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INDUSTRIAL ENERGY EFFICIENCY IN EGYPT

Industrial Energy Efficiency Strategies and Policies

Final Draft Report

2015

مركز تحديث الصناعة
INDUSTRIAL MODERNISATION CENTRE

إتحاد الصناعات المصرية
FEDERATION OF EGYPTIAN INDUSTRIES

الهيئة المصرية العامة للمواصفات والجودة
Egyptian Organization for Standardization and Quality

الهيئة العامة للتنمية الصناعية
Industrial Development Authority

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List of Acronyms

IEE	Industrial energy efficiency
UNIDO	United Nations Industrial Development Organization
CAPMAS	Central Agency for Public Mobilization and Statistics
SEC	Specific energy consumption
SEC	Supreme Energy Council
EMS	Energy Management System
BAT	Best Available Technologies
KPI	Key Performance Indicator
SMEs	Small and medium enterprises
GJ	Giga Joule
CHP	Combined Heat and Power
MEPS	Minimum Energy Performance Standards
EGAS	Egyptian Natural Gas Holding Company
EGPC	Egyptian General Petroleum Corporation
EEHC	Egyptian Electric Holding Company
EII	Energy Intensive Industries
EPC	Engineering, Procurement and Construction

This report was developed by the United Nations Industrial Development Organization within the scope of the Industrial Energy Efficiency Project in Egypt (IEE). The project is funded by the Global Environmental Facility (GEF) and implemented by UNIDO in cooperation with the Egyptian Environmental Affairs Agency (EEAA), the Ministry of Industry and Foreign Trade of Egypt (MoIFT) and the Federation of Egyptian Industries (FEI).

The report was developed under the overall responsibility and guidance of Rana Ghoneim and the coordination of Gihan Bayoumi and with inputs from Ashraf Zeitoun. The report was authored by a consortium of Environics and Logic Energy with contribution from international experts who participated in this assignment; Ea Energy Analyses and Aura Energy.

This report would not have been possible to undertake without the valuable support that the authors' team received from the government and industrial sector stakeholders as well as think tank members.

Last but not least, the work team is deeply indebted to HE Minister of Environment and HE Minister of Trade and Industry for their invaluable guidance and support throughout this assignment.

The industrial energy efficiency (IEE) project supported by the United Nations Industrial Development Organization (UNIDO) aims to tackle the urgent need to optimize industrial energy consumption locally and offer models to the local industries to shift to a more sustainable energy consumption pattern. In this context, this document aims to propose a set of policies to be enacted to achieve IEE.

A framework represented by a "Value Chain" serves as a narrative to aid in assessing the process of creating an Industrial Energy Efficiency policy set.

Six segments represent the conceptual value chain; **Input, Vision, Strategy, Policy, Implementation, and Monitoring**. This framework summarized in figure 1 depicts an idealized scenario of creating and executing a successful policy.

	Input	Vision	Strategy	Policy	Implement ation	Monitoring
Current Situation	• Financial • Institutional • Legal • Social	• Existing Visions	• Existing Strategies	• Existing Policies	• Existing implementation Mechanisms	• Existing Monitoring Mechanisms
Data	• Macro level data	• N/A	• N/A	• Micro level data for policy creation (e.g. intensity at process level)	• Created a mechanism to measure required data for implement.	• Propose Data Measurement required for implementation
Analysis	• Identifying metrics • Benchmarking performance • Identifying areas for improvement	• Defined vision characteristics • Identified options for consideration	• Identified strategy options • Analyzed options impact and success probability	• Analyzed data • Analyze existing policy • Identified policy options & analyzed impact	• Identified implementation requirements (including stakeholders and process)	• Propose Data Analysis mechanism for data being collected for implementation analysis
Proposal	• N/A	• Proposed a vision	• Proposed a clear strategy	• Proposed a clear set of policies or programs	• Proposed a clear implementation mechanism	• Proposed implementation improvement
Consen-sus or approval	• Agreed with an authority on the current performance • Set a clear baseline for the stakeholders	• Agreed vision with key stakeholders • Issued agreed vision in a formal document	• Agreed strategy with key stakeholders • Issued agreed strategy in a formal document	• Agreed policies with key stakeholders • Issued policies or programs formally	• Implementatio n mechanism approved by key stakeholders • Implementatio n started	• Reported on implementation progress and analysis

Figure 1: Value chain for policy development

N/A stands for Not Applicable

Stakeholder engagement was core to this project throughout its different stages and was reflected in the series of interviews, workshops and think-tank meetings carried out throughout the project to benefit from vast and diverse experiences as well as garner support. Moreover, one-to-one meetings were undertaken to confirm owners, outcomes and phasing of the policies.

The current draft represents the basis for two final participatory steps; presentation to FEI leadership and presentation to ministries of industry and environment. Subsequently, a final workshop is planned to take place to finalize policies and implementation plans, after which the final version of this document will be issued.

In a way, this report is the last in a series of reports addressing IEE in Egypt, but could be claimed to be different in a number of aspects; it systematically benefited from previous efforts, followed a strictly participatory approach, as well as the policy value chain framework and did not proceed from one of its links to the following until it was settled to a large extent.

Most importantly, all proposals brought forward in this report were in full awareness of the major challenges facing IEE in Egypt, especially with regards to data, technical and regulatory capacity as well as other characteristics specific to the industrial, energy and administrative environment in Egypt. In other words, effort is directed to using existing capacities and tools to achieve progress rather than aiming at implementing an idealized state while lacking its basic elements.

The proposed package can take IEE a long may forward. Based on UNIDO benchmarking studies and EMS case studies, we estimate that EMS in the first 10 years will yield at least 20% energy savings from industrial consumption, without substantial technological advancements.

However, ownership is a critical element. To hold genuine ownership, there has to be the will, determination and capacity to update, refine and modify based on the experiences gained during implementation and monitoring. It is only then that this report can be considered a first and concrete step towards the sustainable improvement of IEE in Egypt.

1. Industrial Sector Outlook

1.1 Current Industrial Landscape

The Egyptian industry is highly polarized in terms of size and energy-intensity[1]. In terms of size, the modal size of Egyptian industries is micro. The major contributors to employment are largely stimulated by the small and large industries, rather than medium industries.

Sectors employment follows the same pattern of concentration, as most of the employment is in limited sectors. Over 72% of industrial employment is in food, metal products, textiles including ready-made clothes, furniture and electric devices, which all happen to be low energy intensity sectors. (CAPMAS, 2006).

Energy intensive industries make up less than 7% of total industrial labor expenditures (MoTI, 2007), and represent only 1% of the number of factories despite consuming 65% of the industry energy share. (AFEX, 2013).

Given the different attributes of the Egyptian industrial sector, it can be categorised as follows.

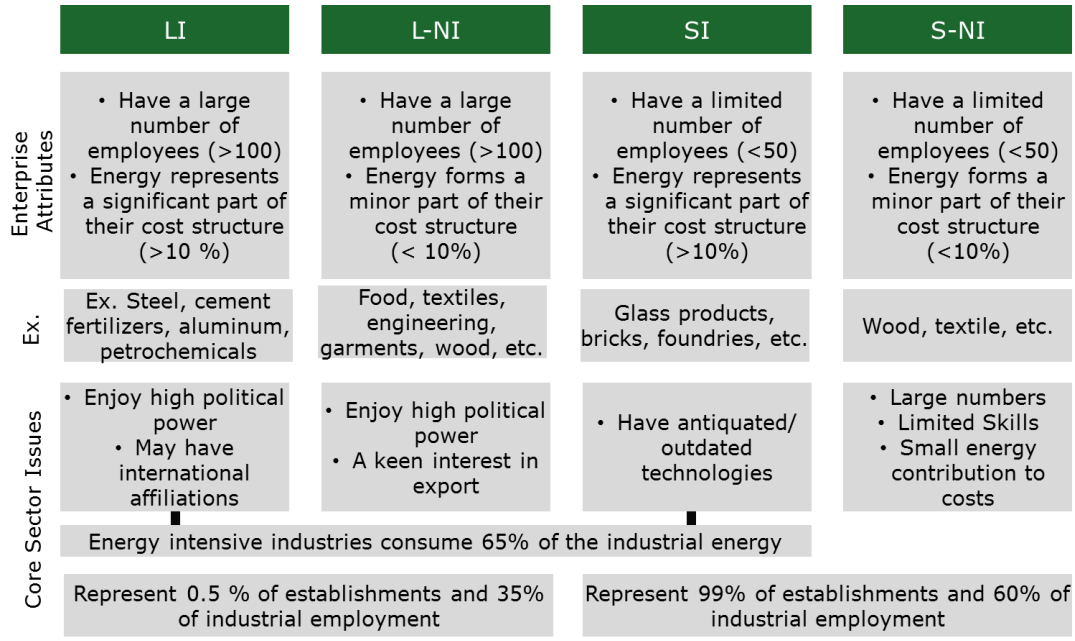


Figure 2: Industrial categories

* no medium category is mentioned in this table due to the fact that we would push the upper medium to Large category and the lower medium to small category to avoid duplication

1 Energy intensity of the industry is determined according to its cost structure. i.e. the contribution of energy costs to the costs of production.

1.2 Institutional Set up

Entities closest to decision-making as well as those with responsibilities relevant to IEE were defined. These entities from both the industrial and the energy sector are listed below.

Industry

a) Ministry of Industry and Foreign Trade, under which the following organizations fall
    - Industrial Development Authority (IDA)
    - Industrial Control Authority (ICA)
    - Industrial Modernization Center (IMC)
    - Industrial training council (ITC)
    - Egyptian organization for Standardization (EOS)
    - National Quality Institute (NQI)
b) Federation of Egyptian Industries (FEI)
c) Union of Production Cooperatives

Energy Management

a) The Supreme Energy Council (SEC)
b) The Ministry of Planning
c) Ministry of Electricity and Renewable Energy
d) The Ministry of Petroleum and Mineral Resources
e) The Central Energy Efficiency Unit (CEEU)
f) Electricity Regulatory Agency (ERA)
g) A gas regulator is currently under development, and is yet to be established.

Gaps in the Current Institutional Setup

The current structure does not support accumulating data, knowledge and analysis necessary to create strategies and policies and carry out efficient planning and monitoring.

On the regulatory level, the energy sector in Egypt in general has more than one regulator. There is no single technically powerful energy regulator that would regulate energy efficiency in general and industrial energy efficiency in particular. Accordingly, there is a lack of integration and synchronization between the different implementing entities.

The responsibility for the energy sector is shared between the Ministry of Electricity and Renewable Energy (MOERE) and the Ministry of Petroleum (MOP). This gap has increased by the disbanding of OEP (Organization for Energy Planning) in 2006.

In 2014, it was announced that an **Egyptian Energy Planning Authority** - which will report directly to the Prime minister- is to be established. However, the decree of its establishment has not been issued yet.

Generally, the current institutional structure is missing a **Policy Unit** at the **Ministry of Industry** that, among other policy activities, would be coordinating and continuously aligning with the different stakeholders and would report to the **Egyptian Energy Planning Entity** that coordinates between the energy efficiency policy units in the different ministries.

Besides the institutional gap, there is also a weak institutional capacity that can take several forms. The entity itself might not have enough authorities to achieve its mandates, which sometimes leads to having weak enforcement mechanisms. It might also be missing the adequate capacity in terms of number of personnel employed and their relative experience, capabilities and knowledge. This is one of the major constraints which the proposed policies have to take into account.

1.3 Energy Subsidy Reform

The questionable sustainability of subsidies led the government to launch an energy subsidy reform program in 2004. It entailed a sharp increase in the price of gasoline and diesel oil, and a gradual increase in the price of electricity and aimed at reaching full cost recovery by 2014.

However, the reform program was suspended in 2009 due to concerns relating to the global economic downturn. The trend of increasing fuel prices continued after the 2011 turmoil, reflected in the prime ministerial decrees 1257, 1258, 1273 in 2012.

In 2014 the Egyptian government announced through a series of decrees price increases for various fuels and consumers including diesel, gasoline and natural gas. Although the decrees did not state the evolution of prices over the coming years, it is understood that fuel prices will continue rising. In 2014 the Egyptian government took the unprecedented decision of issuing a decree (1257/2014) stating the electricity prices for the different consumers up till 2019. The pricing revision set in motion represents a strong driver for demand on IEE.

2. Review of previous efforts

A total of 28 reports were reviewed out of which 23 reports were found relevant to the topic at hand as they addressed IEE over the last couple of decades. The content of these reports were compared against a policy value chain shown in Figure 1.

The discontinuity along the policy value chain is evident where the amount of knowledge and information amassed is disproportionate in comparison to the IEE policies proposed. This extensive coverage came at an advantage to the current assignment as it aided greatly in forming a solid background on IEE in Egypt.

Nevertheless, proposed components of the value chain were reviewed. The only official energy efficiency vision referred to in previous reports is that of cutting 20% of 2007 consumption by 2022.

Although not official, other visions were suggested such as having the SEC of the worst performers in a specific industrial sector in Egypt approach the relevant international benchmark (AFD, 2012).

The consultants discussed strategies and policies suggested under the EU Technical Assistance to support the reform of the Energy Sector in Egypt (TARES project), to ensure complementarity and consistency.

Apart from that, no official EE or IEE strategies were put forward. However, proposed approaches can be classified as follows

- Industry improving efficiency, for instance through direct financial (dis)incentives.
- Increasing the capacity of government to implement IEE
- Removing barriers towards IEE, including knowledge and raising awareness

Furthermore, the need for, energy strategies, industrial strategies, and pricing strategies were consistently discussed. This is in addition to general EE policies, industrial sector policies, and pricing policies.

Moreover, there is a broad spectrum of recommended actions and ideas for policy development in the reports with limited clear policy proposals. Actions and ideas proposed can be categorized as follows

- Information and knowledge
- Financial
- Legal and institutional
- Implementation

Only a few of the reports provided such an analysis of implementation mechanisms. Reports proposed a wide spectrum of ideas, including;

- Performance management through agreements
- Sector specific indicators
- Enforcing the institutional framework
- Finance, EE Commercial and /or Public funds, low interest loans, leasing and environment rating loan method.
- Energy Price reform through subsidy removal
- The application of demand- side management techniques, for instance, the use of smart grids, interactive meters and load shedding incentives.

It is noted that the implementation and monitoring mechanisms are the least addressed in the reports which resulted in their falling short of implementable actions. The consensus stage is also remarkably missing which was highly reflected in the lack of actual implementation of the proposed actions.

One of the most important conclusion of the review is related to potential energy savings. Figures vary among different reports, ranging from 10% to 50% and not all those stated are attainable due to technological differences and different financial capabilities. However the presence of considerable energy savings potential in the different industries is a clear fact.

2.1 SWOT Analysis

Any endeavor in IEE will likely meet barriers on various fronts; instituational, industrial, legistlative and financial among others. Such barriers should either be surmounted or alleviated by the proposed policies. Alternatively, policies need to be adapted to them, at least in the first stage of policy implementation, so as not to delay action. Based on analyses of previous reports and subsequent consultations, the strengths, weaknesses, opportunities and threats pertaining to the pursuit of IEE can be summarized as follows.

Strengths	Weaknesses
• Political will and support from the highest energy authority (Supreme Energy Council) to improve industrial energy efficiency • Due to the efforts being done in the IEE domain in the past 20+ years, numerous experts have been well trained on industrial energy efficiency, its challenges, opportunities and potential methods of improvement. • Current electricity pricing structure promotes energy conservation and energy efficiency in heavy industries. • A good part of intensive users have access to knowledge required to implement EE through their international affiliations. • Human resources of the large enterprises, especially multinationals have the competence to make decisions and take actions regarding energy efficiency.	• Lack of comprehensive and reliable data that can be obtained by decision makers systematically • No clear regulations in the IEE domain, so decision makers will be setting precedents • Weak institutional learning in energy efficiency strategy and policy negotiations (very little formal negotiations have taken place between the concerned parties on formal policy implementation and thus the whole institutional setup did not go through the learning stage) • Weak awareness of the energy efficiency success requirements and needs within the banking sector • High financing interest rates • Subsidized energy prices influenced technology choices during the last couple of decades • Weak Demand for EE from industry influence supply of services, finance, and data generation • A great percentage of the industrial entities are in the informal sector
Opportunities	**Threats**
• Significant potential to save substantial amounts of energy if any strong policies are put in place • Many studies have been undertaken and include ideas that can be developed into policies and supportive measures • Several development banks/agencies are interested to support industrial energy efficiency and thus provide funds to trigger and stimulate real actions in that domain • Energy prices are expected to continue increasing	• Primary energy pricing strategy for the industrial sector is not clear • Industrial development strategy is not clear • The current institutional setup is currently ill-prepared to implement and monitor policies to be issued, especially those requiring strong enforcement • Major industrial sector players have strong lobbies that can push against any measures that force them to invest in energy efficiency measures • Labour intensive industries can push back on EE measures that can influence their profitability in the short term with the excuse of putting their labour out of the job market • Synchronization and integration between the main involved parties (Ministries of Petroleum, Electricity and Industry) is only done at the very high level in the Supreme Energy Council meetings deeming decisions to be slow and often uncoordinated[2].

