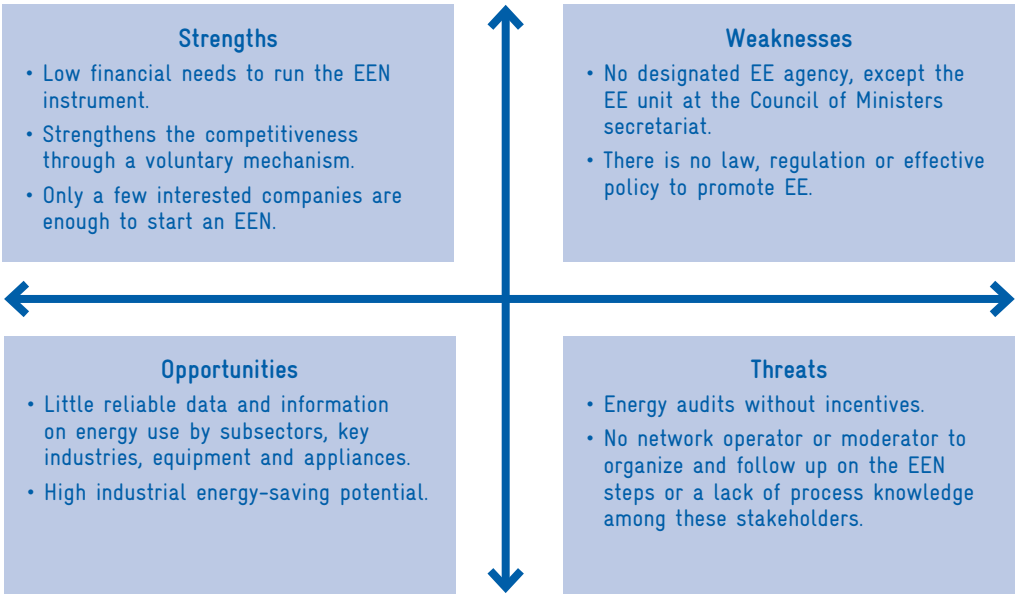
Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

- Complements the mandatory EE target and mandatory EE scheme instruments.

82 "Sustainable Development Strategy; Egypt's Vision 2030" report, 2015, https://www.greengrowthknowledge.org/sites/default/files/downloads/policy-database/Egypt%20Vision%202030%20%28English%29.pdf. Consulted on July 19, 2019.

83 "Clean Energy Development in Egypt", AFDB 2012, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Cata%20Energie%20Anglais.pdf

Figure 38: SWOT Analysis



3.4.5 The Super ESCO in Egypt

Alignment with the National Strategies and Policies

Due to the untapped EE potential in public buildings (up to 50% in some cities), Egypt presents ideal conditions to establish a Super ESCO. The Super ESCO is a unique opportunity to carry out and implement EE projects in the public sector by identifying and developing EPC projects. Moreover, there is a strong push from the Egyptian government to improve EE by creating institutional capacities (e.g. EE units within ministries). It also fits well with Egypt's long-term strategies outlined in the NEEAP 1 and 2, the Vision 2030 and the Sustainable Energy Strategy 2035.

As an instrument that depends on the governmental support and a strong private ESCO market, the Super ESCO has the potential to accelerate implementation of EE projects in the public sector. An example of a project that might be linked to a potential Super ESCO initiative is the "Shamsek ya misr" initiative, under the Egy-sun initiative[84], which implements pilot projects with combined RE/EE investments funded by a grant of EUR 1 million from the EU. This initiative was launched back in February 2014 by the energy efficiency unit (EEU) aiming to promote energy-efficient lighting along with PV systems in public buildings in Egypt. The initiative was backed by decrees issued by the supreme council of energy and the ministerial council on promoting EE and RE.

Market Potential

At the beginning, the Super ESCO should focus on incentivizing ESCOs to participate in public procurement for the public sector, although it will be possible to provide services to private facilities in the future in a more mature energy performance contracting market. In cities like Cairo, the realizable energy savings potential is estimated at between 30% and 50%[85] due to a substantially higher need for cooling compared to benchmarked cities.

Public buildings include government administration offices, police stations, hospitals managed by the Ministry of Health and Population, schools, and universities managed by the Ministry of Education. According to the Central Agency for Public Mobilization and Statistics (CAPMAS), there are 345,078 public buildings in Egypt, representing about 3% of the buildings stock in the country. These public buildings and utilities represented 11% of the electricity consumed in Egypt in the 2013-2014 period.

84 The World Bank, the Arab Republic of Egypt / Egypt Energy Efficiency Implementation: Energy Efficiency and Rooftop Solar PV Opportunities Report Summary, June 15, 2017. Consulted on http://documents.worldbank.org/curated/en/578631498760292189/pdf/Final-Output-Summary.pdf

85 The World Bank, the Arab Republic of Egypt / Egypt Energy Efficiency Implementation: Energy Efficiency and Rooftop Solar PV Opportunities Report Summary, June 15, 2017. Consulted on http://documents.worldbank.org/curated/en/578631498760292189/pdf/Final-Output-Summary.pdf

Barriers to Implementation

In addition to be an initiative to tackle EE in public buildings, the Super ESCO is also a tool for the government to promote the ESCO industry across the country. The existing barriers include:

- Lack of access to more readily available and lower-cost sources of financing;
- Inadequate technical capabilities and need of training among ESCOs;
- A low level of awareness about performance contracting in the market;
- Local ESCOs' inability to effectively and efficiently implement and manage complex EPC projects;
- Difficulty developing projects in the public sector;
- High energy subsidies that disincentivize ECM retrofits in general.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

To advance implementation, Egypt would need to develop legislation to support ESCOs and develop EPCs in general. A recent paper prepared by the Energy Section of the Sustainable Development Policies Division (SDPD) of Economic and Social Commission for Western Asia (ESCWA)[86] provides an informative and helpful analysis of the measures that are being undertaken by Egypt and should be continued to facilitate developing the local ESCO market. These measures include:

- Creating an EE agency or a similar institutional framework;
- Developing legislation for supporting ESCOs and EPC-based EE implementation;
- Raising awareness among end users and consumers and promoting the benefits of working with ESCOs;
- Implementing energy polices and EE targets, such as through the NEEAP;
- Capacity-building of ESCOs;
- Reforming energy tariffs and rationalisation of subsidies;
- Creating a dedicated EE fund, EE revolving funds or EE credit lines offered by domestic financial institutions.

Potential Sources of Financing

Based on real-world experiences associated with the Super ESCO operations, such as Dubai (ETIHAD ESCO), India (EESL), and Belgium (FEDESCO, the Belgian federal corporation for energy services and third-party financing), the government funds the Super ESCO with sufficient means to carry out the initial public projects; once the market is mature, the Super ESCO can leverage available commercial financing. In the future, financing could come also from other sources, such as grants, loans or equity investments.

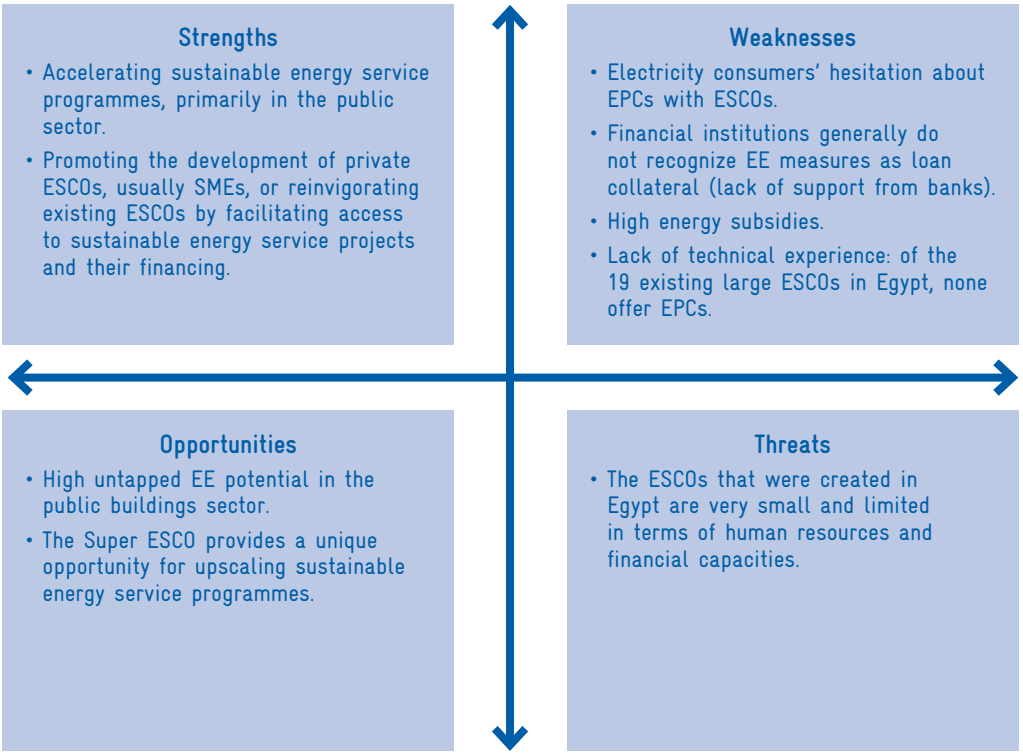
One of the options to make this initiative sustainable in the long run is to operate project financing as a revolving loan fund (RLF), where payments from project savings can be used to fund future projects. The fund revolves in the sense that the loan repayments are reused for similar projects, and the same capital is circulated again and again. An RLF could finance EPCs either in part or in full. Compared with a typical loan, an RFL's benefits may include lower interest rates and lower financing procurement costs. Lower interest rates for project financing reduce overall project costs over the lifetime of EPCs, which means lower interest rate payments.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

- The Super ESCO can help develop the ESCO market by:
  - Supporting training activities in the market;
  - Taking on the financial and technical risks, in part or in full, thus eliminating the financial barrier for ESCOs in the private sector.
- The Super ESCO can support instruments like the ESI by fostering the ESCO market, resulting in better EPCs and energy savings guarantees, and insurers being more confident to take some risks using the ESI mechanism.

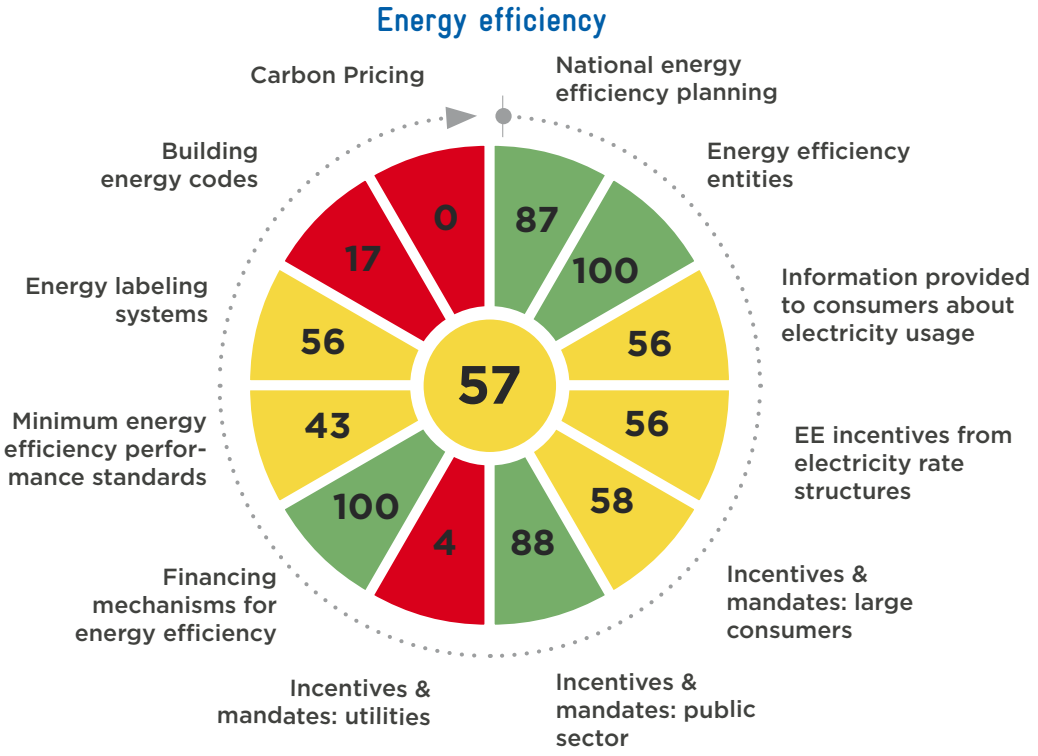
86 SPDP of ESCWA, "The role of Super ESCOs in upscaling energy efficiency in the Arab Region", April 5, 2019. Consulted on https://www.unescwa.org/file/88513/download?token=tatTEl8j.

Figure 39: SWOT Analysis



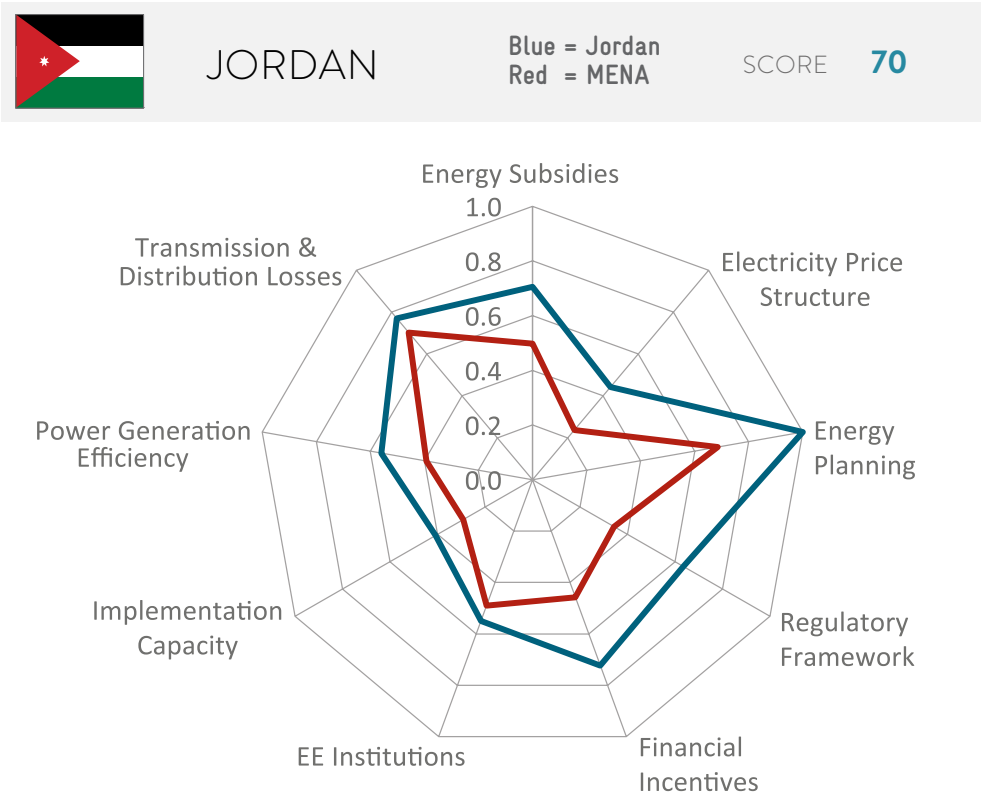
3.5 Jordan

Figure 40: RISE 2017 EE Score of Jordan



Source: RISE (2017): Regulatory Indicators for Sustainable Energy (RISE) Country Profile Jordan. Energy Sector Management Assistance Program, World Bank Group. Washington, DC. Retrieved from: https://rise.esmap.org/datafiles/sections/rise_country_profiles.pdf

Figure 41: AFEX 2017 Spider Chart



Source: AFEX (2017): "Arab Future Energy Index 2017: Energy Efficiency", p.5. RCREEE and United Nations Development Programme. Retrieved from: https://www.rcreee.org/sites/default/files/afex_ee_2017.pdf

3.5.1 Country Context

General Situation regarding Energy Efficiency and EEIs in Place and Planned

Jordan imports more than 95% of the energy it needs, which is a major issue for the country's energy supply security. Therefore, the government adopted a strategy for the energy sector for the 2015-2025 period to tackle this critical challenge, with the main objective to secure sustainable future energy supply for the country.