[2] It is however noted that coordination concerning energy supply (not specifically efficiency) has clearly substantially improved, witness the success in overcoming power outages in the summer of 2015.

3. Proposed Vision

To decide on the Industrial energy efficiency vision depicting the desired future state, several workshops have been conducted with representatives from the different ministries, entities and the private sector. Through these workshops, numerous options were discussed and filtered according to agreed principles and criteria.

The principles agreed were that the vision should

- Preferably be quantitative (or at least quantifiable)
- Imply continuously moving targets
- Address energy intensity (rather than energy consumption)
- Have a horizon/ time span.

Also, agreed criteria emphasized that the vision should be clear, ambitious, achievable and guiding to the strategy and policies.

After applying the vision principles to the proposed alternatives and discussing draft visions, the IEE vision was agreed to be:

"The Egyptian industry continuously achieves the optimum energy efficiency level economically viable for the Egyptian society"

The **optimum energy efficiency level** implies that a facility's financial and organizational ability to reduce its energy consumption should be fully exploited, but should not go further.

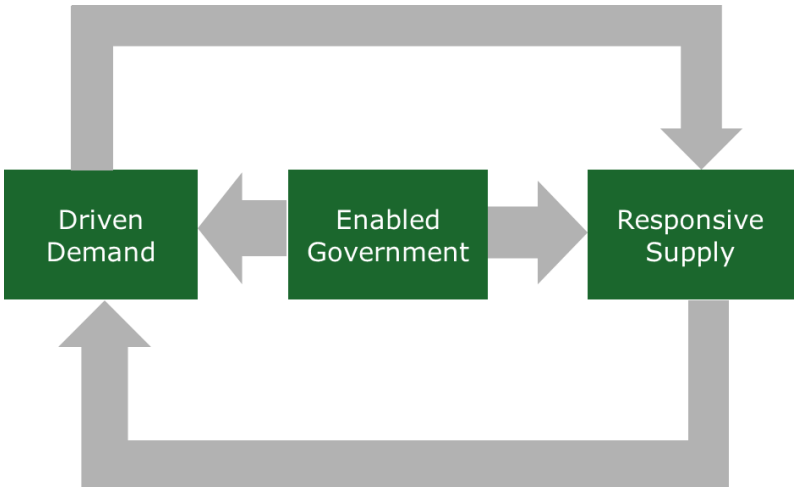
While "**economic viability**" needs to be seen in light of the fact that decisions are taken at the industrial entity level based on perceived costs and benefits to the enterprise (energy saved, monetized and non-energy benefits if any). It will be too early to bring on board what is economically viable for the Egyptian society, as stated in the vision. Assuming that prices will be adjusted in 2020 to the financial cost of supply, it is only then that pricing can be considered to go further than financial costs for IEE purposes.

In light of the proposed vision, phasing of the strategy becomes essential. It implies the need for full transparency and communication through continuous monitoring, reporting and evaluating on the progress and the key performance indicators.

4. Strategy

Three key strategic objectives address the three main pillars of the Industrial Energy Efficiency ecosystem;

1. **Drive industrial sector demand for Industrial Energy Efficiency**
2. **Ensure responsive supply:**
3. **Enable government institutions to plan, regulate and monitor IEE ecosystem**



Progress on these strategic lines should be balanced and sustained while taking into account common challenges to all three objectives which can be categorized under four categories:

1. **GOVERNMENT FUNDING**, mainly reflected in limited ability to subsidize EE investments.
2. **DATA CHALLENGES** including; measurement, availability, accessibility, reliability and consistency.
3. **INFORMAL SECTOR**. This sector can hardly be targeted directly before it is formalized. Currently, the ministry of industry is considering viable approaches to formalize these entities. When formalized, they might add to the pool of micro-enterprises which have their own challenges.
4. **MICRO-ENTERPRISES** are challenging to address due to their large numbers, different affiliations, limited technical capacity, and non-bankability.

Multiple approaches are needed to address the various needs of the different target groups addressed in the IEE strategy within the industrial sector. Namely;

Large- intensive
Large- non intensive
Small-intensive
Small – non intensive.

Given the different characteristics of the industrial categories as well as their constraints, for the strategy to achieve the objectives, it will have to be sensitive to these characteristics.

Driving demand for Industrial Energy Efficiency will differ according to size. Some of these facilities have outdated technologies, limited skills…etc. This implies the need for extensive support to be able to replace equipment, as well as the need for training to be able to apply IEE interventions. Small industries, having less than 50 employees, represent 99% of the establishment and 60% of the industrial employment.

For the second objective concerned with ensuring **responsive supply**, the services provided by the different parties will differ according to the category given their different needs and nature. For example, small and medium enterprises (SMEs) need more support in training and capacity building than larger companies who can afford to hire/ outsource experts.

Regarding the third objective which is to **enable the government**, the government's role will change slightly according to the different categories. For example, there should be a consensus between the government and large industries given the political power they have arising mainly from their size and number of employees.

More government support is expected to be provided to small industries to be able to optimize their energy consumption and reach their energy saving potential. In other words, while energy savings on a national level would imply a government focus on energy intensive industries, the government is responsible towards helping smaller industries as well to overcome the impact of subsidy reform through energy efficiency.

Key success factors for the IEE strategy were identified. One such factor is that for EE to be sustained, it should become a core business issue. This means that it should positively affect profit margins, give a competitive advantage and Open up a new market or preserve current markets. Another factor is establishing a formal mechanism for data collection at the facility level. Moreover, given current challenges, government funding should be rationalized. Finally, sectors should be prioritized; any suggested measure has to be compatible with the facility's capacity and aptitude.

5. Policy

Sets of policies are established to create demand for IEE and a corresponding set of policies to secure supply. Policies enabling the different government entities to manage the IEE ecosystem are also proposed. Additionally, the selection of effective tools considers whether the facilities are new or already exist.

Given the need to ensure that policies are implementable given the existing challenges, policies necessitating the following were not considered for the current phase:

- Requiring extensive micro-data for implementation
- Relying on strong regulatory capacity for implementation and enforcement
- Requiring robust financial models
- Requiring substantial state financing, subsidies for implementation
- Requiring strong energy service providers capacity

For the policy to be sustainable, it has to

- Facilitate and support performance quantification and benchmarking
- Create a sustainable, continuous internal demand for IEE, minimizing reliance on external drivers
- Mobilize existing institutional capacities

To the enterprise the policy should

- Be compatible with existing level of know-how of the enterprise
- Diffuse cultural change

Moreover, the enterprise should be able to derive customized actions from the policy directed to them, i.e. imposing “one-size-fits-all” policies should be avoided.

Thus, the goals in the first stage for policies to adapt to these constraints, is to

- Achieve substantial energy savings through EE,
- Establish an EE culture in industrial and regulatory bodies; and
- Widen the scope of policies for the following years through relieving major constraints especially with regards to inadequate data and capacity.

When establishing those policies, the phasing strategy adopted mainly took into consideration the size and energy intensity categorization as a reference. Policies are phased such that they target at first the most organizationally,

technologically and financially competent and capable (i.e. predominantly large energy intensive) industrial sub- sectors. Additionally, the majority of policies proposed are continuously expanding in terms of size (from large to small) and energy intensity (from intensive to less intensive). Thus, they are not bound to a timeframe but they will "mature" and cover most of the industrial sector in no less than 10 years.

The demand for IEE is primarily created when the industrial enterprise adopts EE as a core business issue and thus as a regular part of its responsibilities. The main premise at the core of most of the policies proposed to trigger demand is to ensure an energy management system (EMS) through a variety of means and leverages by the government. EMS has the advantage of being an internal and comprehensive system managed by the company itself and entailing periodical audits, data reporting, among others. This serves the near term goals of IEE mentioned above.

Given the proposed phasing strategy, the industries targeted at first for the adoption of EMS will form a "critical mass" of industries that will build the momentum towards EMS implementation within the specific sub-sector. Once these systems are engrained in the everyday business of the targeted industries, the system will expand within the sector, starting with energy intensive industries and moving on to the less energy intensive over time. Meanwhile, phasing out selected equipment increases demand on energy efficient equipment on one hand and also expediting IEE in sectors not yet reached by EMS policies.

EMS as a tool will result in the generation of data pertaining to the different facility activities and operations, together with other policies. In recognition to the data challenges stated stringent data verification mechanisms should be established to guarantee satisfactory data quality.

Regarding SMEs, the policy proposed for them bridges the gap between their present need for EE and the actual demand for it by extending technological (in terms of equipment and services) and financial support from a dedicated entity[3]. As for energy intensive SMEs (e.g. bricks, foundries), a dedicated program will promote energy efficient technologies.

In parallel to the policies proposed, public disclosure will be used as a tool to:

- Make the energy performance of the targeted sectors for each phase public, improving the accountability of the enterprises.
- Mitigate unfair practices by publicising criteria upon which a facility EMS deemed acceptable by regulators

[3] In a recent effort to support small and medium industries, early July 2015 the Social Development Fund signed a cooperation protocol with innovation and technology center under the ministry of industry entailing financial and non-financial support to new and existing small and medium industries. The support includes technical assistance, training, consulting services as well as providing finance for the different industrial sectors. Although not explicitly addressing energy efficiency, technical assistance could include provisions for IEE.

- Mobilise equipment suppliers and service providers through informing them about current and upcoming trends
- Guide new comers to the market conditions

Finally, it is worth pointing out that a key step in instilling the culture of energy efficiency in the industry is having the State and military-owned establishments take the lead, whenever possible, in implementing energy efficiency interventions and EMS.

In general, supply policies need to be synchronised with demand policies to ensure the success of the overall system. However, first and foremost, policy and decision-making units need to be established at the competent executive industrial entity(ies) to ensure effective governance and decision-making to all IEE policies and procedures.

Accordingly, most of the demand policies will come to effect and carry out their activities after the policy and decision-making units have been set-up and supply policies are enacted. A notable policy exception would be requiring an operative EMS from energy intensive industries with strong organisational capacity such as cement, iron and steel, fertilisers and petrochemicals.

5.1 Policy Summary

Drive industrial sector demand for Industrial Energy Efficiency	Ensure responsive supply	Enable Government
1. Include EMS in export requirements 2. EMS as condition for state procurement 3. Establish system for grid-connected combined heat and power (CHP) 4. Phasing out selected equipment 5. Reach out to SMEs through intermediaries 6. Ensuring efficient energy performance of new facilities, operations and processes	7. Ensure Quality of Energy Management System Consulting Services through certification 8. Link Qualified consulting Services to rising demand on Energy efficiency technologies 9. Minimum Energy Performance Standards (MEPS) 10. Create an awareness mechanism that leverages integrated information related to IEE 11a. Capitalize on FEI fund to subsidize Industrial Energy Efficiency Projects 11b. Augment cooperatives fund to finance IEE projects	12. Mandatory reporting for registered facilities as a condition to renew their license 13. Ensure proper & effective governance mechanism of all related IEE policies and procedures

Description	Owner	Stakeholders
Strategic Objective 1: Drive industrial sector demand for Industrial Energy Efficiency		
Policy 1: Incorporate EMS in export procedures		
This policy requires sectors exporting energy intensive goods (i.e. goods whose energy costs comprise more than a specific percentage of their cost structure) to have the following: • An operative energy management system (EMS) • Reported energy data • Approved and implemented EE plan Incorporating EMS for export can be carried out through the export duty such that export duties are imposed on targeted products and waived on a product if it is produced from a facility with EMS	IDA	**Support:** ENCPC, Export councils of relevant industries and FEI, Foreign trade sector, Energy Planning Authority **Facilitate:** NQI, ITC, Foreign trade training center **Evaluate:** Policy Unit at MOI
Policy 2: Incorporate EMS as a condition for state procurement		
Incorporate EMS as a condition for state procurement as the government has the right to stipulate certain conditions on the materials they acquire or acquired by their contractors. The conditions could include that such material are sourced from manufacturing facilities with an operative EMS system, which report energy data and implement their plans to pursue EE. The policy proposes the imposition of these conditions in multiple ways, including adding a condition in the project's tender documents that specifies that contractors should source specific raw materials from facilities with EMS having an acceptable implementation status.	IDA	**Support:** NQI/ITC, General Authority for Government Services (GAGS), Relevant ministries e.g. Ministry of Housing, Energy Planning Authority **Facilitate:** NQI, ITC, **Evaluate:** Policy Unit at MOI
Policy 3: Establish system for grid-connected combined heat and power (CHP)		
Establish operational system for grid-connected combined heat and power (CHP) through a decree. The operational system should be established such that the electricity prices encourage CHP and resolve any issues that might arise with regards to grid management; metering and accounting systems, etc. are resolved before the decree is issued.	Egypt ERA	**Support:** EETC **Facilitate:** FEI **Evaluate:** Egypt ERA

Policy 4: Phasing out selected cross-cutting equipment		
Selected installed cross-cutting equipment should be replaced, over a specified number of years based on a set of criteria including nameplate performance specification, size and age. It is proposed that Minimum Energy Performance Standards (MEPS) are the reference against which equipment replacement is obligatory, such that equipment whose efficiency is e.g. 80% that of the MEPS or less (depending on the case) will be replaced. The percentage should be set such that, when replacing the majority of equipment, an acceptable payback period (less than 5 years) is achieved.	Industrial control authority (ICA)	**Support:** Industrial technology development sector (MoI)/ ENCPC **Facilitate:** FEI/ FEI-ECO **Evaluate:** Industrial Control Authority (ICA)
Policy 5: Strengthen industrial organizations to provide IEE support		
Build-up and strengthen the capacities of industrial organizations (chambers and cooperatives) such that they can independently support their members on matters regarding IEE. These organizations thus become the interface through which SMEs receive assistance. The government will follow-up on the progress of these organizations and provide direct assistance to industrial organizations if requested. This policy also proposes that the new entity catering for small and medium projects extends support on IEE to SMEs through creating guidelines to outline energy saving opportunities for each sector of SMEs, recognition programs as well as financial support	The announced new entity concerned with SMEs.	**Support:** Production cooperatives and FEI, FEI-ECO, MoF, Industrial technological development sector (MoI) (including ENCPC), IDA **Facilitate:** FEI and production cooperatives **Evaluate:** New entity concerned with SMEs, Production cooperatives and FEI
Policy 6: Ensuring efficient energy performance of new facilities, operations and processes		
Ensuring efficient energy performance of new facilities, operations and processes through limiting license provision to targeted facilities unless: • the production technology employed is at least at par with that of the most efficient decile of local manufactures/technologies • If they are committed to establish their EMS (noting that the EE plan will not include significant interventions such as equipment change for some time) If an industry does not have a precedent locally, international best practices should be the reference as there are no local plants to compare, and compete, with.	IDA	**Support:** ENCPC, Energy Planning Authority **Facilitate:** NQI **Evaluate:** Ministry of trade and industry-Policy unit

Strategic Objective 2: Ensure responsive supply		
Policy 7: Ensure quality of energy management system consulting firms through certification		
Establish a certification mechanism for consulting firms and individuals in the field of Energy Management System that encompasses a renewal processes to the certification holders in order to ensure that they are actively operating in this field. This mechanism also allows for categorizing the consulting firms based on a point system that aids in having structured clusters of different levels of consultancies. EMS consulting firms should be able to submit an executive summary of auditing reports to the certifying body for the number of industrial facilities served allowing for data gathering and analysis to build knowledge on sectorial trends and know how.	NQI	**Support:** IDA, FEI **Facilitate:** Donor Funded Projects **Evaluate:** Ministry of trade and industry-Policy unit
Policy 8: link qualified consulting firms to rising demand on energy efficiency technologies		
The policy aims to provide the market with qualified technical consulting firms / individuals in different engineering fields (mechanical – electrical – chemical- engineering). This qualification process includes: • Registration • Setting the technical standards for the consultant's know-how • technical assessment by a central accreditation body that will ensure compliance to international standards in this field • Awarding consultants the certificate to be able to operate in the market. There is also a renewal processes to the accreditation holders from the engineering consulting firms and a points system in order to ensure that they are actively operating in their respective fields.	NQI	**Support:** Industrial Training Center (ITC), IMC/FEI **Facilitate:** Technical training centers, Donor Funds **Evaluate:** Ministry of trade and industry (or EGAC)
Policy 9: Minimum Energy Performance Standards (MEPS)		
This policy requires Minimum Energy Performance Standards (MEPS) to be developed with a focus on equipment that comply with the following prioritization criteria: • Have high potential energy saving, where priority is to those with highest potential • Are used across a large number of industries, where the most cross-cutting are given priority • Are imported, where priority will be for imported equipment rather than the ones manufactured locally	Egyptian Organization for Standardization and Quality (EOS)	**Support:** ENCPC, MoI Policy Unit, Ministry of Finance, Industry and technology development sector (MoI) **Facilitate:** FEI **Evaluate:** Custom authorities, IDA, Ministry of trade and industry-Policy unit

Policy 10: Create an awareness mechanism that leverages integrated information related to IEE		
Establish a mechanism/platform responsible for raising awareness on the benefits of energy efficiency in Egypt, targeting both direct and indirect stakeholders. This including banks, government, industrial sector, with its various sizes and activities, and energy consulting services, in addition to all owners indicated across the other policies. Awareness is also raised on topics including IEE financing options, technologies and announcing relevant strategies and policies.	Federation of Egyptian Industries (FEI)	**Support:** IMC **Facilitate:** IDA, NQI, EOS, MOF, ERA, Banks, Industrial Sector, Energy Consulting Services **Evaluate:** FEI, Ministry of trade and industry-Policy unit
Policy 11a: Capitalize on FEI fund to subsidize Industrial Energy Efficiency Projects		
This policy aims to capitalize on the Federation of Egyptian Industries funds in order to subsidize Industrial Energy Efficiency Projects with special focus on small and medium enterprises (SMEs). In order to ensure that these funds are being put to best use, a ceiling can be set (i.e. maximum amount of money per facility). This ceiling will be more attractive to smaller facilities (as larger ones may need larger amounts).	FEI	**Support:** Ministry of Finance
Policy 11b: Augment cooperatives fund to finance industrial energy efficiency projects		
Augment the funds available to the Productive Cooperative Union in order to finance industrial energy efficiency projects for its members. In order to increase this fund, it is proposed that the ministry of finance (MOF) establishes a cooperation protocol with the Cooperative Union to finance its members in order for them to undertake EE projects and interventions based on certain terms and conditions. The flow of funds will only be sustained if data is provided, audits are undertaken, transparent criteria are set, relatively long payback (more than 3 years) is proven	New entity concerned with SMEs	**Support:** Ministry of Finance, IMC and Industrial technological development sector (MoI) (including ENCPC), IDA **Facilitate:** NQI /ENCPC **Evaluate:** Energy Planning Authority, IDA, New entity concerned with SMEs, Production Cooperatives

Strategic Objective 3: Enable government institutions to plan, regulate and monitor IEE ecosystem		
Policy 12: Mandatory reporting for registered facilities as a condition to renew their license		
This policy aims at creating robust data (i.e. reliable and consistent) to enable effective decision making through mandatory reporting for registered facilities as a condition to renew their license. Data collection includes: General data and information, data on industrial production, data on energy consumption. Noting that license renewal is every 5 years, it is a requirement that yearly data must be submitted on time. As such, industrial facilities will be obliged to deliver the required data and face risks of having their license revoked if they do not deliver or deliver inaccurate data.	IDA	**Support:** IMC, Ministry of Industry, Ministry of Electricity and Renewable Energy, Ministry of Petroleum and Mineral Resources, Supreme Energy Council **Facilitate:** FEI **Evaluate:** Ministry of Industry, Ministry of Electricity and Renewable Energy, Ministry of Petroleum and Mineral Resources, Supreme Energy Council
Policy 13: Ensure proper and effective governance mechanism of all related IEE policies and procedures		
This policy aims to ensure proper and effective governance mechanism of all related IEE policies and procedures. This policy proposes identifying policy units at the sectoral level, in our case within the ministry of industry to specifically handle industrial energy efficiency. That is; own the current document and detail and update the industrial energy efficiency strategy and policies and report to the Egyptian Energy Planning Authority that will identify the status of energy efficiency on the national level and not just on the ministerial level. The unit will be reporting directly to the minister with its members recruited internally, from the ministry of industry.	Ministry of Industry- Policy Unit	

6. Integration and Mutual Support

Policies proposed are to be implemented as “packages” to ensure the presence of necessary support and their success. The “packages” can be carried out in parallel, with the priority given to those needing the least prerequisites for implementation (e.g. CHP package and EMS for large energy intensive industries).

1: CHP package

2: EMS package

3: Equipment upgrading package

4: SME Support package

5: Data acquisition and processing package

7. Long Term Preview

For each sector, a portion of the existing enterprises will implement EMS to become exempt from export duties and to be eligible to supply State projects. New entries to the industry will adopt exclusively energy efficient technologies and an EMS. Only after a “critical mass” is created within a sector, it will be possible to oblige the remaining enterprises in the sector to report data and eventually have an implemented EMS to have their licence renewed. [4] When mandating data reporting as a condition to license renewal, a program to promote EMS will be put in place in parallel to raise the industry’s awareness. This program will have the benefit of using case studies from the same sector in Egypt as demonstration cases. After a given time period, EMS will also be mandated as a condition to license renewal.

These conditions on licensing will only represent a novel requirement for those enterprises that do not export or bid for state projects the acceptance of these license requirements will be much facilitated after a “critical mass” is created within a sector.

After having this combination of tools operative and moving from one sector to the less energy intensive sector for a period of time, a substantial part of the Egyptian industry will considerably improve their energy efficiency.

Later, if the need arises, a wider variety of tools can be employed to further drive down energy consumption for selected industries such as quantitative performance-based agreements and regulations (yearly benchmark of savings and costs for specific sectors).

Performance-based regulations require a legislative framework implemented through a regulator with a strong inspection and enforcement capacity which is not currently available. Moreover, performance-based regulations should be based on micro-data that is currently unavailable. The implementation of the proposed policies for a number of years should relax these two critical constraints.

Additionally, an established culture of IEE could in the future facilitate voluntary agreements

This confirms the need for the goals set for the first 10 years (achieving EE, establishing an EE culture and widen the scope of policies for the following years) and their importance.

[4] The more limited the number of enterprises in a sector the better as those who establish the EMS will be able to influence the rest of the sector.

Activity	Target	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Onwards
Undertake studies on local technologies to identify most efficient ones	L, EI												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
	S, EI												
Ensuring EE of new facilities	L, EI												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
	S, EI												
Prepare and issue decrees which exempt facilities with EMS. from export duties	L, EI												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
Export duty and exemption (where applicable)	L, EI												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
	S, EI												
Program to change outdated technologies	S, EI												
Incorporate new conditions on EMS for contractors in State tender documents	L, EI												
	L, med. EI												
	L, non- EI (Tier 1)												
	S, EI												
	L, non- EI (Tier 2)												
EMS condition for State procurement (where applicable)	L, EI												
	L, med. EI												
	L, non- EI (Tier 1)												
	S, EI												
	L, non- EI (Tier 2)												
Consider performance based regulations	L, EI												
	L, med. EI												
	L, non- EI (Tier 1)												
Data reporting for license renewal	L, EI												
	L, med. EI												
	L, non- EI (Tier 1)												
	S, EI												
	L, non- EI (Tier 2)												
Promote EMS in entire sector	L, med. EI												
	L, non- EI (Tier 1)												
	S, EI												
	L, non- EI (Tier 2)												
EMS as condition for license renewal	L, EI												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
	S, EI												

Table 1: Evolution of EMS coverage across the different industrial sectors

L, EI: e.g. cement, steel, fertilizers, aluminum, copper and petrochemicals
L, med. EI: e.g. ceramics, porcelain, metal products and glass
L, non- EI: e.g. textiles, food and beverage, paper, rubber and plastics
S, EI: e.g. bricks, foundries, glasswork, paper etc

8. Immediate Action Plan

The actions needed from the various entities pertaining to the proposed policies within the **first 6 months** after approving and adopting this document is detailed below.

Ministry of Industry	
Policy 13	1. Create Policy Unit 2. Undertake the pivotal role of coordinating all activities below
Policy 4	Allocate resources and build organization capacity of Industrial Control Authority
Policy 7 & 8	Allocate resources and build organization capacity of NQI
Policy 12	Allocate resources to build the capacity of the new unit concerned with energy efficiency and renewable energy

Ministry of Finance	
Policy 5	Establish a cooperation protocol with the Cooperative Union to finance its members on carrying out IEE
Policy 11	Establish the system to infuse and/or direct funds to FEI and cooperatives union funds to support IEE sign protocols

National Quality Institute	
Policy 1	Create an inventory of energy service providers/consultants catering for all industries.
Policies 7 and 8	1. Identify resources and capacity required to be able to perform its function 2. Identifying certification prerequisites 3. Build the operating model of the certification processes 4. Design templates and forms for certification
Policy 6	1. Create an inventory of energy service providers/consultants catering for all industries as per policy 8. 2. Researching the local (and international, if needed) processes and equipment for targeted industries

Federation of Egyptian Industries (FEI)	
Policy 3	1. Inform local suppliers of potential CHP equipment (under the chamber of engineering industries - FEI) 2. Inform facilities with CHP potential on the potential CHP equipment and technologies to be installed
Policy 5	1. Communicate needs to support their members to new entity concerned with SMEs 2. Support their members in implementing IEE
Policy 8	Formulate a technical committee that will help NQI set the accreditation standards and criteria
Policy 10	1. Choosing communication platforms 2. Allocate resources to establish platform

FEI- ECO	
Policy 11a	1. Develop the fund (along with the Ministry of Finance) 2. Lobby and coordinate with the different stakeholders in order grow the fund through liaising with the Ministry of Finance, donor funds and any domestic or international grants earmarked for energy efficiency programs. 3. Set up the mechanism for evaluating and selecting from applicants
Policy 5	Extend their financial and technical services to include more facilities and sectors as per policy 11.

Egyptian Organization for Standardization (EOS)	
Policy 9	1. Data collection and Identify Inefficient Equipment (utilizing IFC study) 2. Develop an action plan (phasing the equipment for MEPS)

Industrial Development Authority (IDA)	
Policy 1 and 2	1. Set templates for data and plans for each sector 2. Set mechanisms for data collection, assessment (data verification tool), analysis and revision. 3. Set mechanisms for plan collection, assessment, analysis and follow-up. 4. Personnel capacity building
Policy 6	Start the process of modifying licensing criteria for new facilities to include EE assurance
Policy 12	1. Identify resources and capacity building required for the new unit concerned with energy efficiency and renewable energy to perform its role 2. Identify data to be collected

EGYPT ERA	
Policy 3	1. Undertake studies to estimate the potential of CHP in the industrial sector. 2. Undertake studies to ensure adequate grid management, metering and accounting systems 3. Issue the decree for the executive regulations for the law governing CHP

Industrial Control Authority (ICA)	
Policy 4	1. Identify resources and capacity needed to perform its role 2. Initiate equipment selection for phasing out and replacement, in conjunction with policy 9

New entity concerned with SMEs	
Policy 5	1. Identify the chambers and cooperatives targeted according to each phase and get their buy-in on the program 2. Conduct audits to develop guidelines, if needed. 3. Engage financiers (funds from donor entities and the ministry of Finance) 4. Setting “model systems”, based on the current system at FEI-ECO, feedback from beneficiaries and cooperative capacities.
Policy 11b	1. Assess financial needs 2. Establish the protocol’s terms and conditions 3. Set up the mechanism for evaluating and selecting from applicants

ENCPC	
Policy 1	Support in setting systems for EE plans and data acquisition, consulting the relevant industry
Policy 4	Assist in map out cross-cutting equipment used in the different industrial sectors along with their status in order to select a set of equipment for phasing out and replacement, based on existing information.
Policy 6	Support in setting systems for EE plans and data acquisition, consulting the relevant industry
Policy 9	Identify inefficient equipment by performing studies and agree on the equipment to have MEPS with EOS

Egyptian Electricity Transmission Company (EETC)	
Policy 3	Ensuring the network’s capacity/ability to receive and transmit additional loads

Production Cooperatives	
Policy 5	1. Communicate needs to support their members to new entity concerned with SMEs 2. Support their members in implementing IEE

Industrial Modernization Center	
Policy 8	Formulate a technical committee that will help NQI set the accreditation standards and criteria

1. Introduction

1.1 UNIDO's program and project

The industrial energy efficiency (IEE) project supported by the United Nations Industrial Development Organization (UNIDO) aims to tackle the urgent need to optimize industrial energy consumption locally and offer models to the local industries in order to shift to a more sustainable energy consumption pattern. Ultimately, the goal of this project is to reduce greenhouse gas emissions by promoting continuous improvement of energy efficiency in industries and eventually transforming the market towards industrial energy efficiency. The project is expected to complete its mission by:

- Strengthening the policy and regulatory framework in Egypt inducing a wide scale dissemination and adoption of energy efficiency, energy management standards in energy intensive industries;
- Improving productivity and competitiveness of energy intensive industries by reducing their reliability on energy consumption and hence their operational costs by promoting compliance with national energy efficiency and energy management standards;
- Increasing awareness on industrial energy efficiency and energy management in Egypt;
- Building capacity of stakeholders (industrial enterprises, policy makers, national consultants, etc.) to develop and implement energy efficiency projects.

Thus, the IEE Project is designed to extend support to all stakeholders involved in the energy supply chain for the industrial sector (excluding national power plants and the national grid). The project includes the following components:

- Component 1: National program to define energy benchmarks and energy efficiency policy
- Component 2: Raising awareness on industrial energy efficiency and management in industry
- Component 3: Capacity Building for Energy Efficiency Services
- Component 4: Access to finance for energy efficiency improvement projects
- Component 5: Implementation of energy management systems and system optimization

The Consortium awarded the first project component is composed of two Egyptian consulting firms, Environics Management and Development Advisors and LOGIC Energy Management Consulting (Project terms of reference in annex 1). In parallel, international consultants Ea Energy Analyses and Aura Energy were assigned to

develop the methodology and framework for strategy and policy development and to provide support to the Egyptian counterparts.

This document is the final deliverable of the first component of the project concerning energy efficiency policy. It encompasses the results of three main activities;

Activity I: Baseline Assessment

Activity II: Industrial Energy Efficiency Strategy

Activity III: Industrial Energy Efficiency Policy

1.2 Aim of the document

This document aims to propose a set of policies to be enacted to achieve IEE. To this end, the document also brings forward a framework outlining the course from the assessment of the current situation regarding IEE followed by the inception of the IEE vision and the subsequent strategic objectives. Finally, policies serving the strategic objectives are proposed along with their monitoring and implementation mechanisms. Moreover, responsibilities are allocated to fulfill the proposed policies.

1.3 IEE Framework

A framework represented by a “Value Chain” serves as a narrative to aid in assessing the process of creating an Industrial Energy Efficiency policy set.

Six segments represent the conceptual value chain; **Input, Vision, Strategy, Policy, Implementation, and Monitoring**. This depicts an idealized scenario of creating and executing a successful policy.

Policy creation starts with **“Input”**, which refers to the knowledge and information necessary for creating an IEE policy. Following is the **“vision”** which is the aspiration or the long term target and what the policy aims to achieve. This is followed by a **“strategy”** that provides a roadmap towards the vision by deciding where to play and how to win. Consequently, specific **“policy”** or policies are to be constructed, aligning with the strategy and acting as a guide to actions taken by the administration in order to translate strategy to actions. The **“implementation”** and **“monitoring”** of each of these policies would be the next segments in the value chain. To ensure proper execution, the responsible entity should be identified, as well as a timeframe for implementation. Monitoring, or the systematic process of observing and checking the progress or quality of a specific entity or process, ensures that the strategy and the policies are being implemented in a way that would help achieve the vision.

In each of the segments one goes through the following stages: understanding the **“current situation”**, considering various relevant ***“data”***, performing an **“analysis”** of knowledge at hand, which ultimately leads to a **“proposal”**. Finally, support or **“consensus”** for this proposal is garnered. One can envision this as a matrix, where columns are the segments of the value chain and various stages are the rows, as per Figure 1 below.