Renewable energy and energy efficiency are considered as important components in the government's strategy with the objective of having renewable energy accounting for 20% of the total generated electricity by 2025 and reducing energy consumption by 20% compared to the business-as-usual scenario in 2020.

The government of Jordan has developed its second NEEAP for the period 2018-2020, with the ambitious target to save almost 2000 GWh of electricity by 2020. The NEEAP includes 35 measures (26 measures and 9 cross-cutting projects) covering the residential, tertiary, industrial, water-pumping, street-lighting and transport sectors.

Over the past few years, efforts have been made to move Jordan towards a more energy-independent and efficient market that is favorable for EE development. In fact, the implementation of the subsidy removal plan has led to elimination of all subsidies for oil products and a major part of the electricity tariff categories. However, electricity is still subsidized for certain customer categories, mainly low consumption customers under 600 kWh/month and some sectors, such as irrigation and water pumping. Energy efficiency in these market segments may need public support to be profitable for end users.

As a result of these subsidies, the National Electric Power Company (NEPCO) responsible with electricity transmission is incurring huge financial losses valued at JD 5.5 billion in 2019 (7.8 billion USD). In line with the recommendation made by the International Monetary Fund (IMF) to reduce subsidies, the Jordanian government developed a national plan to reduce and eliminate the debt from NEPCO by gradually phasing out the subsidy to energy tariffs. However, the removal of subsidies for low-income consumers may create high socio-political risks.

General Supportive Framework Conditions and Barriers in the National Context

Energy efficiency and renewable energy in Jordan is regulated mainly by Law No. 13 of 2012 and its related by-laws, including obligations and advantages provided to consumers in these fields.

Bylaw 10 of 2013 (then updated by Bylaw No. 13 of 2015) grants total exemption from customs duties and sales taxes to RE and EE equipment and devices imported or produced locally in order to promote the investment in these technologies. The eligible products are mentioned in the annexes of the bylaw and can be updated under proposals of the Committee of Customs Duties and Sales Taxes Exemption created by the same bylaw.

In addition to this tax-related support, the government of Jordan created in 2012 the Jordan Renewable Energy & Energy Efficiency Fund (JREEEF) by enacting the EE and RE Law No. 13, but it came into effect in 2015 after the promulgation of Bylaw No. 49 of 2015. The fund was established within the MEMR with the aim of providing end-users with the necessary funding for energy efficiency and renewable energy measures. It supports any programme and financial mechanism allowing RE and EE project developers and owners to access financing from banks, and local and international financial institutions. This support includes loan interest rate subsidies, revolving funds, financial risk mitigation, credit guarantees, equity participation, subsidies to investment in innovating projects and soft investment, such as energy audits, feasibility studies, and public awareness campaigns.

Currently, JREEEF is implementing EE and RE-supporting mechanisms in several sectors with financial help from international donors, including the EU, the Wold Bank, bilateral cooperation organizations, etc. The following table presents the strategic plan of JREEEF by 2020.

Table 45: JREEEF's 2020 Strategic Plan					
	Low-income Households	**SMEs**	**Small and Medium Hotels**	**Small and Medium Hospitals**	**Public Buildings (mainly schools)**
Objective by 2020	15,000 PV systems; 50,000 SWH; 150,000 LED tubes and 51,000 LED bulbs	Cumulative SME RE/EE investment of 10 million JD	Cumulative SME RE/EE investment of 5 million JD	Cumulative SME RE/EE investment of 5 million JD	Cumulative SME RE/EE investment of 3 million JD

It is worth mentioning that EE is receiving much support from international bilateral and multilateral donors, including the EU, the USAID, the AFD, KfW, the EBRD, etc.

Barriers to EE development are mainly linked to:

> Lack of access to suitable financing, particularly for households and small businesses;

> Lack of awareness of EE measures;

> Electricity tariff subsidies for small residential consumers with consumption less than 600 kWh/month.

Expected Future Developments

In accordance with the NEEAP, the Jordanian government will mainly focus on the following initiatives in the next 3 years:

> Enforcing the energy performance labelling and standards programme for 4 categories of home appliances: air-conditioning, refrigerators, freezers and washing machines.

> Enforcing the new thermal insulation code.

> Promoting LEDs through utilities.

> Launching a pilot programme for roof insulation of existing buildings in the residential and commercial sectors.

> Setting up a programme of thermal retrofitting in public buildings.

> Setting up an EE programme in the industrial sector targeting 50 industrial enterprises per year.

> Implementing an ambitious energy efficiency programme in water pumping at 11 large facilities.

Subsides will continue to be provided in the country because it is a matter of political stability; however, they will be gradually reduced.

3.5.2 Auction systems for EE in Jordan

Alignment with the National Strategies and Policies

Overall, the EE auction system is suitable to Jordan's energy policy and focus on EE and renewable energy (RE). This policy is being operationalised through the following strategies, regulations, action plans and tools:

> The Government adopted a new strategy for the energy Sector 2015-2025 to achieve the following general objectives:
  – Secure a sustainable future energy supply in Jordan;
  – Diversify the national energy mix and increase the share of local resources;
  – Reduce the dependence on external energy sources and decrease the national energy bill;
  – Contribute to the achievement of GHG emission mitigation country target as adopted in the Jordan NDCs.

> Renewable energy and energy efficiency are considered as important components in the government strategy with the objective of having 20% of generated electricity from renewable energy by 2025 and reduce energy consumption by 20% compared to business as usual scenario in 2020;

> Law No. 13 of 2012 concerning the Renewable Energy and Energy Efficiency Law (REEEL)[87] and its related bylaws aimed at rationalising energy use and improving energy efficiency across various sectors;

> The second National Energy Efficiency Action Plan (NEEAP) with the objective of reducing 2,000 GWh per year by 2020, which represents 17.5% of the five-year average baseline consumption (2006-2010);

> A public competitive bidding and direct proposal submission instrument for developing large-scale private RE projects.

87 International Labour Organization (ILO), Jordan Renewable Energy and Energy Efficiency Law, http://www.ilo.org/dyn/natlex/natlex4.detail?p_lang=en&p_isn=94599&p_count=96150&p_classification=01.06&p_classcount=2839. Consulted on July 10, 2019.

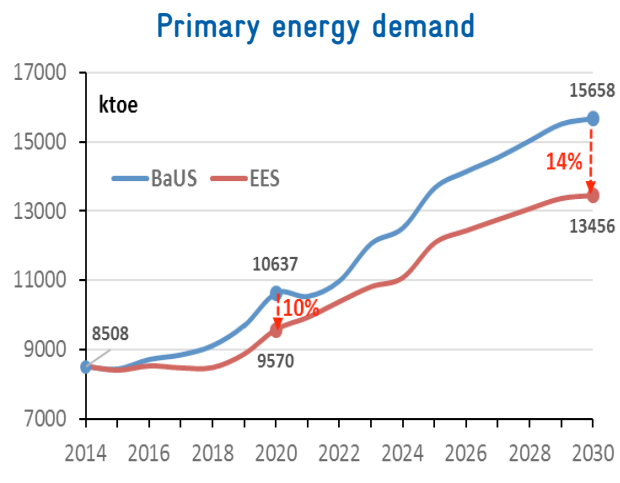
EE auctions seem to be compatible with these Jordanian energy policies because such auctions are intended to help reduce energy consumption, thereby rationalising them through energy savings at highly attractive prices. A significant portion of the energy savings targeted by Jordan can be supported by an auction mechanism.

Moreover, Jordan has successfully implemented several RE projects through public competitive bidding and direct proposal submissions. So far, three rounds have been successfully tendered with good results and implemented projects are operational. Typically, the government seeks the most competitive prices submitted through an auctioning process after shortlisting the most qualified companies. The experience accumulated by the Jordanian government in this field may serve as a good basis for implementing an EE auction instrument.

Market Potential

As mentioned before, Jordan has high energy-saving potential. The long-term EE scenario presented in the second NEEAP estimates there is potential for a 14% reduction of the primary energy demand by 2030, as highlighted in the figure below.

Figure 42: Jordan NEEAP Long-term EE Scenario



The expected cumulated energy savings over the period of 2016-2030 is around 18 Mtoe of primary energy, 13.5 Mtoe of final energy and 41 TWh of electricity. All these savings would translate into an energy bill cut of approximately USD 10 billion for the country over the period of 2016-2030.