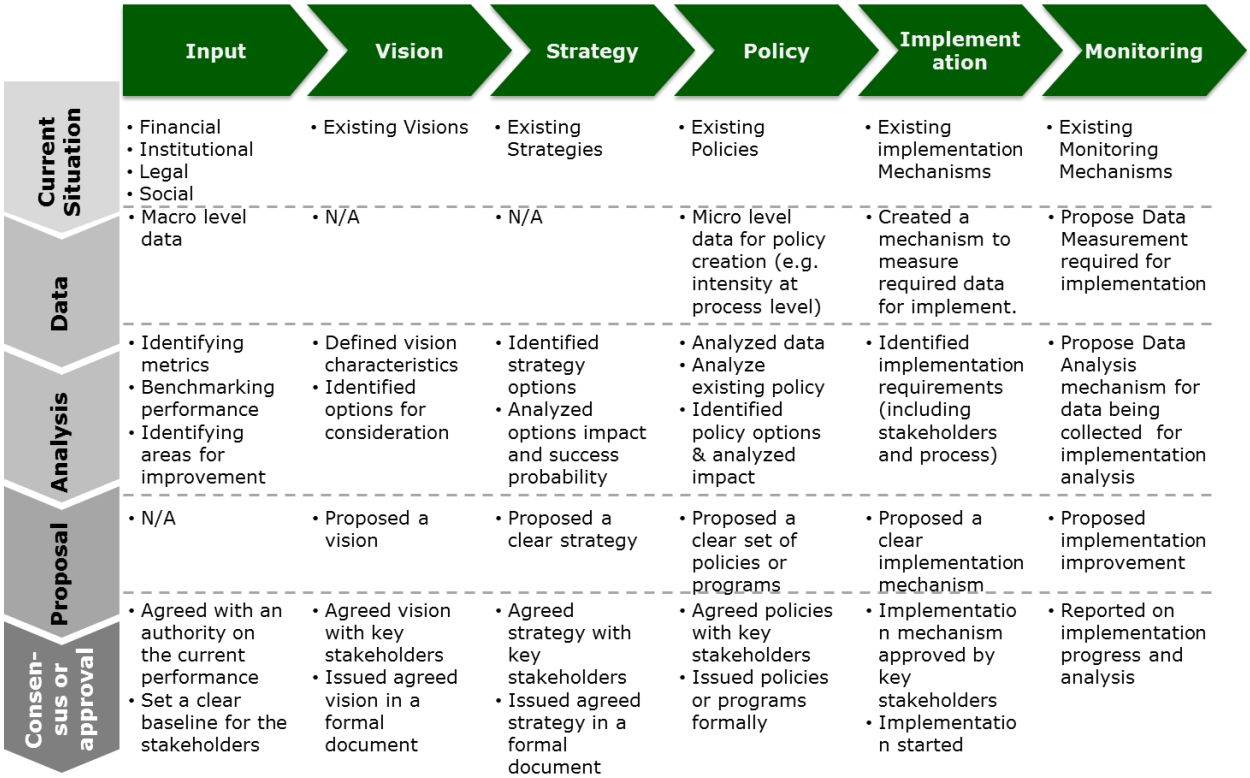


Figure 1: Value chain for policy development

N/A stands for Not Applicable

As a sequel to the baseline report (see Appendix) that elaborated on the current situation and its analysis, this report emphasizes on the proposal stage and reflects on the process of proposing the IEE vision, strategy and policy set.

1.4 Methodology

Stakeholder engagement was core to this project throughout its different stages and was reflected in the series of interviews, workshops and think-tank meetings carried out throughout the duration of the project as to benefit from the vast and diverse experiences, as well as garnering support from all stakeholders.

The early stages of the project focused on reviewing the previous works done on IEE and illustrating the IEE landscape in Egypt. The current industry anatomy and situation of IEE in Egypt was identified, aided by reviewing a selection of 23 reports of relevance to the field (appendix) and interviewing key stakeholders to obtain insights and eventually conducting a think tank meeting to agree on the status of IEE in Egypt. Members of the think tank were composed of professionals from academia, government, service providers and industrialists (see annex 2, table 1).

These efforts concluded in a Baseline Report (appendix) after which another think tank meeting was held to present findings and articulate the vision. The implications of the vision on the strategy were identified along with the principles guiding the strategy. Strategic objectives defining the IEE ecosystem were delineated.

In parallel, discussions were carried out with the project's international counterparts EA Energy Analyses on their deliverables, namely reports on International Best Practices and Approach for Developing an IEE Strategy and Roadmap for Egypt. The local consultants also discussed strategies and policies suggested under the EU Technical Assistance to support the reform of the Energy Sector in Egypt (TARES project)[5], to ensure compatibility and consistency.

The first in a series of two workshops was then undertaken to:

- align on strategic objectives;
- generate potential actions to achieve objectives and mitigate challenges; and
- agree on the criteria upon which policies can be deemed viable

Following the workshop and input from participants (attendees listed in Annex 2, table 3), potential policies pertaining to the strategic objectives were derived. Those policies were shared and discussed in a second workshop where industrial associates had a higher representation (attendees listed in Annex 2, table 4). One-to-one meetings were undertaken (interviewees listed in Annex 2, table 5) to confirm owners, outcomes and phasing of the policies.

Following the review of this draft by the UNIDO IEE project, two final participatory steps will be undertaken; presentation to FEI leadership and presentation to ministries of industry and environment. Subsequently, a final workshop is planned to take place to finalize on policies and implementation plans, after which the final revision of this document will be issued.

5 This project was undertaken within the Energy Sector Policy Support Program (SPSP) by the European Commission.

1.5 Structure of the document

This report comprises eight chapters detailing the inception of the policies and their implementation plans.

- This first chapter is an introduction to the project and its position under UNIDO's IEE program.
- The second chapter presents the main features and characteristics of the industrial sector in Egypt to which an IEE strategy and policy is sensitive.
- The third chapter aims to brief on the previous efforts carried out in formulating IEE policy and strategy as well as the key takeaways.
- The fourth chapter presents the process followed to formulate and build consensus on the IEE vision as well as the implications of this vision on the strategies and policies.
- The fifth chapter presents the strategic objectives necessary for achieving the vision, challenges to achieve these objectives, with a focus on those common to all objectives.
- The sixth chapter introduces the different policy types as well as the proposed policies and the principles guiding them.
- The seventh chapter presents the immediate action plans necessary for successful initiation of policies.
- Finally, concluding remarks are communicated in chapter eight.

2.1 Current Industrial Landscape

The Egyptian industry is highly polarized in terms of size and energy-intensity[6].

Size

The modal size of Egyptian industries is micro. The high polarization of the industry is expressed in an actual gap in employment in medium size industries, making a clear boundary between smaller industries and larger ones (see Figure 2).

Industrial establishments having less than 10 employees represent more than 95% of industrial establishments in Egypt and employ around 50% of the workers in the industrial sector. A mere 0.5% of establishments employing more than 100 employees account for 35% of industrial sector employment, while 4% of the establishments employ between 10 and 100 employees and are responsible for approximately 15% of industrial employment. (CAPMAS, 2006)

Thus, the major contributors to employment are the small and large industries rather than medium industries, highlighting the polarization of the industrial sector.

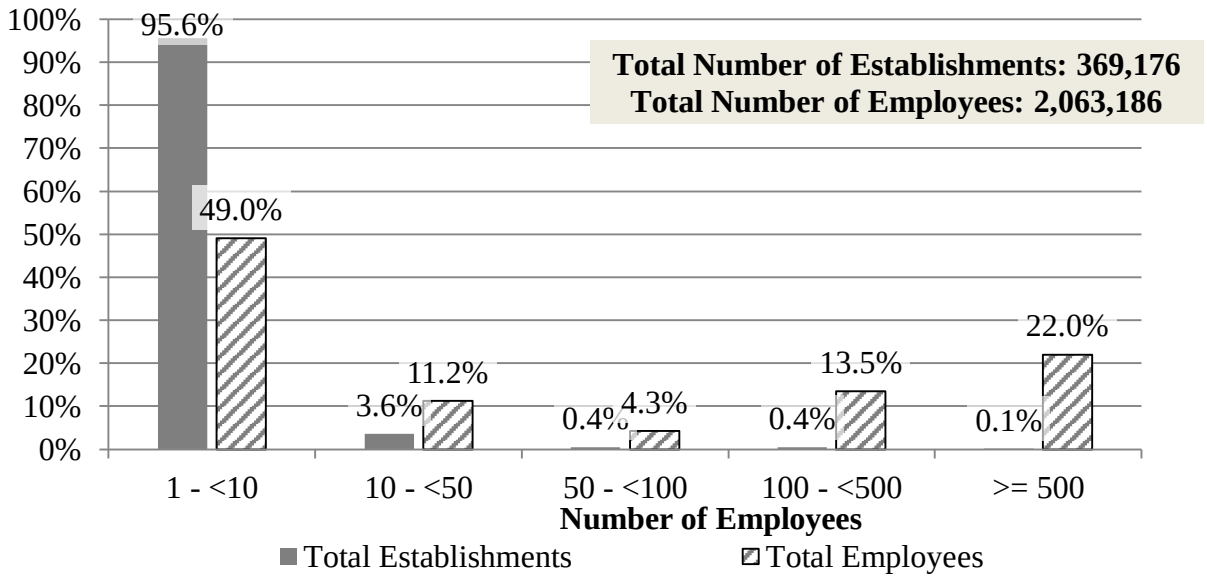


Figure 2: Number of Establishments and Share of employment

Source: CAPMAS 2006

Sector Distribution

Sectors employment follows the same pattern of concentration, as most of the employment is in limited sectors. Over 72% of industrial employment is in food, metal

6 Energy intensity of the industry is determined according to its cost structure. i.e. the contribution of energy costs to the costs of production.

products, textiles including ready-made clothes, furniture and electric devices, which all happen to be low energy intensity sectors. (CAPMAS, 2006)

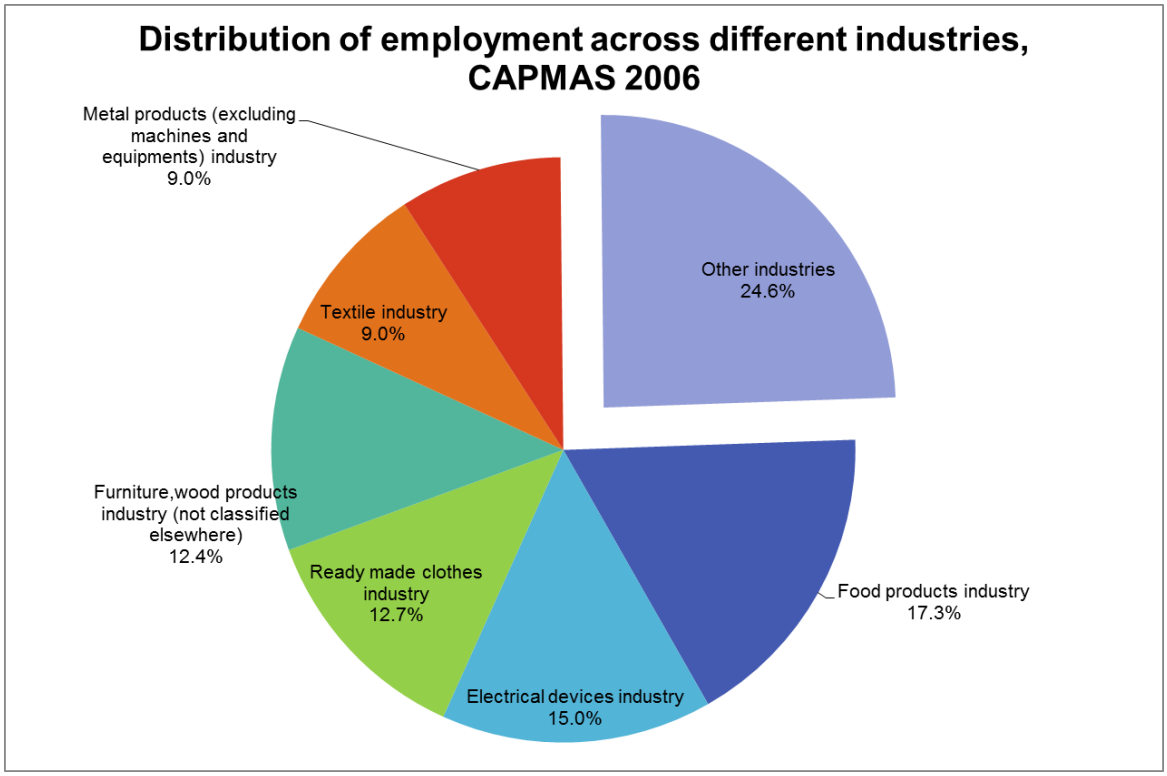


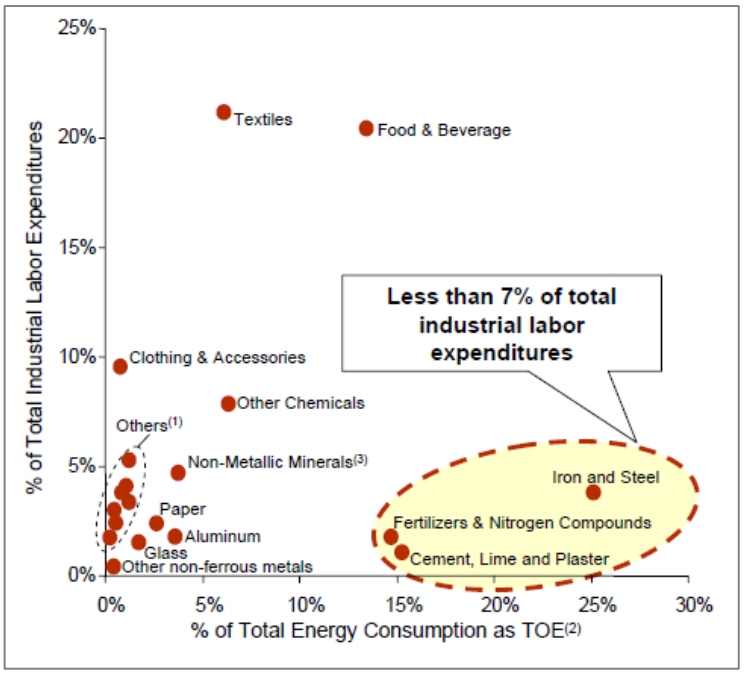
Figure 3: Distribution of employment across different industries, CAPMAS 2006

Energy intensity

Expectedly, energy intensive industries are not the major contributors to employment in the industrial sector, possessing less than 7% of total industrial labour expenditures as shown below (MoTI, 2007).

It is also noted that the iron and steel, fertilizers and nitrogen compounds, and cement, lime and plaster industries combined consumed about 55% of total energy consumption. (MoTI, 2007).

Other studies suggest that energy intensive industries represent 1% of the number of factories and consume 65% of the industry energy share. (AFEX, 2013).



(1)Includes Rubber and Plastics, Formed Metals, Machines and Equipment, Electrical Appliances, Motor Vehicles/Other Transport, Tobacco, etc.

(2)Based on energy costs and energy mix by Industry (3) Includes Ceramics (4) Excludes Oil and gas and Oil Refining

Source: CAPMAS Statistical Industrial Production Report 2006 (2004/05 data); IDA Consumption Data

Figure 4: Energy Consumption vs. Contribution of Industries 2005 [Figure from (MoTI, 2007)]

Thus given the different attributes of the Egyptian industrial sector, it can be categorised as follows.

	LI	L-NI	SI	S-NI
Enterprise Attributes	• Have a large number of employees (>100) • Energy represents a significant part of their cost structure (>10 %)	• Have a large number of employees (>100) • Energy forms a minor part of their cost structure (< 10%)	• Have a limited number of employees (<50) • Energy represents a significant part of their cost structure (>10%)	• Have a limited number of employees (<50) • Energy forms a minor part of their cost structure (<10%)
Ex.	Ex. Steel, cement fertilizers, aluminum, petrochemicals	Food, textiles, engineering, garments, wood, etc.	Glass products, bricks, foundries, etc.	Wood, textile, etc.
Core Sector Issues	• Enjoy high political power • May have international affiliations	• Enjoy high political power • A keen interest in export	• Have antiquated/ outdated technologies	• Large numbers • Limited Skills • Small energy contribution to costs
	Energy intensive industries consume 65% of the industrial energy			
	Represent 0.5 % of establishments and 35% of industrial employment		Represent 99% of establishments and 60% of industrial employment	

Figure 5: Industrial categories

2.2 Institutional Set up

General Outlook

Several national stakeholders are involved in energy efficiency activities in the industrial sector in Egypt at various levels of responsibility and degrees of participation and services provided.