The breakdown among the sectors in percentages of the final energy savings by 2030 is as follows: industrial, 28%; transport, 42%; residential, 26%; commercial, 5%. The EE auction instrument is particularly suitable to the industrial and commercial buildings, which together account for one-third of the total expected savings by 2030, approximately 580 ktoe per year.

EE auctions can play a significant role in Jordan's electricity system because the demand for electricity is expected to grow quickly at an average annual rate of 5% between 2016 and 2030 according to an business-as-usual scenario. A portion of the continued expected growth in electricity consumption could be met by EE measures. EE measures can respond to grid-stability needs and peak-demand-shaving and can be implemented through an auction mechanism.

Barriers to Implementation

Across the world, there are some common main barriers to participation in EE initiatives and the dedicated EE auction mechanism. These barriers include knowledge and information gaps and a lack of familiarity with EE activities and auctions. Auctions dedicated to EE and participation in EE-based generation projects can help raise awareness of EE as a significant source of energy savings that can help reduce demand and compete with new power generation infrastructure on a cost basis. For certain customer groups in the market, rising prices are likely to make EE better known and help drive down prices if the EE activities aggregated or bundled by a single coordinating entity can be eligible for auctions.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

RE auctions could be valuable in supporting the general framework conditions needed for EE auctions despite the lack of established specific regulatory and legal framework conditions. Jordan could develop legislation to support EE auction systems and enable EE to compete against generation through auctions. Jordan could also adopt several other measures to help develop EE auction systems, including:

- Strengthening the capacity of the Ministry of Energy and Mineral Resources (MEMR), the entity assigned to play the role of EE auctioneer;
- Strengthening the capacity of the Energy and Minerals Regulatory Commission (EMRC), which will ensure the role of monitoring the proper application of the rules of transparency and equal opportunities of the EE auction process;
- Strengthening the capacity of the assigned organisation/entity to fulfill the role of implementor of the national EE strategy and action plan to support MEMR in implementing EE auctions;
- Training potential stakeholders by informing and educating them about the potential EE auction programmes to be implemented in various sectors;
- Implementing a number of pilot projects before rolling out any large-scale auction programme.

Potential Sources of Financing

Regarding the public financing sources dedicated to EE in Jordan, two main financing tools should be mentioned, namely the JREEEF and the Central Bank's facility.

> The Jordan Renewable Energy & Energy Efficiency Fund (JREEEF), under the Ministry of Energy, is responsible for providing end-users with the necessary funding for energy efficiency and renewable energy measures in cooperation with national and international financing institutions. The JREEEF mainly intervenes in five areas: (1) revolving credit, (2) credit guarantees and risk mitigation, (3) technical support, (4) equity financing and (5) investment subsidies for innovating or social projects. However, the JREEEF lacks sustainable resources because it currently relies on grants from international donors.

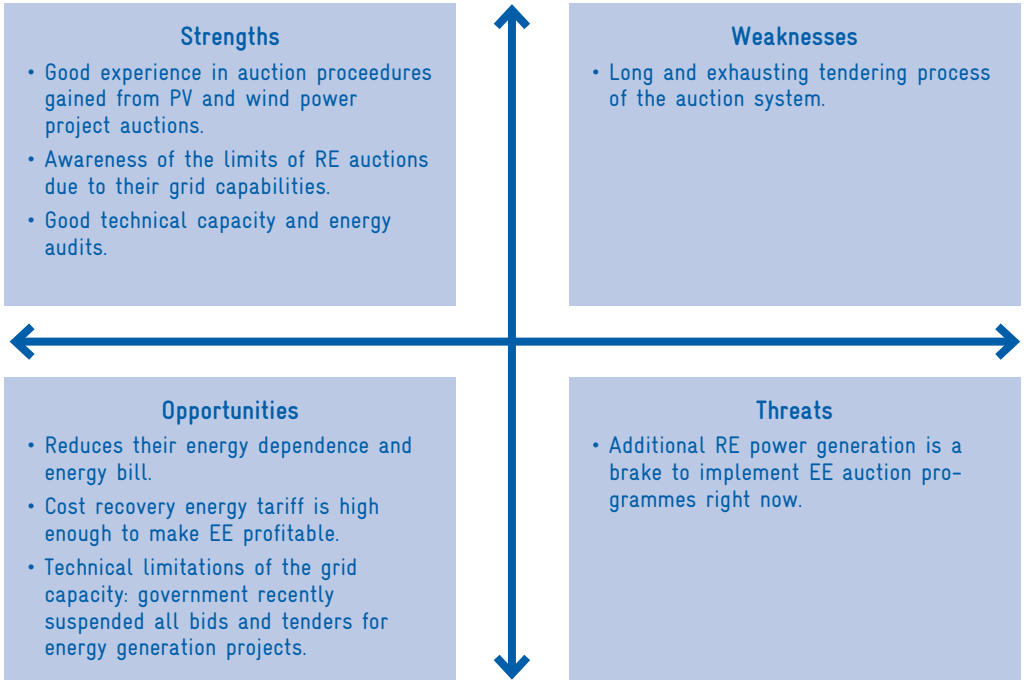
> The Central Bank's facility has been operational since 2013. It is a credit facility and offers reduced interest rates (implemented through 14 local banks) to support economic activities in 6 sectors, including RE and EE. The interest rate offered to the banks is 1% to the regions outside Amman and 1.75% in Amman. Consequently, the resulting average final interest rate offered to consumers ranges from 4% to 5% in Amman and 3% to 4% outside Amman, whereas the average standard rate offered by banks is 10%. In addition to low interest rates, the facility offers a fixed interest rate on the loan period, which can reach 10 years with a one-year grace period (for EE and RE). The ceiling amount of credit is 4 million JD

In addition to these public resources, EE in Jordan is receiving financial support from many bilateral and multilateral financial and development institutions, such as the EU, the AFD, KfW, the USAID, the WB, etc. The local banking sector is also very active in financing RE projects and can be highly interested by exploring new market segments offered by EE projects. All these sources could be used to finance projects promoted by EE auctions.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

The EE auction is in line with several existing initiatives, such as the JREEEF's financing instruments, the Central Bank's facility, and the already mature RE auction system in Jordan.

Figure 43: SWOT Analysis



3.5.3 A Mechanism for Replacing the Stock of Energy-using Equipment and Appliances in Jordan

Alignment with National Strategies and Policies

Improving appliances' energy performance is one of the top priorities of Jordan's energy strategy. In fact, the second NEEAP (2018-2020) includes, among others, the following measures:

- Enforcing the energy label and standards programme for 4 categories of home appliances, namely air-conditioning, refrigerators, freezers and washing machines.
- Replacing incandescent lamps with LEDs for low- and medium-income household classes (<600 kWh/month), including 1 million lamps targeting 250,000 consumers.
- Replacing fluorescent tubes (10-watt) by LEDs in public buildings, including replacement of 250,000 units of fluorescent tubes (4x18 watt) with LED 60 cm tubes in commercial buildings.

All these measures are expected to accelerate the replacement of the stock of energy-using appliances. This means that Jordan is ready to develop and use this instrument, which fits in well with Jordan's significant efforts to improve energy efficiency.

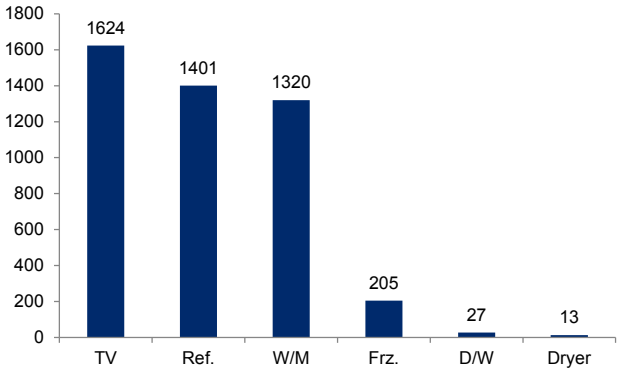
Market Potential

A survey conducted by the USAID in 2015 in Jordan[88] provided the following main findings about the stock of the main appliances used in the residential sector, indicating that there is great potential for implementing a mechanism of replacing the stock of energy-using equipment and appliances in the country.

- **Lighting:** The stock is about 18 million lamps of various types, of which almost half (9.8 million) are CFLs; 5 million (29%) are fluorescent tubes; 2.6 million (14.7%) are incandescents; and 341,000 (1.9%) are LEDs.
- **Refrigerators:** Almost all the households sampled (97%) each owned at least one one-door refrigerator. Nearly 30% of the refrigerators kept by Jordanian households were over 10 years old. Because refrigerators' energy efficiency has increased rapidly over the past decade, there is an opportunity to save energy by encouraging customers to replace these older models with energy-efficient newer models. Almost two-thirds (64.3%) of the refrigerators were over five years old, while 31.6% are four years old or less.
- **Freezers:** Just 14.7% of the households each owned a freezer. Almost 44% were less than four years old.
- **Washing machines:** Nearly half of the Jordanian households each own at least one washing machine.

The following Figure 44 shows the estimates of the stock of the main categories of appliances in 2015 in Jordan (in thousands):

Figure 44: Jordan estimate of the stock of appliances (2015)



Source: "National Household Load Survey Report 2015", USAID, 2015

Regarding air-conditioners, almost 27% of Jordanian households each owned one or more AC units. About 61% of the air-conditioners were less than five years old. The number of air-conditioners is likely to increase over the next year or two because the recent heat wave has prompted many consumers across the country to purchase AC units for the first time. It is worth mentioning that 75% of the AC units are imported.

Barriers to Implementation

- It may not be profitable or attractive enough for end-users to replace some appliances, such as refrigerators and air conditioners.
- Therefore, the Jordanian government has to provide subsidies to cover part of the cost for purchasing new appliances. Providing such subsidies is very difficult because of the current constraints on the public budget in Jordan.
- There may not be a clear incentive for the government to support consumers with subsidies for upgrading their equipment because there is much potential for a rebound effect, where higher-efficiency appliances and equipment result in more energy use by consumers.
- The lack of financing is particularly serious among low- and medium-income households because of their low capacity to invest, poor access to bank loans or credit (For example, 60% of the population do not have any bank account.) and their high indebtment. Generally, banks are reluctant to fund programmes that replace the stock of appliances and lack interest and motivation in making EE improvement.

88 Nsour, F. et. al. (2015) "National Household Load Survey Report 2015", USAID. Available from https://escb-jordan.org/wp-content/uploads/2016/05/National-Load-Survey-Report-FINAL-DRAFT1-Dec-14.pdf

> Another solution might be to mobilize the utilities to finance new appliances. However, they may not want to invest a part of their revenues in appliance-replacement programmes.

> There is also a lack of awareness and interest among households regarding the use of energy-efficient appliances.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

The regulator should cooperate with appliance distributors and implement a mechanism for collecting old appliances in Jordan.

The NERC is now well equipped with laboratories for testing the main categories of appliances. However, the NERC will need to strengthen its human resources and technical capacity to competently handle the large flow of tests required by the programme.

Potential Sources of Financing

The mechanism can be financed by the following sources:

> To implement the instrument, a public subsidy will need to be created to help cover the cost of purchasing energy-efficient appliances replacing old ones. The government should set allocate part of the public budget to provide this subsidy through, for example, the JREEEF.

> The utilities could invest in an incentive and penalty programmes using part of their revenues, which basically come from ratepayers.

> National banks can play a major role in setting up special loans within the programme to provide households with better access to financing.

> International funds or financing programmes can help by creating lines of credit to be used by local banks as part of the old appliance stock replacement programme.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

This instrument is well suited to be implemented as part of a policy package and can create synergy with several other instruments proposed in this study, as discussed below.

> Currently, the JREEEF is experimenting with a financing mechanism with the utilities for replacing incandescent lamps by LEDs for low electricity consumers. This pilot programme can be extended to other appliances, such us refrigerators and air-conditioners.

> With the help of incentive and penalty programmes, the old-appliance-stock-replacement mechanism can help develop the ESCO market by creating better opportunities with higher EE incentives to replace equipment and appliances in various sectors.

> The old-appliance-stock-replacement mechanism may get help from the mandatory EE targets instrument, which can pressure large energy consumers to make efforts to improve their EE by replacing their high-energy-consuming equipment and appliances.

> This instrument can be also helped by setting up utility-managed EE programmes.

3.5.4 Utility-managed EE Programmes in Jordan

Alignment with the National Strategies and Politics

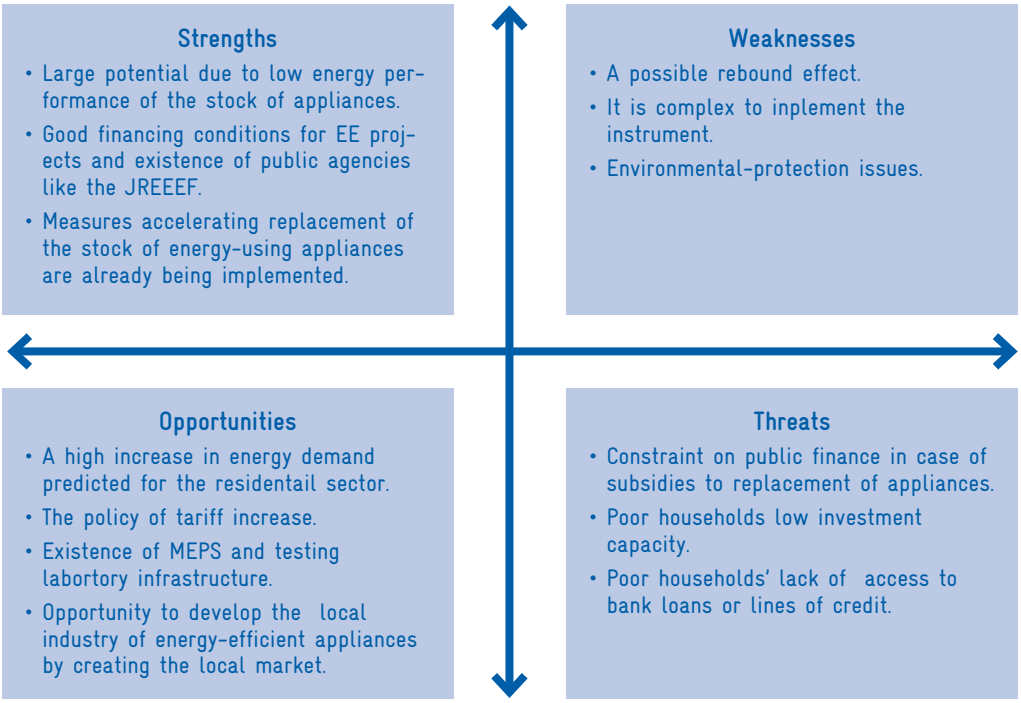
Although Jordan's energy market is facing some barriers mainly related to the current concession agreements with electricity distribution companies, including the financial model applied, utility-managed EE programmes are well suited to be applied in Jordan and some key elements have already been developed by existing projects, as explained below.

> The Efficient Lighting projects are being developed with the three distribution utilities under the DSM initiatives, targeting customers paying lower tariffs. The objective is to cover 1 million lamps in the next 5 years.

> The JREEEF is in discussion with distribution utilities to set up a mechanism for financing solar water-heaters (SWHs) for low electricity consumers by using the electricity bill to reimburse the loans. The objective is to finance 200,000 SWHs within the next 5 years. This mechanism can also cover other efficient appliances.

Theses initiatives clearly show that the utility-managed EE programme is in line with current policy in Jordan.

Figure 45: SWOT Analysis



Market Potential

Based on an average baseline consumption level of 11,291 GWh per year over the period of 2006-2010, the 2nd NEEAP's target is to save a cumulative total of 2,258 GWh in electricity consumption over the period of 2018-2020. This target can be reached by implementing this instrument in the market. In general, an EE obligation scheme can target 0.5% of savings per year in their early years, rising to 2% when the scheme is more mature.[89]

Barriers to Implementation

Although some barriers have to be removed, Jordan has several key conditions needed for implementing utility-managed EE Programmes, as discussed below.

> The utilities are authorized by the regulator (EMRC) to practice non-core activities, such as energy efficiency and renewable energy equipment and services supply.