Annex 3 presents most of the stakeholder participating in IEE activities in Egypt and their involvement in different areas relevant to energy efficiency in industry such as:

- Developing strategy and policy making,
- Performing studies and research.
- Project financing as well as implementation and monitoring.
- Providing education, training, awareness and capacity building.
- Supporting Technology transfer.
- Information management and dissemination.
- Legislation.
- Norms and standards.
- Energy supply and consumption.

Based on data, information, and experience gained about the actual involvement and the effective participation of the national and international stakeholders in energy efficiency initiatives and activities in industrial sector in Egypt, the stakeholders are classified and disaggregated, in annex 3, as: Directly related and involved in IEE and indirectly or partially related and involved in IEE. Their roles in inputs, vision, strategy, policy, implementation, and monitoring are outlined following the IEE Framework.

Focused Approach

Over the course of this project extensive meetings were carried out with government entities and the ones closest to decision-making as well as those with responsibilities relevant to IEE were defined. These entities from both the industrial and the energy sector are outlined below, emphasizing on their mandates and roles pertaining to IEE.

A. Industry

The industrial landscape in Egypt can be mapped along the governance pillars: Planning, Execution and Regulation. It is worth mentioning that the same entity can be repeated in several roles. For example, a planner has a monitoring role, as related to implementation of the plans and policies.

Even though execution is done by the industrial facilities themselves, there are entities that have a supportive role of facilitating implementation. This can be done via ensuring competitiveness of the industrial facilities, data collection and analysis…etc.

a) Ministry of Industry and Foreign Trade

The Ministry of Industry is the main industrial policy stakeholder as it is primarily responsible for setting industry and foreign trade policies as well as the preparation of industrial plans and maps for industrial development and attracting investments for small and medium industrial projects.

It also supports execution via:

- The development and modernization of the Egyptian industry in order to leverage its competitiveness;
- The development of industrial exports and the promotion and attracting of private investments to establish new factories;
- Providing the appropriate environment for the development and the utilization of technology to establish and develop Industry and foreign trade databases and its management.

Apart from monitoring its plans and strategies, the ministry oversees standardization, inspection and accreditation authorities to aid in regulating the market.

Also, under the ministry's regulatory role, the **Consumer Protection Authority (CPA)** is a governmental entity affiliated with the Ministry of Trade and Industry that aims to protect consumers, and regulate consumer-trader relations.

b) Federation of Egyptian Industries (FEI)

The aim of this non-governmental association is to enhance the performance and productivity of the sector members in addition to providing tools that facilitate the overall commercial and business effectiveness. Its main mandates are:

- To directly represent members' interests before governmental and legislative bodies, as well as other local and international associations.
- To participate in developing policies and legislations that result in encouraging investment and developing suitable environments conducive to rapid growth of national economy.
- To advocate structural reform that leads to transparency in governmental legislative & enforcement practices.
- To contribute to the development of Egyptian industry by improving competitiveness, adopting new technology and international quality standards.
- To provide information to its members via its databases, publications, seminars…etc. in order to serve their requirements.

Moreover, the Environmental Compliance Office (ECO) under FEI offers the following:

- Loans with administrative fees estimated by 2.5% to help the industrial enterprises to comply with environmental legislations;
- Technical consultations and labour training in the field of the cleaner production.

c) Industrial Development Authority (IDA)

IDA was established according to a presidential decree number 350 for the year 2005. It aims to achieve the continuous development and improvement of Egyptian industry. To facilitate governing the industrial sector, its prime activities include, but are not limited to:

- Setting the general policies and plans necessary for developing the industrial zones, in coordination with the governorates and other concerned entities.
- Studying the legislations concerning industry and setting pertinent proposals.
- Setting the conditions and rules enabling the private sector companies to establish, extend public utilities to, and manage the industrial zones, along with providing areas, lands and places in them for investors, and authorizing them to manage the industrial zones.
- Collect verified industrial data and issue periodical publications and factual guides on the status of industrial production, sources of raw materials and industrial products for export.

d) Industrial control authority (ICA)

The authority was founded and established according to presidential decree number (94) for the year 1956 placing it under the umbrella of the Ministry of Industry. Among its mandates, the authority undertakes Industrial Product Quality Control through:

- Periodic and continuous inspection on quality systems and production units to provide necessary technical advice to make any necessary adjustments to the existing systems.
- Inspection of the various stages including the stage of final product.
- Random samples of the final product or production stages preceding it if necessary and sending it to competent laboratories for analysis and review of the extent of compliance with the Egyptian standard specifications.
- Taking the necessary legal action against non-conforming products.

Moreover, the authority ensures the availability of applications and conditions to protect the environment and ensures the approval of the competent authority of

licensing. In case of any violations, it notifies EEAA. However, ICA has judicial seizure authority.

ICA also participates in the development of standard specifications with the committees formed by the Egyptian Organization for Standardization (EOS).

e) Industrial Modernization Center (IMC)

Established by a Presidential Decree number 477/2000, IMC is mandated to perform as the prime agent for substantiating the government's vision of a vibrant and globally competitive industrial sector, in addition to creating an enabling environment in which the private sector can lead growth and make Egyptian industries leapfrog into global competitiveness. To perform its role in planning and facilitating efficient execution, its main activities include:

- Launching initiatives in the different areas of sustainable industrial development through bilateral and multilateral agreements.
- Developing the appropriate operational and financial management capabilities to run such joint projects with maximum efficiency and transparency.

It is worth mentioning, however, that IMC offers its services to the industrial facilities registered with them which amount to only around 2,000 industrial facilities, accounting for less than 1% of total industrial establishments.

f) Egyptian Organization for Standardization (EOS)

EOS was established according to the Presidential decree number 29/1957. It sets industrial products norms and standards. It has a role in planning as it participates in Egyptian industrial development by providing data and different standardization and quality control studies for investors, industrials and decision makers.

As for its role in monitoring and regulation, it continuously develops Egyptian industrial products standards to comply with the international specifications and standards in order to increase its competiveness.

g) National Quality Institute (NQI)

NQI is established based on the Presidential Decree 351/2012. It is mandate to “provide training, qualification and technical consulting services and revising the quality systems (especially ISO systems) within the industrial facilities.”

NQI also issues certificates to the training service providers, besides revising and accrediting the training material in the field of quality, environment, safety and relevant activities based on international standards.

Therefore, NQI plays a significant role in monitoring the market and ensuring quality services in the industrial sector.

B. Energy Management

a) The Supreme Energy Council (SEC)

SEC members consist of key government ministries and the council directly stems from under the Prime Minister. SEC aims to provide overall guidance on energy sector strategy and energy sector policy. According to decree 317 of the year 2014, SEC has the mandate to accredit the energy strategy which EE is part of.

b) The Ministry of Planning

The Ministry of Planning assumed the mandate of the Organization of Energy Planning (OEP) after it ceased operation in 2005 and its mandate was transferred to the Ministry of Planning. OEP was established in 1983, through a presidential decree number 112, to have an overall responsibility for the energy sector. The main mission of the OEP was to analyze energy sector development and propose energy strategies and policies. It also aimed to promote the efficient use of energy through its role in raising the profile of EE in Egypt via data collection, analysis of EE potential, pilot projects, capacity building, awareness campaigns, energy audits as well as standard and label programs.

Utility level planning, i.e. the translation of the energy strategy into long term plans on the utility level (electricity, natural gas...etc.), is the responsibility of the Ministry of Petroleum and Mineral Resources as well as the ministry of Electricity and Renewable Energy. The energy efficiency unit (EEU) also plays a role in planning.

Given the centralized energy governance system in Egypt, the ministries of petroleum and electricity have an executive role as well.

c) Ministry of Electricity and Renewable Energy

The MoERE is primarily responsible for overseeing the development and operation of the power sector to ensure adequate power supply to meet the needs of economic development.

Regarding its role in execution, the Ministry of Electricity and Renewable Energy is responsible for the provision of electricity to all consumers across the nation. Its activities also include “restructure electricity sector to optimize investments and improve electricity services”.

The Ministry’s involvement in energy efficiency is generally more focused on promotions (e.g. switching to efficient lighting), but also devising its power factor regulations. The Ministry will be further enhanced through its current endeavour to establish its own Energy Efficiency Unit.

d) The Ministry of Petroleum and Mineral Resources

Regarding its role in utility level planning, the Ministry’s mandate is to secure oil and natural gas supplies through the expansion of exploration activities, diversification of resources and working to modify the energy mix, while maintaining environmental standards and sustainable development.

As for execution, the Ministry is primarily responsible for the exploration, development and operation of the petroleum and gas sector to satisfy the country’s demand for petroleum products and gas.

e) The Central Energy Efficiency Unit (CEEU)

CEEU is affiliated with the Information and Decision Support Center of the Cabinet. It is mainly responsible for the coordination and streamlining of national energy efficiency activities. Accordingly, its role extends to include both planning and coordination with execution entities.

f) Electricity Regulatory Agency (ERA)

ERA was established in 2000 to supervise the implementation of power sector policies and monitor sector performance. Its mandate includes ensuring that all activities of electric power generation, transmission, distribution, and sale, are carried out in compliance with the Egyptian laws and regulations, especially those relating to environmental protection. Moreover, it sets regulations that ensure lawful competition in the field of electric power production and distribution in the best interests of the consumer.

It is worth mentioning that ERA does not have any authority over price issues, contrary to the norm in most countries in the world.

Similar to the Electricity Regulator, a gas regulator is currently under development, but has not been established yet.

Gaps in the Current Institutional Setup

There is an institutional gap when it comes to IEE and EE at large. The current structure does not support accumulating data, knowledge and analysis necessary to create strategies and policies and carry out efficient planning and monitoring.

In Egypt, there is no Ministry of Energy that acts as a one overarching ministry possessing the overall responsibility for developing and coordinating the national energy strategy and policy. Instead, the responsibility for the energy sector is shared between the Ministry of Electricity and Renewable Energy (MOERE) and the Ministry of Petroleum (MOP).

This gap has been further increased by the disbanding of OEP (Organization for Energy Planning) in 2006. Sporadic EE activities are carried out at particular agencies and institutions on the regulatory and operating levels, with minimal coordination on a policy level. For example, an EE unit of the Supreme Energy Council was created with the aim of streamlining EE activities nationally and fulfilling the national EE targets. However, it is not very clear whether the EE unit has the formal authority to coordinate activities related to EE in the country (AFD, 2012)

Therefore, this structure requires a separate entity that would set the energy efficiency strategy in alignment with both ministries.

This specific gap is currently being addressed. In 2014, it was announced that an **Egyptian Energy Planning Authority** is to be established. However, the decree of its establishment has not been issued yet. This entity will be mandated to develop the Integrated Energy strategy and energy policy (i.e. responsible for the central planning) which includes energy efficiency and hence, industrial energy efficiency. The entity will also have the mandate of coordinating energy efficiency activities and acting as the

technical arm for the SEC. Reporting directly to the Prime Minister, the entity will ensure its independence from the Ministry of Electricity and the Ministry of Petroleum.

To be able to coordinate energy efficiency activities, the **Ministry of Industry** should have a **policy unit** concerned, inter-alia, with Industrial Energy Efficiency. The Energy Planning Authority would then coordinate its activities with the energy efficiency activities taking place in other ministries.

This policy unit would ideally own the current document and be responsible for the continuous updating and refining of the Industrial Energy Efficiency strategy and policies. Accordingly, based on progress made as well as the evolution of the context in which these policies are implemented, it should also monitor the implementation of those policies. That is, besides the continuous alignment with the numerous IEE stakeholders in the planning and monitoring phases, this unit should also have access to databases and the data collected from audits to be able to perform its role in monitoring and making effective plans.

Therefore, the current institutional structure is missing the **Ministry of Industry Policy Unit** that, among other policy activities, would be coordinating and continuously aligning with the different IEE stakeholders and would report to the **Egyptian Energy Planning Entity** that coordinates between the energy [efficiency] policy units in the different ministries. This unit is referred to as the MOI policy unit in this document.

2.3 Energy subsidy reform

Energy prices perceived by the industry are and have been a determining factor for endeavours in IEE. The government regulates and administers the prices of natural gas, petroleum products and electricity. Subsidies were put in place so that Egyptians can benefit from the country's oil resources and hence the government engages in policies to drop domestic energy prices below international levels to keep them affordable to most citizens. This necessitates financial subsidies to energy consumers and entails significant opportunity costs in terms of foregone foreign and government revenues.

In 2015/2016, subsidy allocations were estimated at EGP 163 billion, of which EGP 61 billion was assigned for petroleum subsidies. These figures are significantly less than the subsidy allocations in the previous couple of years, owing primarily to energy price reforms and declining international oil prices. According to the national budget, the price of Brent oil fell from about US $105.5/ barrel in 2013 to US $73.9/barrel in 2014, and is expected to reach US $75/barrel in 2015. However, Brent oil prices fluctuated below this figure, reaching US $53/barrel by the end of July 2015.[7]

[7] Bloomberg Business. Brent Crude (ICE) prices. 30 July 2015.

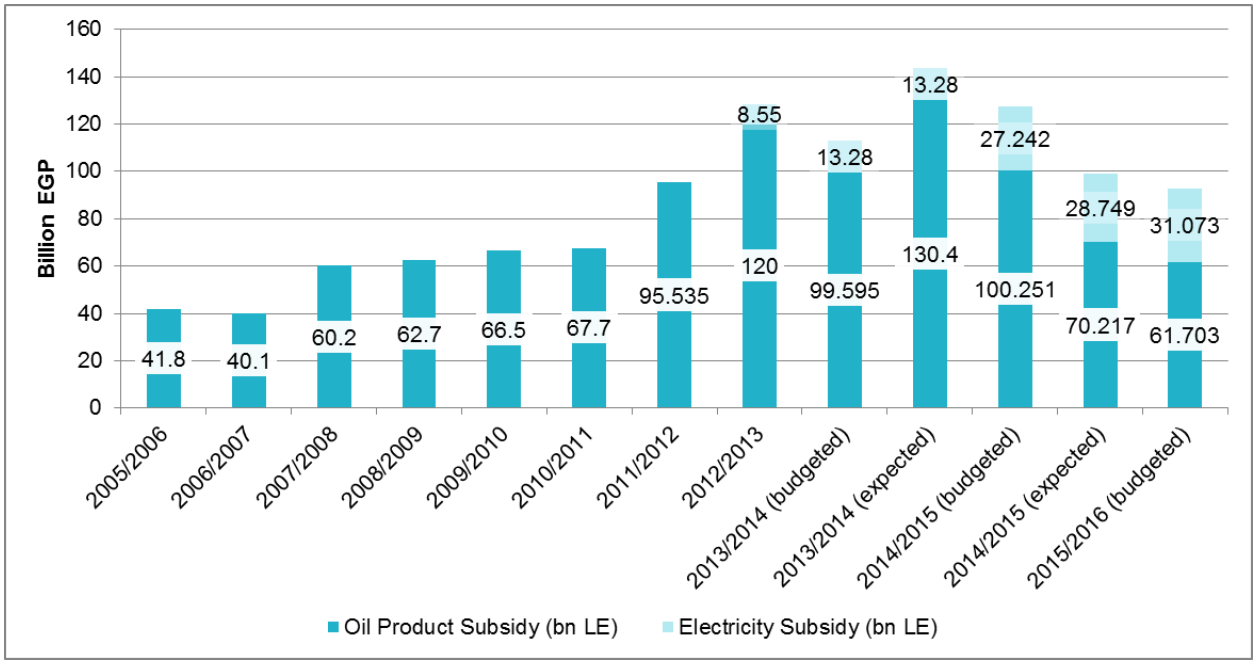


Figure 6: Petroleum product and electricity subsidy values (2005-2015)

Owing to the decline in the domestic production of oil and gas, fluctuations in the cost of energy supply as well as the government's growing budget deficit, the questionable sustainability of these subsidies led the government to launch an energy subsidy reform program in 2004. It entailed a sharp increase in the price of gasoline and diesel oil, and a gradual increase in the price of electricity and aimed at reaching full cost recovery by 2014.

Given the substantial energy consumption and limited number of energy-intensive industries, the government has specifically addressed them with policies and pricing systems in light of dwindling local resources. Energy intensive industries are seen by the government as the most apt users to pay at or above cost. Even if this is not an officially declared stance, it has been clear with the series of decrees issued from 2007 till now, separating energy intensive industries from the other users and gradually increasing the cost of fuels supplied to them. In 2008, the government substantially increased the price of natural gas and electricity to energy intensive industries. However, the reform program was suspended in 2009 due to concerns relating to the global economic downturn.