> Utilities are willing to set up a mechanism to pre-finance EE measures based on loans to be paid back gradually through the electricity bill. However, EMRC does not allow the distribution companies to cut the electricity service in case of non-payment of loan reimbursement. Because of the associated risks, utilities are reluctant to carry out these initiatives.

> Knowledge about the instrument, technical skills to design and supervise it, and political will to implement it.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

The implementation of an EE obligation scheme targeting distributors may be facilitated by a strong, independent energy regulator, such as the EMRC. However, implementing utility-managed EE Programmes may require making changes to not only the electricity law and some related bylaws, but also the concession contracts with the 3 electricity distributors to include the EE obligations, which may require long negotiations among stakeholders.

89 See, for example, the EED target of 1.5% for all member states. For a discussion of the challenges and experience, see Staniaszek, D. and Lee, E. "Determining Energy Savings for Energy Efficiency Obligation Schemes". RAP. (2012). http://www.raponline.org/wp-content/uploads/2016/05/rap-lees-esoeupaper-2012-april-18.pdf

The Ministry of Energy and Mineral Resources (MEMER) should serve as the public authorities supervising utility-managed EE Programmes by fulfilling the following main duties:

> Developing the regulations and procedures governing utility-managed EE Programmes;

> Designing and setting up utility-managed EE Programmes market management system;

> Setting the overall objective of utility-managed EE Programmes;

> Monitoring the market and the penalties.

Potential Sources of Finance

Typically, an EE obligation scheme is funded by a charge to all ratepayers or through general tax revenues. Both options are possible in Jordan.

Jordan has relatively good financing conditions for energy efficiency projects. The inflation rate was only 1.46% in 2018, suggesting a certain level of monetary stability needed for financing, for example, energy efficiency contracts. Jordan grants to energy-efficient equipment exemption from sales tax and customs duties.

A utility-managed EE programme can become an easier way to target opportunities within the commercial sector (e.g., banks, hospitals, and hotels), services sector (telecom, banks) and industrial sector, which pay higher prices for electricity.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

The EE obligations to be imposed on utilities may have synergy with several exiting or potential instruments in Jordan, such as the following:

> The JREEEF's programme for distributing 1 million LEDs and financing 200,000 SWHs;

> The instrument for replacing the old appliance stock;

> The EE auctions, etc.

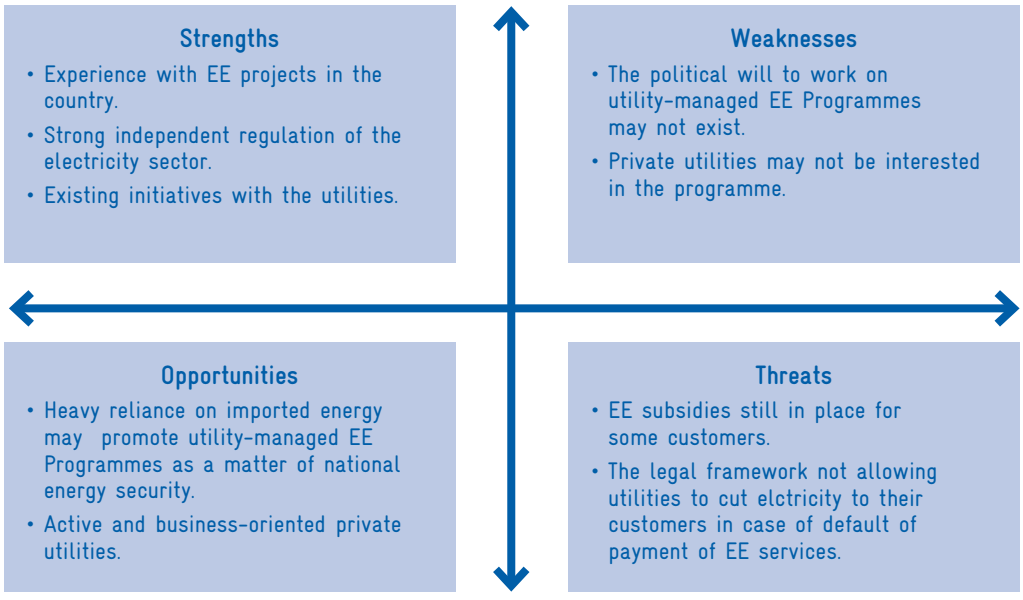
3.5.5 Dynamic DSM Electricity Pricing in Jordan

Alignment with the National Strategies and Policies

Jordan is already applying a diverse range of ToU pricing systems to various consumer classes, including seasonal tariffs and varying peak times. Completely dynamic tariffs have not yet been implemented for any customer class.

Given the range of partially dynamic tariffs in place, further improving dynamic tariffs seems to be in line with all relevant policies. Several prerequisites need to be put in place before that can happen, and dynamic prices may be more suitable to some customers than others, including industrial customers with flexibility and resources to react to rapid changes in prices due to increasing amounts of variable renewable energy generation expected as projects come online.

Figure 46: SWOT Analysis



Market Potential

The peak load in Jordan increased at a galloping annual average rate of 7.3% from 1,515 MW in 2004 to 3,200 MW in 2015. This shows the large potential and interest associated with the dynamic electricity tariff instrument in Jordan.

Large industrial consumers may be well placed to pilot this incentive, particularly if both high and low prices in the wholesale market are passed through, or potentially for some equipment that can be run separately from other operations (energy storage through material processing storage).

Residential consumers may be interested to shift some loads to off-peak circuits if they are available, but the current variability of the peak periods makes this a less certain value to the operator.

Barriers to Implementation

Smart meters are not yet commonly used, and neither are the backends that must be in place to handle the data they produce. There is potential resistance among residential customers to very high prices; peak rebates may be easier to find acceptance among certain ratepayers.

Changes in the Institutional, Regulatory, Legal, Economic and General Framework Conditions Required for Implementation

Few changes are expected except for typical regulatory procedures to review the tariff structure. Regulatory changes to account for the information produced by smart meters may be necessary and new tariff classes are likely to be introduced.

In general, greater dynamism is well suited for introduction into the Jordanian market. In addition, the use of simple automated devices that limit usage during peak periods has the potential to enable customers to limit their bills and enable the utility to achieve peak load reductions before upgrading to smart meters. The main barriers are the lack of advanced equipment on the networks, and the potential for poor customer relations as pricing changes must be designed to be sensitive to customer challenges and their willingness to alter behaviours in response to price signals.

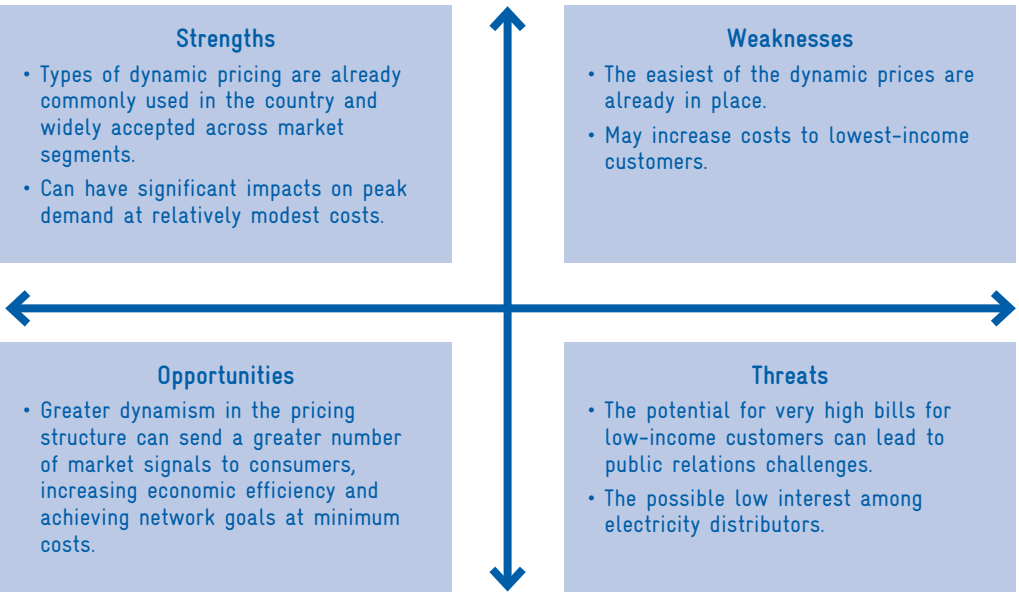
Potential Sources of Financing

Grid tariff studies and pilot costs for certain customers may be required. Equipment costs and backend development costs will be needed to upgrade to smart equipment. These costs can be recovered through the tariffs, but those costs will need to be discussed and verified with the regulator before they are passed through.