The trend of increasing fuel prices continued after the 2011 turmoil, reflected in the prime ministerial decrees 1257, 1258, 1273 in 2012. The latest of fuel price increases took place in 2014 when the Egyptian government announced, through a series of decrees, price increases for various fuels and consumers. As for natural gas, different prices were stated in PM decree 1162/2014 for the different industries, all of which saw an increase from previous years. An exception was for brick production where NG prices dropped from US$ 6 / million BTU (PM decree 110/2013) to US$ 5 / million BTU. Heavy fuel oil prices for all consumers also saw an increase under PM decree 1159/2014. Similarly, prices of diesel and kerosene for all consumers were raised under PM decree 1160/2014.

Moreover, in 2014 the Egyptian government took the unprecedented decision of issuing a decree (1257/2014) stating the electricity prices for the different consumers up till 2019.

Thus, as can be inferred, there is a considerable level of uncertainty regarding pricing levels as, to date, not all the plans for price increases are clear or announced and currently price changes are done for cost recovery purposes and fiscal issues. As opposed to electricity prices, which the schedule was announced for the next 5 years, fossil fuels were subject to a price hike, only with clear indications that others will follow. Furthermore, an electricity price schedule was announced to be contingent on the feeding fuel (natural gas and HFO) price to the utilities, but this condition was not stated in the related decree.

Although pricing revision set in motion represent a strong driver for demand on IEE, it will be seen that differential pricing schemes are not considered in the current policy document while prices are adjusted. These will add unnecessary confusion to an already fluid situation but can be considered, at a later stage, when the currently evolving pricing scheme will be settled.[8] Assuming that prices will be adjusted in 2020 to the financial cost of supply, it is only then that pricing can be considered for IEE purposes.

[8] The economic pricing of energy, reflected on the EE actions as will be discussed later in the vision, could be considered in this context.

3. Review of previous efforts: first phase summary

Reports addressing various aspects of IEE have been published in the past, forming a substantial body of knowledge. These were explored to gain information and insights on the IEE landscape.

3.1 Documents Reviewed

Out of 28 reports identified, a total of 23 reports were found relevant as they addressed IEE over the last couple of decades. These reports were reviewed and analyzed as they already explored the industrial landscape and the policies related to IEE[9].

The content of the reports examined were compared against the value chain mentioned in section 1.3, which helped creating a graphical representation of the assessment of reports with regards to development of IEE policy. While most of the reviewed reports did not particularly aim at proposing an IEE policy for Egypt, various valuable excerpts towards such end exist.

In the Figure below, the number in each entry represents how many reports addressed the information representing the entry. The color background indicates how adequately such element in the value chain was covered.

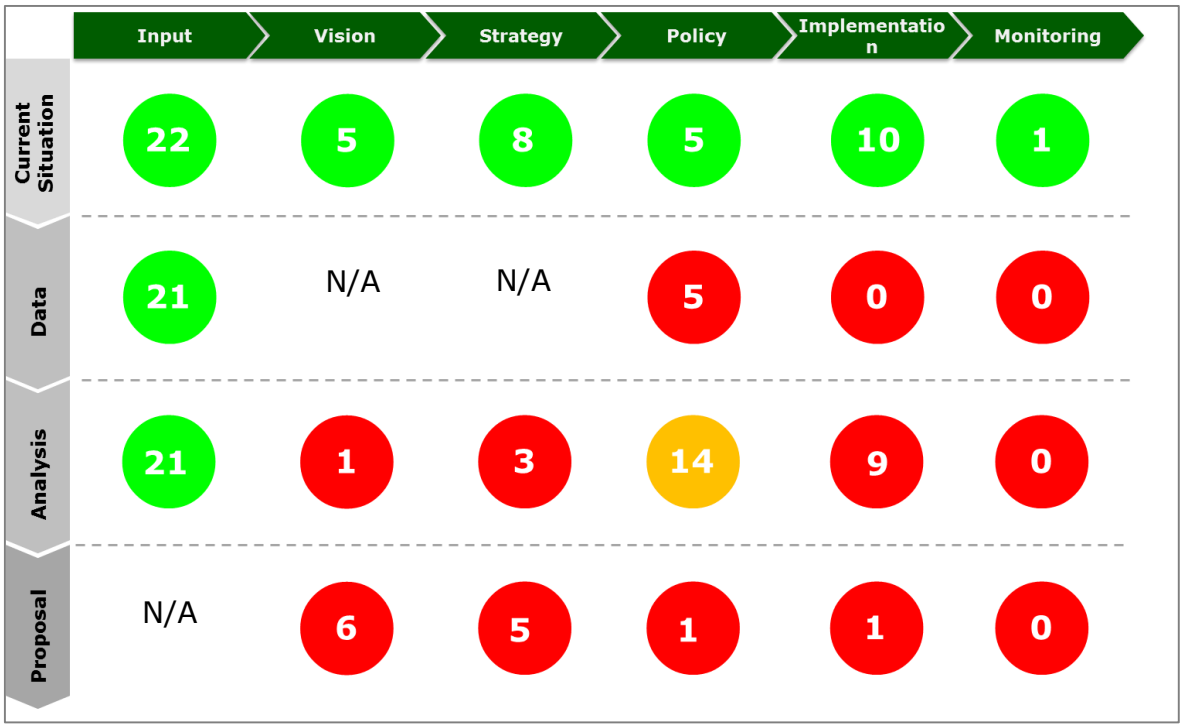


Figure 7: Visual evaluation of reports through the value chain.

Green refers to elements sufficiently addressed and would require minimal further work, yellow refers to the availability of valuable knowledge but further work is required, Red refers to element which still requires substantial work. Total number of relevant reports is 23.

9 The reports studied are stated in the annexed baseline report (Appendix).

Figure 7 shows the discontinuity along the policy value chain where amount of knowledge and information amassed (as per the input column) is disproportionate in comparison to the IEE policies proposed. That extensive coverage came at an advantage to the current assignment as it aided greatly in forming a solid background on IEE in Egypt. It is noted that the implementation and monitoring mechanisms are the least addressed in the reports which resulted in their falling short of implementable actions. The consensus stage is also remarkably missing which was highly reflected in the lack of actual implementation of the proposed actions.

The discontinuity in the value chain is evident in the analysis of proposals for vision, as shown in section 3.2

3.2 Proposals

The proposals brought forward in previous documents that pertain to IEE are presented in this section following the policy "value chain" introduced in section 1.3.

Vision

The only official energy efficiency vision referred to in previous reports is that of cutting 20% of 2007 consumption by 2022, which has not been translated into clear policies or actions. No analysis of that vision was available to the consultant either. In most reports, although no visions were proposed, strategies or policies were. As the policy value chain must be known to the consultants who produced these reports, it is possible that the reason for such discontinuity lies in the scope of work only intended to create strategies or policies. Although not official, other visions were suggested such as having the SEC of the worst performers in a specific industrial sector in Egypt approach the relevant international benchmark (AFD, 2012).

Strategy

No official EE or IEE strategies were put forward in the past. However, the need for energy strategies, industrial strategies, and pricing strategies were consistently discussed.

On the other hand, strategies proposed can be classified as follows,

- Those directing and moving the industry towards improving efficiency, for instance through direct financial (dis)incentives;
- Those increasing the capacity of government to implement IEE policies, for example through institutional reform or development of information systems, and
- Those removing barriers towards IEE, such as lack of awareness or lack of private sector investments in EE.

As with the proposed vision, the justification for the proposed IEE strategies was not clear.

Policies

Previous reports did not put forward IEE policies per se (see Figure 7) rather, they focused on discussing other relevant policies in the current situation. General EE policies, industrial sector policies, and pricing policies, were all mentioned in the reports.

There is a broad spectrum of recommended actions and ideas for policy development in the reports with limited clear policy proposals. Actions and ideas proposed can be categorized as follows:

Information and knowledge:

1- Improving awareness and providing training and education

2- Facilitating access to information and knowledge

3- Demonstration projects

4- Labeling, public recognition and energy audits

Financial:

1- Facilitating and providing funding for IEE projects

2- Negative economic incentive

Legal and institutional:

1- Institutional reform

2- Legal and regulatory measures

3- Standards

4- Voluntary and negotiated agreements

Implementation

An analysis of implementation mechanisms is expected to provide success requirements, potential barriers, and assessment of strengths and weaknesses of the proposed mechanisms. Only a few of the reports provided such an analysis. Reports proposed a wide spectrum of implementation mechanisms and ideas, those included:

- Performance management through performance agreements between entities and regulatory agencies as well as performance based Licensing Fees.
- Specifying sector specific indicators.

- Enforcing the institutional framework by creating units and entities in addition to empowering/strengthening existing entities through adequate staff, capacity building, budgets as well as clarifying responsibilities and mandates.
- Regarding finance, EE Commercial and /or Public funds, low interest loans, leasing and environment rating loan method.
- Energy Price reform through subsidy removal to increase energy prices, accompanied with necessary communication and transparency.
- Technology-oriented as the application of demand-side management techniques, for instance, the use of smart grids, interactive meters and load shedding incentives.

Monitoring

Monitoring is the least covered segment of the value chain. Proposals for monitoring involved three components; indicators, mechanisms, and monitoring entities.

Indicators proposed were those for measurement and attribution of changes in energy use in the economy, tracking energy use changes with time and relating it to changes in the size of the economy, economic structure, or efficiency of energy use were proposed.

Monitoring mechanisms included, self-monitoring, inspection, collection of information from Electricity, Water and Gas companies, field surveys, and IEE obligations in Environmental Impact Assessment (EIA) studies. On an institutional level, the establishment of an Industrial Intelligence Unit with the main role of monitoring the performance of the players in the industrial field was proposed.

3.3 EE Potential

Egypt has a high potential for improving its industrial energy efficiency. Even though the potential savings figures vary among different reports and although not all savings stated are attainable due to technological differences and different financial capabilities, the opportunity for savings is clear and present.

The potential energy savings for the Egyptian industry have been investigated by several entities in the past. For example, figures from 2010 suggest that the energy saving potential of the local cement, fertilizer industries account for about 10% and 18% respectively compared to the international average. While energy saving potential of the local iron and steel and aluminum industries account for about 23% and 11% respectively compared to the international average. (JICA, 2010)

Other figures from 2011 suggest that potential savings for local cement, fertilizer industries are 50% each. While energy saving potential of the local iron and steel and aluminum industries account for 25% each. (OME, 2011)

Apart from the discrepancies among the figures presented, the presence of considerable energy savings potential in the different industries is a fact. The potential saving figures are outlined in appendix, section 2.2

Recently, a series of benchmarking reports have been produced under the IEE project covering large, energy-intensive industries in Egypt namely, cement, fertilizers and iron and steel.[10] This effort offers the most recent insight into those industries identifying the technologies used, energy saving opportunities and their energy performance through site surveys.

These findings show the diversity in energy performance within the same sector, and although the figures for savings potential differ from previous reports, the findings reiterate the fact that the potential for savings is present across the different industries.

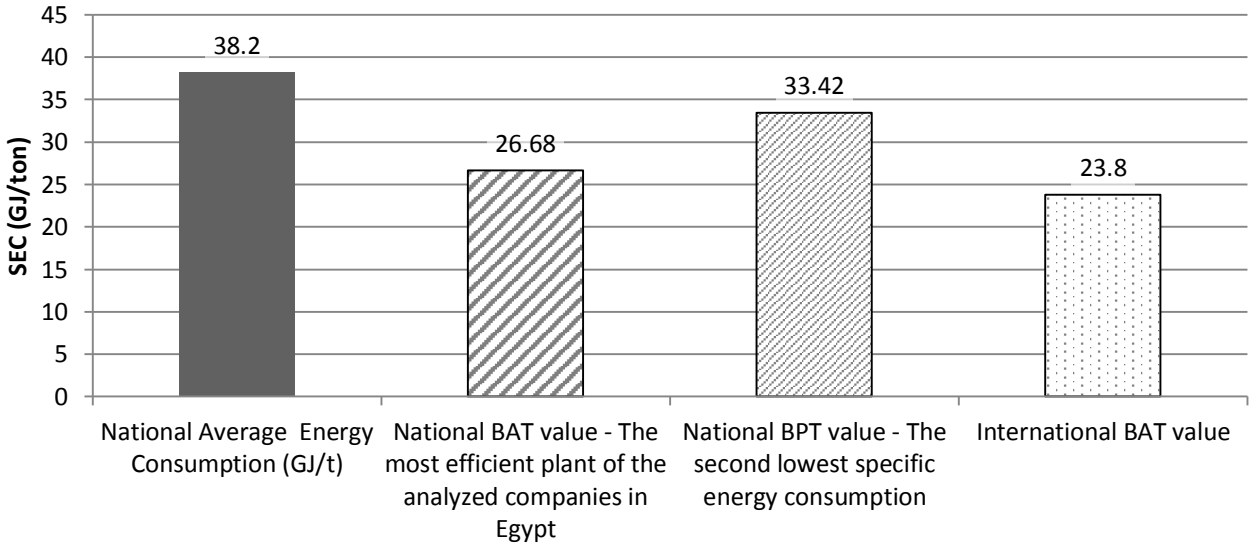


Figure 8: Average national energy consumption for fertilizer production in comparison to local and International BAT

[10] See references 6-8- in bibliography

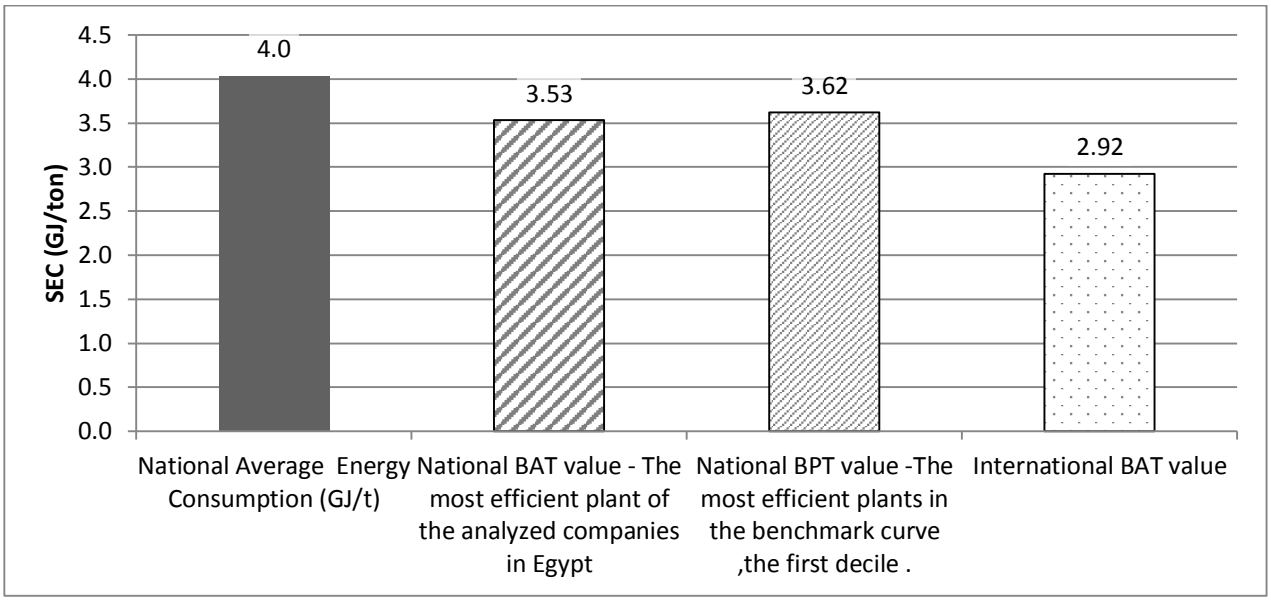


Figure 9: Average national energy consumption for cement production in comparison to local and International BAT

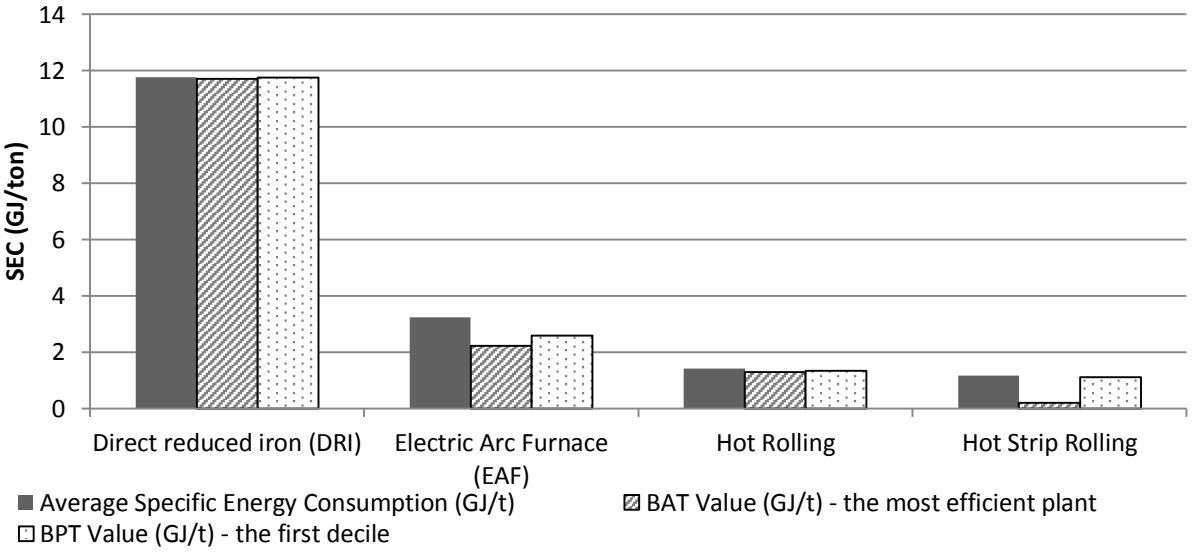


Figure 10: Average national energy consumption for iron and steel production in comparison to local and International BAT

3.4 Barriers to IEE

Based on analyses of previous reports and subsequent consultations, any endeavor in IEE will likely meet barriers on various fronts: institutional, industrial, legistlative and financial, among others. Such barriers should either be surmounted or alleviated by the proposed policies. Alternatively, policies need to be adapted to them, at least in the first stage of policy implementation, so as not to delay action.

Institutional

- Unclear responsibility distribution among the different involved government stakeholders
- Lack of a clear IEE ownership in the government to lead and promote EE
- Divorce between regulatory bodies and entities concerned with EE
- Lack of integration and synchronization between relevant government authorities.
- Administrative entities tend to have weak enforcement mechanisms and capabilities
- Weak institutional experience in EE strategy and policy negotiations
- Policy makers are less used to preventive measures and tend to focus on “end-of-pipe” approach
- Unclear development strategy and energy pricing strategy

Legislative

- Formal government legislations addressing EE are only recently starting to come through[11].

Financial

- Weak historical demand on funding for EE
- Lack of dedicated funding to promote and support EE activities and thus limited funding mechanisms
- The government has a limited capacity to provide incentives and subsidize EE investments
- Uncoordinated donor activity
- Weak awareness of the EE success requirements within the banking sector
- High financing interest rates

Industrial

- Weak historic demand for EE services

[11] EE is exclusively addressed in the fourth chapter in the electricity law 87/2015

- Low energy prices in the past accumulated a capital stock with inefficient equipment and processes
- Lack of EE culture. Thus, energy saving is not a priority for the facility as compared to increasing production or expanding markets.
- Capacity building already started a couple of decades ago and has not been sustained
- Micro-enterprises are difficult to target due to their large numbers, different affiliations and limited technical capacities.
- No sufficient guidance to small and medium industries
- The informal sector cannot be targeted directly before they are formalized

Knowledge and awareness

- Inadequate information and awareness, on the enterprise and governmental levels
- Data challenges in terms of availability, accessibility, reliability and consistency
- Limited access to information and lack of knowledge

3.5 SWOT analysis

Based on the thorough analysis of the current situation regarding IEE, the strengths, weaknesses, opportunities and threats pertaining to the pursuit of IEE can be summarized as follows.

Strengths

- Political will and support from the highest energy authority (Supreme Energy Council) to improve industrial energy efficiency.
- Due to the efforts being done in the IEE domain in the past 20+ years, numerous experts have been well trained on industrial energy efficiency, its challenges, opportunities and potential methods of improvement.
- Current electricity pricing structure promotes energy conservation and energy efficiency in heavy industries.
- A good part of intensive users have access to knowledge required to implement EE through their international affiliations.
- Human resources of the large enterprises, especially multinationals have the competence to make decisions and take actions regarding energy efficiency.

Weaknesses

- Lack of comprehensive and reliable data that can be obtained by decision-makers systematically.
- No clear regulations in the IEE domain, so decision-makers will be setting precedents.
- Weak institutional learning in energy efficiency strategy and policy negotiations (very little formal negotiations have taken place between the concerned parties on formal policy implementation and thus the whole institutional setup did not go through the learning stage).
- Weak awareness of the energy efficiency success requirements and needs within the banking sector.
- High financing interest rates.
- Subsidized energy prices influenced technology choices during the last couple of decades.
- Weak demand for EE from industry influence supply of services, finance, and data generation.

Opportunities

- Significant potential to save substantial amounts of energy if any strong policies are put in place.
- Many studies have been undertaken and include ideas that can be developed into policies and supportive measures.
- Several development banks/agencies are interested to support industrial energy efficiency and thus provide funds to trigger and stimulate real actions in that domain.
- Energy prices are expected to continue increasing.
- Large but non-energy intensive industries have high social impacts and are closely related to export and could benefit from certifications related to carbon foot-printing and environmental performance to support them in exporting and expanding their market.

Threats

- Primary energy pricing strategy for the industrial sector is not clear.
- Industrial development strategy is not clear.

- The current institutional setup is currently ill-prepared to implement and monitor policies to be issued, especially those requiring strong enforcement.
- Major industrial sector players have strong lobbies that can push against any measures that force them to invest in energy efficiency measures.
- Labour intensive industries can push back on EE measures that can influence their profitability in the short term with the excuse of putting their labour out of the job market.
- Synchronization and integration between the main involved parties (Ministries of Petroleum, Electricity and Industry) is only done at the very high level in the Supreme Energy Council meetings deeming decisions to be slow and often uncoordinated[12].

Considering the previous efforts and the industrial sector profile depicted so far, the following sections will bring forward proposals for items along the policy value chain starting with the vision.

[12] It is however noted that coordination concerning energy supply (not specifically efficiency) has clearly substantially improved, witness the success in overcoming power outages in the summer of 2015.

4.1 Methodology

The Industrial energy efficiency vision depicts the desired future outcome and defines the overall guiding principles.

To decide on the IEE vision for Egypt, several workshops have been conducted with representatives from the different ministries, entities, and the private sector. Through these workshops, numerous vision options were brainstormed and filtered according to set criteria. This process was triggered by the consultant through researching the different vision types and studying energy efficiency visions in different countries, including those proposed in Egypt.

4.2 IEE Vision Alternatives

A vision can take several forms as it can either be Quantitative, Qualitative or Prospective. While the Quantitative vision puts a clear target to be achieved in the future, the qualitative describes the desired future state of industrial energy efficiency, without indicating a specific number. Having a clear target makes the vision easier to control, so in a vision that states “reduce 20% of 2007 energy consumption by 2020” allows for setting milestones for this target and in 2020 measure the energy savings against the target to assess performance. This, however, requires high effort to reach a consensus on the target, unlike other types that are more descriptive. It also necessitates having adequate data to reach a well-informed figure, which is currently missing in Egypt.

Both the quantitative and the qualitative visions are based on the current situation as a reference point, unlike the prospective vision that it based on the future state. So a prospective vision will be predicting the future state and setting a vision based on it. For example “drive towards a carbon neutral industry”, foresees a world where carbon neutrality will become an important criterion for industry.

The comparison is further clarified in the figure below:

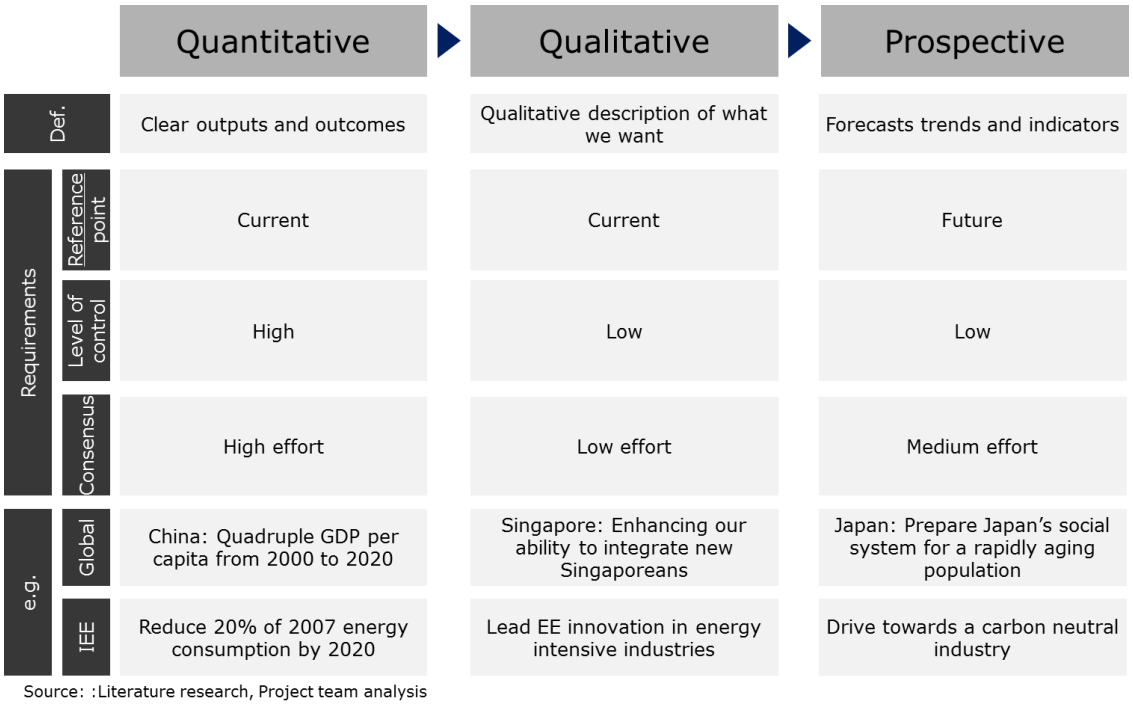


Figure 11: Comparison of different vision types

Multiple alternatives were proposed, according to the different vision types. The Quantitative vision options were:

- Reduce 20% of 2007 industrial energy consumption by 2020
- Reduce industrial energy intensity (Billion Oil Equivalent/USD) by 20% between 2015 and 2025
- Continuously improve industrial EE by 10% every 5 years

The Qualitative vision options were:

- Continuously improve industrial EE
- Be an innovation world leader in energy intensive industries EE
- The Egyptian industrial sector is world class sector when it comes to IEE

Only one prospective vision was discussed:

- Drive towards a carbon neutral industry

4.3 IEE Vision Principles

Through the workshops, as the alternatives were discussed, it was resolved that the vision should:

- Preferably be quantitative (or at least quantifiable)
- Imply continuously moving targets

- Address energy intensity (rather than energy consumption)
- A horizon/ time span for the vision should be set

Also, a set of criteria on which the vision should be evaluated was decided upon. These criteria agreed emphasize that the vision should be:

- Clear
- Ambitious
- Achievable
- Guiding (to reach the strategy and policies)

4.4 IEE Vision 2015

After applying the vision principles to the proposed alternatives and discussing draft visions word for word, the agreed IEE vision is:

The Egyptian industry continuously achieves the optimum energy efficiency level economically viable for the Egyptian society

أن تستمر الصناعة المصرية في تحقيق المستوى الأمثل لكفاءة لاستخدام الطاقة المجدي اقتصاديا للمجتمع المصري

4.5 Interpretation and Impact on strategy

Since the vision states the desired future or "where we want to be", hence, the interpretation of this vision is key in setting the strategic objectives and guiding the strategy at large.

This vision implies that the strategy should target **optimum** savings across the industrial sector, to be able to reach the optimum energy efficiency levels, as long as they are **economic at the society level.**

The **optimum energy efficiency level** implies that a facility with the financial and organizational ability to reduce its energy consumption should exploit this potential such that the magnitude of EE interventions corresponds to their financial and organizational capacities. The "do-ability" of an intervention can be measured by its payback period which can reach 5 years[13], and interventions having a longer payback period should not be imposed but all interventions having a shorter payback will be implemented.

As for "**economic viability**", it needs to be seen in light of,

- Ultimate decisions to invest or otherwise modify equipment or practices are taken at the industrial entity level.

[13] This proposed time span for payback was agreed in the workshops including members of different industrial sectors.

- Decisions are taken at the industrial entity level based on perceived costs and benefits and benefits to the enterprise (energy saved, monetized and non-energy benefits if any).

In other words, as enterprises are only concerned with the prices they perceive and regulators do not currently have the capacity to influence this perception through sophisticated tools, it will be too early to bring on board what is economically viable for the Egyptian society, as stated in the vision.

This should also take into consideration the large gap between current subsidized prices of energy and the full economic value (including social externalities e.g. national energy independence and environmental impacts). Assuming that prices will be adjusted in 2020 to the financial cost of supply (see section 2.3), it is only then that pricing can be considered for IEE purposes.

In light of the proposed vision, phasing of the strategy becomes essential. This means that policies and activities will be distributed along the time-period of the strategy, given the diverse sizes and intensities of the industrial facilities and whether they are new facilities or existing ones. The diversity is also apparent in the type, size and age of the equipment and the financial capability of the facility where different industrial categories will follow different tracks. Phasing is also needed due to the envisaged change in external factors, such as a subsidy removal.

Phasing implies the need for full transparency and communication through continuous reporting on the progress and the key performance indicators. This is needed to measure the success of the strategy and identify the need for interventions which leads to sustained progress.

Also, the strategy should be resilient to changes through its independency from external factors, such as a subsidy removal. This independency from any external factors ensures the success, feasibility and implementation of the strategy under any and all circumstances.

5.1 Methodology

The strategy is the path that leads to achieving the vision from the current situation through guiding IEE activities on the long term. Therefore, it should answer “where to play” and “how to win”.

To decide on the strategic objectives and the strategy as well as policies, the framework below has been followed.

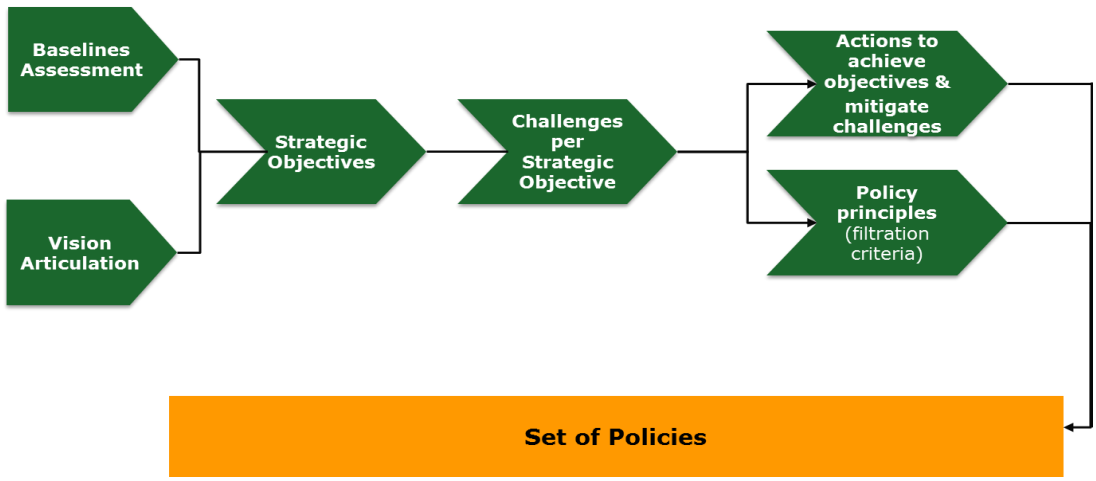


Figure 12: Policy inception framework

Baseline Assessment outlined the current energy saving potential in the industrial sector, the industry structure, areas of strength and weaknesses as well as opportunities and threats. The vision identified the desired status of Industrial energy efficiency in the future.

The gap between the vision that defines “where we want to be” and the current situation, identified through the baseline assessment defines the strategic objectives.

Challenges to reach those objectives are then identified so that by tackling those challenges reaching the strategic objectives is feasible. Accordingly, in a workshop setting in February 2015, actions to mitigate those challenges were identified, and were grouped to form policies that are filtered through the policy principles.