Synergies with Other National Energy-efficiency Instruments, Projects, Approaches, Strategies and Developments

Pricing tools can be used together with various other instruments and tend to complement rather than detract from existing projects. Projects aimed at reducing demand prior to pricing changes are particularly synergistic because they enable customers to adjust beforehand and be prepared.

Figure 47: SWOT Analysis



Conclusion and recommendations

The objective of this report was to conduct a comprehensive study on innovative incentive instruments and mechanisms for promotion and cost-effective dissemination of energy efficiency in the MENA region. To complete the objective, a team of experts brainstormed and researched options to arrive at an initial long list of 19 innovative instruments and then built an evaluation matrix of innovative instruments/approaches worldwide and within the MENA region. Using the evaluation matrix allowed for selecting 10 instruments from the initial 19. These 10 instruments have been carefully analysed in this comprehensive report and case studies for four instruments for each of five countries has been completed.

At the conclusion of the report, to help harness the greatest potential of the innovative EE instruments, we offer the following recommendations:

1 Learning about international examples of innovative EE instruments in global and regional peer-to-peer exchange platforms

Global and regional exchange platforms can support the dissemination of innovative, market-based approaches for Energy Efficiency. These platforms should include policy makers, public officials, organizations responsible for energy efficiency but also economists, research groups, chambers of industry or ESCOs. As these platforms bring together several actors, they create a network among policy makers and market actors which could foster the identification of suitable EE models. By sharing best practices and experience, platform members can discuss relevant topics and adjust them more easily to their specific circumstances. This could include the adoption of technologies that already exist elsewhere to their respective markets, the development of pilots for new EE instruments but also the discussion about regulatory frameworks and market conditions.

2 Selecting and testing innovative EE instruments for specific sectors and consumer groups

Some of these innovative EE instruments can be initially used for specific groups and the outcomes can then be compared before they are introduced on a larger scale. By using these "testing labs", the results can be used to show advantages and identify common problems and issues on a small scale at an early stage. At the same time, the results obtained in similar environments can be compared so that proof of effectiveness can be provided. This can lead to increased acceptance, especially in areas with a high level of scepticism towards these instruments.

3 Implementing a robust process for monitoring the effectiveness of all EE instruments available in a country and optimizing the mix of instruments put in place

With one or several EE instruments put in place, a robust monitoring and verifying process will be crucial for ensuring that the targets set initially are consistently and effectively achieved.

A monitoring and verification process will help improve data availability and reliability and can subsequently be used to increase the effectiveness of the mix of instruments. The use of other instruments can be planned more purposefully to increase the cost-effectiveness and benefits. At the same time, this data can be serve as an example of good practice in order to attract and motivate other implementations and further use cases.

Appendix I – Long list and methodology

Long List of instruments

Table 46: A Long List of Innovative EE Instruments Proposed for the MENA Region	
#	**Instrument**
1	Mandatory EE schemes or energy utility mandatory programmes
2	Trading obligations (white certificates, etc.)
3	Auction systems for EE
4	The Perform- Achieve-and-Trade Scheme
5	Mandatory energy efficiency targets
6	Electricity pricing depending on DSM or dynamic electricity tariffs
7	Energy savings insurance (ESI) mechanism of an energy performance contract (EPC)
8	Super ESCO
9	The voluntary agreement
10	The Green Economy Financing Facility (GEFF)
11	Guarantee funds
12	Revolving funds for EE investments
13	Carbon tax systems to support EE investment or the carbon pricing system
14	MEPS or Eco-design for industrial equipment
15	Mechanism for accelerating the replacement of the stock of energy-using equipment and appliances
16	Procurement standards for EE (public and other sectors)
17	Creating networks with voluntary goals
19	Mandatory energy management systems (ISO 50001) for large consumers

EEI evaluation matrix

Selection methodology

The methodology for selecting the EE instruments for the designated countries is based on a multi-criterion assessment approach. The process includes 5 main steps, as summarized below:

1 The first step consists of identifying the criteria and proposing a brief description.

2 The second step involves designing a scoring scale based on the criteria discussed and deciding on whether the scale is positive or negative for the selected criteria.

3 In the third step, each criterion is given a weight, which reflects its importance relative to the other criteria. This step is iterative, and the weight can be readjusted to reflect subjective evaluation elements.

4 The fourth step is to calculate the final score for each of the criteria for each country involved.

5 Based on the scores, the last sept is to prioritize the instruments for each country.

Criteria Identification

Two groups of criteria have been identified. The first group is intrinsic to the instrument and independent from the country's context but is specific to the region. They are as follows:

1 Is the instrument in place in the MENA region? (Can it be considered innovative in the region?)

2 What is the relative simplicity of implementation of the EE instrument?

3 Is the instrument easily transferable and replicable to new locations and situations?

4 What is the relative cost-effectiveness of the instrument?

5 How can the sustainability of the instrument be judged, particularly its financial sustainability?

6 Does the instrument contribute to a leverage effect for other instruments or initiatives?

7 How does the instrument contribute to increasing the capacity of market transformation?

The second group consists of a set of criteria specific to each country, as listed below:

1 Does the instrument require making significant changes to regulation and/or legislation in the country?

2 Is the instrument broadly compatible with existing policy?

Criteria-scoring System

To simplify the task of evaluation, each criterion has been graded according to a scale of 1 to 5. Depending on the criterion, lower numbers can be considered more positive or negative. For example, the first criterion gives a higher value when there are fewer examples in the region, because it measures the innovative character of the instrument for the region.

Table 47: General Criteria Scoring

#	General Criteria	Scoring Scale - Low Value	Scoring Scale - High Value
1	Is it in place in the MENA region?	1 well represented in the region	5 practically nonexistent
2	Simplicity of implementation	1 very complex	5 easy to put in place
3	Transferability and replicability	1 very context specific	5 easily transferable
4	Cost-effectiveness	1 not very cost-effective	5 very cost-effective
5	Sustainability of the instrument	1 not sustainable	5 very sustainable
6	Leverage Effect	1 small potential for leverage	5 high potential for leverage
7	Capacity of market transformation	1 small capacity for transformation	5 large capacity for transformation

Two criteria have been chosen as the country-specific criteria, as shown below.

Table 48: Country-specific Criteria			
#	Country-specific Criteria	Scoring Scale - Low Value	Scoring Scale - High Value
1	Requires changes to the regulation	1 requires major changes	5 practically nonexistent
2	Compatible with the existing policy	1 incompatible with the existing regulations	5 very compatible with the existing regulations

Criteria's Weighting

The next step consists of assigning weight to each criterion with a percentage on the basis of an assessment of the relative importance of each criterion in the assessment of the instrument. The weight has been assigned as follows.

Table 49: Criteria Weighting		
Type	Criteria	Weighting
General Criteria		
	Is it in place in the MENA region?	5%
	Simplicity of implementation	20%
	Transferability and replicability	20%
	Cost-effectiveness	15%
	Sustainability of the instrument	15%
	Leverage effect	10%
	Capacity of market transformation	15%
Specific Criteria		
	Requires changes to the regulation	50%
	Compatible with the existing policy 50%	50%

Final Scores of the Instruments in the Context of a Given Country

The final step consists of scoring for a given country. More specifically, the weighted sub-totals of both groups of criteria are added up to obtain an overall score, with each group of criteria having half of the total weight.

Instruments Prioritization

The scores obtained are sorted from the highest to the lowest in order to classify the instruments. Then, we can select from among those with the highest scores to be analyzed more in detail in subsequent parts of the study.

The Methodology applied to Morocco

The results of the methodology applied to the case of Morocco are summarized in the following table.

Table 50: Methodology Results for Morocco

Instrument Number	Instrument Name	Instrument Criteria Score	County-specific Criteria Score	Total Score
3	Auction systems for EE	4,25	4	4,15
5	Mandatory Energy Efficiency Targets	4,4	3,5	4,04
7	Energy savings insurance (ESI) mechanism of an energy performance contract (EPC)	3,85	4	3,91
17	Creating networks with voluntary goals	3,6	4	3,76
19	EE Tax based instruments (non GHG-/Carbon-tax but tax benefits for EE/savings)	3,6	4	3,76
1	Utility-managed EE Programmes	3,8	3,5	3,68
14	MEPS or Eco-design for industrial equipment	3,65	3,5	3,59
4	The Perform- Achieve-and-Trade Scheme	3,85	3	3,51
12	Revolving funds for EE investments	3,35	3,5	3,41
9	Voluntary Agreement	3,2	3,5	3,32
15	Mechanism for accelerating the replacement of the stock of energy-using equipment and appliances	3,7	2,5	3,22
18	Mandatory energy management systems (ISO 50001) for large consumers	3,45	2,5	3,07
13	Carbon tax systems to support EE investment or the carbon pricing system	3,35	2,5	3,01
2	Trading obligations (white certificates, etc.)	3,55	2	2,93
6	DSM electricity pricing or Dynamic electricity prices	3,45	2	2,87
11	Guarantee funds	3,1	2,5	2,86
8	Super ESCO	3,45	0	2,07
16	Procurement standards for EE (public and other sectors)	3,45	0	2,07
10	EE Financing Facility (EEFF)	3,05	0	1,83

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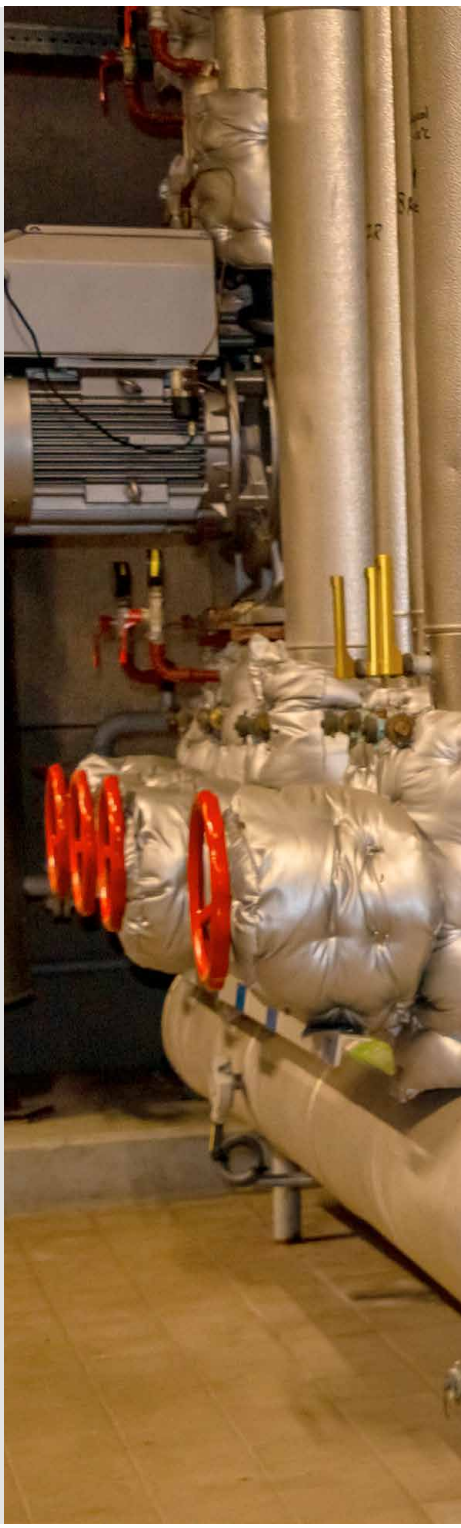
Abbreviations

ADEREE	National Agency for the Development of Renewable Energy and Energy Efficiency
AER	Authority for Electricity Regulations
AFD	French Development Agency
AFEX	Arab Future Energy Index
AMEE	Moroccan Agency for Energy Efficiency
ANCE	Association of Normalization and Certification
BMU	German Ministry of the Environment, Nature Conservation and Nuclear Safety
BOO	Build-Own-Operate
CAPMAS	Central Agency for Public Mobilization and Statistics
CITE	Energy Transition Tax Credit
CPP	Critical Peak Pricing
CRT	Cost Reflective Tariff
CSP	Concentrated Solar Power
DEWA	Dubai Electricity and Water Authority
DFS	Dhofar Power System
DGSM	Directorate General Standards and Metrology
DIAPOL-CE	Policy Dialogue and Knowledge Management on Low Emission Strategies in the MENA Region
DPC	Dhofar Power Company
DSM	Demand-side Management
EBRD	European Bank for Reconstruction and Development
ECM	Energy Conservation Measure
ECP	Eurovent Certified Performance
EE	Energy Efficiency
EEN	Energy Efficiency Network
EEO	Energy Efficiency Obligation
EEOS	Energy Efficiency Obligation Schemes
EER	Energy Efficiency Ratio
EETC	Egyptian Electricity Transmission Company
EEU	Energy Efficiency Unit
EIB	European Investment Bank
EIB	European Investment Bank
EPC	Energy Performance Contract
ESCO	Energy Savings Company
ESCWA	Economic and Social Commission for Western Asia
ESI	Energy Savings Insurance
ESP	Energy Service Provider
EUREM	European Energy Manager Programme
FEE	Energy Efficiency Fund
FER	Renewable Energy Fund
GEEREF	Global Energy Efficiency and Renewable Energy Fund
GEFF	Green Economy Financing Facility
GHG	Greenhouse Gas
HVAC	Heating Ventilation and Air conditioning
IEA	International Energy Agency
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPMVP	International Performance Measurement and Verification Protocol
IRENA	International Renewable Energy Agency
ISFU	Implementation Support and Follow-up
JREEEF	Jordan Renewable Energy & Energy Efficiency Fund
KAPSARC	King Abdullah Petroleum Studies and Research Center
KfW	German Bank of Development

KSA	Kingdom of Saudi Arabia
LEEN	Learning Energy Efficiency Network
M&V	Monitoring and Verification
MASEN	Moroccan Agency for Sustainable Energy
MBI	Market-based Instrument
MENA	Middle East and North Africa
MEPS	Minimum Energy Performance Standards
MERMER	Ministry of Energy and Mineral Resources
METI	Ministry of Economy, Trade and Industry
MHEW	Ministry of Housing Electricity and Water
MIS	Main Interconnected System
MOMRA	Ministry of Municipal and Rural Affairs
MORSEFF	Morocco Sustainable Energy Financing Facility
MRV	Measurement Reporting and Verification
NAMA	Nationally Appropriate Mitigation Actions
NEDO	New Energies and Industrial Technology Development
NEEAP	National Energy Efficiency Action Plan
NEEP	National Energy Efficiency Programme
NEPCO	National Electric Power Company
NGO	Non-Governmental Organisation
NREA	National Renewable Energy Authority
NREP	National Renewable Energy Programme
NTP	National Transformation Plan
NTP	National Transformation Plan
OETC	Oman Electricity Transmission Company
ONEE	National Office of the Electricity and Drinking Water
OPWPC	Oman Power and Water Company
PA-CEMP	Pan Arab Energy Management Professionals
PRA	Power Purchase Agreement
PV	Photo Voltaic
RCREEE	Regional Center for Renewable Energy and Energy Efficiency
RE	Renewable Energy
REEEL	Renewable Energy and Energy Efficiency Law
REPDO	Renewable Energy Project Development Office
RLF	Revolving Loan Fund
RTP	Real-time Pricing
SASO	Saudi Standards, Metrology and Quality Organization
SDI	Sustainable Development Impacts
SDPD	Sustainable Development Policies Division
SEEC	Saudi Energy Efficiency Center
SEEP	Saudi Energy Efficiency Programme
SIE	Société d'Investissement Energétique
SME	Small or Medium-sized Enterprise
SNDD	National Strategy for Sustainable Development
SWH	Solar Water Heater
SWOT	Strengths Weaknesses Opportunities Threats
ToU	Time-of-Use
TSP	Technology Service Provider
U4E	United for Efficiency
UNDP	United Nations Development Programme
VA	Voluntary Agreement



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