5.2 Strategic Objectives

Three key strategic objectives address the three main pillars of the Industrial Energy Efficiency ecosystem:

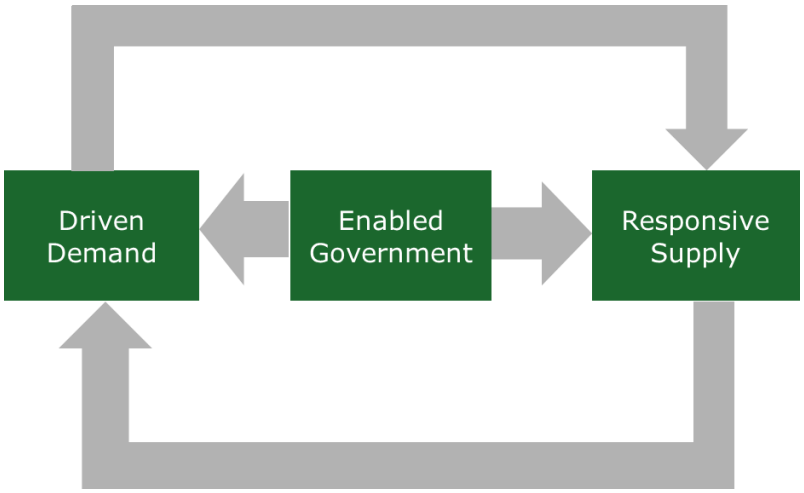
1. **Drive industrial sector demand for Industrial Energy Efficiency**

2. **Ensure responsive supply:**

    a) **Financial models for EE projects**

    b) **Technical services and equipment**

3. **Enable government institutions to plan, regulate and monitor IEE ecosystem**



Hence, to reach the optimum energy efficiency level in the Egyptian industry, there needs to be a demand from the industrial sector for energy efficiency. Also, this demands needs to be met by responsive supply, through providing quality services and energy saving technologies and offering financial services and models required to support the increasing demand for industrial energy efficiency. Both the driven demand and responsive supply should function in a mutually supportive ecosystem provided by an enabled government that can plan, regulate and monitor the execution of industrial energy efficiency.

5.3 Strategy Principles

Strategy principles are the essence of setting effective strategies as they define the characteristics of an implementable strategy. Accordingly, four principles have been developed and used to filter the strategy options:

- **Avoid Contradiction**: Strategy is in line with other government strategies and does not contradict them
- **Comprehensive:** Addressing the different issues in the different categories in a sustainable manner
- **Feasible**: Leveraged on current capacities and potential challenges. Also, phased based on all the players capacities
- **Clear**: Can be measured (performance indicators)

5.4 Major (common) Challenges

During discussions with workshop participants, the following challenges are common to all three strategic objectives, and can be categorized under four categories as follows:

Government Funding

- Limited ability to subsidize EE investments.
- Limited capacity to support EE capacity building e.g. providing training…etc.

Data Challenges

Data challenges represent a threat to industrial energy efficiency as it affects the planning, execution and monitoring. Ensuring availability of reliable data is key to setting efficient strategies and policies that optimize IEE as well as their effective implementation. Challenges regarding data include:

- **Availability**: Data does not cover all years and industries.
- **Accessibility**: Not all available data is accessible to all decision-makers.
- **Reliability**: Lack of clear data verification mechanisms.
- **Consistency**: Not all data is collected periodically and numerous entities collect the same data but through different methodologies, resulting in disparities and lack of consistency.

Informal Sector

The informal sector can hardly be targeted directly before it is formalized. It is worth mentioning that the informal sector encompasses numerous industries that are too small and large in number. More importantly, those in the informal sector are not licensed and there is no reliable record database that enables tracking and/or targeting them. Currently, the Ministry of Industry is considering viable approaches to formalize these entities. When formalized, they may add to the pool of micro-enterprises which have their own challenges.

Micro-enterprises

Micro-enterprises are challenging to address due to their

- Large numbers;
- Different affiliations;
- Limited technical capacity ; and
- Non-bankability.

5.5 Sensitivity to industrial category

As implied in the vision, there must be multiple approaches to address the various needs of the different target groups addressed in the IEE strategy within the industrial sector. Namely;

- Large- intensive
- Large- non intensive
- Small-intensive
- Small – non intensive.

Besides classifying the industrial sector according to size and intensity, it can be further classified as to whether it is:

- Old: which refers to an already existing facility, or
- New: in reference to a yet-to-be licensed facility.

Given the different characteristics of the industrial categories as well as their constraints, the strategy needs to take into consideration their sensitivity to the different objectives.

Driving demand for Industrial Energy Efficiency will differ according to size. For example, large facilities are mostly influential market players that either have international affiliations, which dictate some measures such as the use of specific equipment, or have very large employment often used to shield them from government policies or are public companies.

As for small industries, they are large in number which makes them harder to target. Some of these facilities have out-dated technologies, limited skills…etc. This urges the need for extensive support to be able to replace equipment, as well as the need for training to be able to apply IEE interventions. Small industries, having less than 50 employees, represent 99% of the establishment and 60% of the industrial employment.

Driving demand for IEE is also sensitive to the energy intensity of those facilities. For example, it is easier for energy intensive industries to materialize the potential energy savings into significant cost savings while non-energy intensive industries will require more effort due to lower energy contribution to costs.

For the second objective concerned with ensuring **responsive supply**, the following is an example of the list of services provided by the different parties:

- ESCOs (Consulting Services, EPC providers, and investors);
- Original Equipment Manufacturers (OEMs)[14];
- Financial institutions; and
- Training providers

The services differ according to the category, given their different needs and nature. For example, Small and Medium Enterprises need more support in training and capacity building than larger companies who afford to hire/ outsource experts.

With regards to the third objective, which is to **enable the government** to plan, regulate and monitor IEE activities, the government's role will change slightly according to the different categories. For instance, there should be a consensus between the government and large industries given the political power they have, arising primarily from their size and number of employees. Moreover, they do not necessitate external support from the government.

Unlike large industries, more governmental support is expected to be provided to small industries to be able to optimize their energy consumption and reach their energy saving potential. In other words, while energy savings on a national level would imply a government focus on energy intensive industries, the government is responsible towards helping smaller industries overcome the impact of subsidy reform through energy efficiency.

[14] Training may also be provided by OEMs as a way to create demand for their products.

5.6 Key Success Factors for the IEE strategy

- For EE to be sustained, it should become a core business issue, which means that it should:
    - Positively affect profit margins
    - Giving a competitive advantage
    - Opening up a new market or preserving current markets
- “Threatening” tools, such as penalties, should be avoided
- A formal mechanism for data collection needs to be established at the facility level
- The government responsibility extends to support small industries and given current challenges, government funding should be rationalized.
- Sectors should be prioritized, i.e. the strategy should focus on the most financially and organisationally apt industries at first and any suggested measure has to be compatible with the facility’s capacity and aptitude

6.1 Methodology

As elaborated in section 5.2, three core strategic objectives guide the policies and their implementation plans. Thus a set of policies can be derived for each strategic objective. Those policies make provisions for the different segments of the industrial sector where different sectors are targeted in each policy phase.

Thus, sets of policies are established to create demand for IEE and a corresponding set of policies to secure supply. Policies enabling the different government entities to manage the IEE ecosystem are proposed.

Phasing of policies will take size and energy-intensity categorization as its main reference. Moreover, the selection of effective tools considers additionally whether the facilities are new or already exist. The industrial categories addressed in the report are:

- Large energy intensive
- Large non-energy intensive
- Small energy intensive
- Small non-energy intensive

6.2 The different policy types

Policies generally fall under three main categories or types: informative, normative and economic. Policies are either exclusively any one of these types or a hybrid between two or three types.[15]

Informative: this policy type leaves a high degree of freedom, assuming that if the end-user has the right and sufficient information they will make an energy efficient choice. Examples for this policy type include; General information and campaigns (e.g. brochures, internet tools), labeling (e.g. buildings, equipment, appliances, vehicles) and tailored information (e.g. audits, energy management systems, EE networks), etc.

Normative: this policy type ensures compliance to the norms (i.e. the requirements). This type is key to assess the possibilities for checking compliance and issuing penalties in case of non-compliance. Examples for this policy type include minimal efficiency standard (building codes, appliance standards).

Economic: this policy type assumes that the end-user is motivated by economic signals. It also promotes the implementation of measures that are cost-effective from the end-user's perspective. Examples of this policy type include taxes and subsidies to EE investments.

[15] Industrial energy efficiency policy: International practice and experience and analyzed for application in Egypt. Aura Energy and Ea Energy Analyses. August 2014

A selection of different IEE policies as per the above type classification is represented as follows.

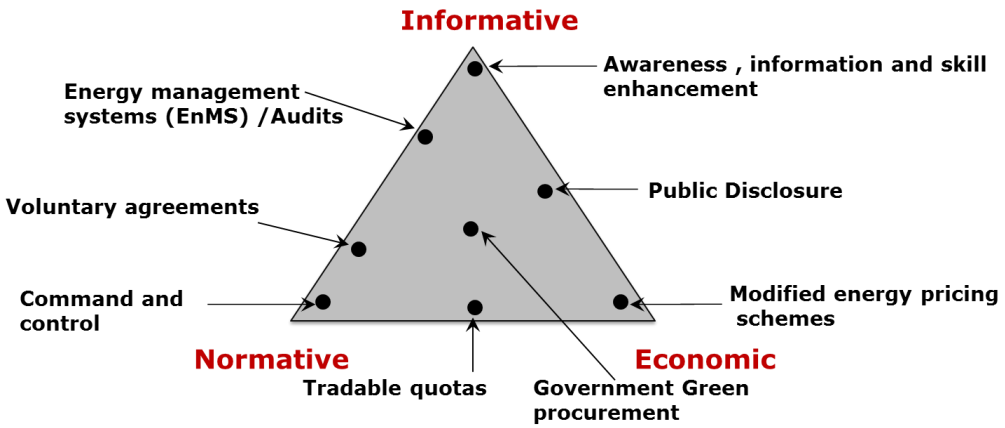


Figure 13: Different policies and their types

Where,

Modified energy pricing schemes

Pricing policies rely on financial incentives to rationalize energy consumption

Those include,

- General pricing levels; or
- Differential pricing schemes.
- Taxes/subsidies

Command and control policies

Command and control policies rely on regulation (permission, prohibition, standard setting and enforcement) as opposed to financial incentives to rationalize energy consumption.

Those include,

- Performance based regulations;
- Technology based regulations;
- Quantity restrictions.

Voluntary agreements policies

Voluntary agreements typically entail that the end-users voluntarily commit to carry out certain EE activities or reach a certain EE improvement level in return for economic rewards and information.

Those include,

- internal sector agreements
- Sector/regulator agreements

Market creation policies

These policies use, or redesign, the market mechanism to encourage certain reactions from the target community

Those include,

- Tradable quotas (in conjunction with quantity restrictions)
- Green procurement

Facility–specific interventions

Facility specific interventions mainly comprise high quality information targeted and adapted to the individual industrial company. Such information is either delivered by external experts or company staff.

Those include,

- Energy management systems (EMS)
- Mandatory audits
- EE Action plans

Information based tools

Information-based tools are typically uncontroversial, soft tools that support other activities and prepare the ground for new activities, policies and political acceptance.

Those include

- Public Disclosure
- Awareness
- Skill enhancement

6.3 Policy Principles [16]

Following the policy value chain from the inception of the vision and the strategic objectives through which the vision will be actualized, policies were derived bearing certain principles in mind[17].

[16] Those principles were discussed with the stakeholders in a workshop in February 2015.
[17] Reports by Ea Energy Analyses and Aura Energy were a main reference for obtaining the policy filters and selecting the possible policies to be implemented.

For a policy to garner acceptance and support the policies will ideally have the ability to

- gain social support,
- stimulate political will and support, and;
- Become accepted and promptly up taken by enterprises.

It is, however, likely that policies will not be similarly received by all groups in any specific society.

Given the various restraints limiting the possibilities for the policy and the need to ensure that policies are implementable given the existing challenges, policies necessitating the following were disregarded for the current phase.

- Requiring extensive micro-data for implementation
- Relying on strong regulatory capacity for implementation and enforcement
- Requiring robust financial models
- Requiring substantial state financing, subsidies for implementation
- Requiring strong energy service providers capacity
- Relying on set and announced future prices for implementation

For the policy to be sustainable, it has to:

- Facilitate and support performance quantification and benchmarking
- Have easily monitored and assessed performance
- Create a sustainable, continuous demand for IEE, minimizing reliance on external drivers
- Mobilize existing institutional capacities

To the enterprise the policy should:

- Be compatible with existing level of know-how of the enterprise
- Diffuse cultural change

Moreover, the enterprise should be able to derive customized actions from the policy directed to them, i.e. imposing “one-size-fits-all” policies should be avoided

6.4 Policy Timeline

In the midst of constraints mentioned earlier, especially those related to data challenges, institutional and service provider capacity, the policies will be initiated

across the different sectors to relieve those constraints. The goal of the first stage is for the policies adapted to these constraints to

- Achieve substantial energy savings through EE;
- Establish an EE culture in industrial and regulatory bodies; and
- Widen the scope of policies for the following years through relieving major constraints especially with regards to inadequate data and capacity.

As phasing is a major philosophy adopted, the majority of policies proposed are continuous and expanding in terms of size (from large to small) and energy intensive (from intensive to less intensive). They are thus not bound to a timeframe but they will "mature" and cover most of the industrial sector in about 10 years. Almost 5 years into the policies' implementation the market for IEE will be established and intricacies of a bulk of the industrial sector will be known and thus additional policies can be outlined. Those additional policies will not be specified herein as it is not possible at this point to define their particulars as they depend on many unknown variables. However, proposals are brought forward in section 6.6. After 10 years, the policies will reach maturity and their effectiveness and success will be assessed and additional policies can be put in place, further reinforcing IEE.

6.5 Proposed Policies by Strategic Objective

Markets only function and are sustained when the demand is reciprocated by supply. The market for IEE is no exception where the creation of demand is the precursor for a thriving IEE ecosystem, a necessary but not a sufficient condition for its sustainability.

Demand for IEE is primarily created when the industrial enterprise adopts EE as a core business issue and thus a regular part of its responsibilities. For an issue to become core to the business, it has to be essential for the business's successful operation and prosperity. To this end, energy management has to be linked to those core business issues.

This is the main premise at the core of most of the policies proposed to trigger demand; ensuring an energy management system (EMS) through a variety of means and leverages by the government. EMS has the advantage of being an internal and comprehensive system managed by the company itself and entailing periodical audits, data reporting, among others (see Box 1). Having EMS instilled in the facility will help the decision maker at the facility acquire necessary information regarding the facility operation. [18] It has been suggested in previous workshops that a chapter on energy efficiency can be included in the environmental register. However, environmental register requirements currently apply to all facilities. Unless the environmental agency considers different requirements according to industrial categories, these will not be in line with our strategy of phasing EE on sectors.

[18] The scope of this project is restricted to industrial energy efficiency, however, to optimize energy management, renewable energies should be considered in tandem with energy efficiency for industrial applications.

Box 1: EMS system

The EMS system proposed for the set of policies below is simpler than that of ISO 50001and requires industrial facilities to

- Secure top management commitment
- Allocate energy manager responsibility
- Assign energy management team and contact point (who will report)
- Undertake audits periodically
- Establish system of relevant personnel training (in-house or out-sourced)
- Set system for data management (generation and reporting) according to requirements
- Set system for EE planning (plan generation, submission for ratification, implementation and updating) according to requirements

Reported energy data

Data will be submitted to the relevant regulatory authority in a set template for each industry on an annual basis. Data collected can include information on industrial production (e.g. total production of different industrial products), information on energy consumption (e.g. quantity and value of different types of energy commodities). Furthermore, data collected should include information on waste heat (i.e. its sources and amount released) in order to facilitate identifying prospects for heat recovery.

EE Plans

A five year plan exhaustively undertaking interventions paying back in less than 5 years updated and submitted to the relevant regulatory authority annually and implementation reported.

Moreover, an audited energy balance at the end of each year should be undertaken.

This system serves the goals of IEE in the near future which are as per section 6.4: achieving EE, establishing an EE culture and widen the scope of policies for the following years (specifically through relieving data constraints).

Energy management is not a novel system to the Egyptian industries as facility energy managers have been trained in various industries. So far, the UNIDO IEE project provided technical assistance to 31 Industrial facilities in adopting Energy Management systems with some of them becoming ISO 50001-certified. Moreover, those are not the only facilities introduced to the system.

EMS implementation is the core of policies 1, 2 and 6 addressing links to exports, state procurement and licensing new production facilities, respectively. These policies are phased such that they target at first the most competent and organisationally, technologically and financially capable (predominantly large energy intensive) industrial sectors.

These will form a “critical mass” of industries that will build the momentum towards EMS implementation within the specific sub-sector. Once these systems are engrained in the everyday business of the targeted industries, the system will expand within the sector, supported by a “critical mass”, EMS will be linked to the renewal of any facility license. On the other hand EMS will continue to be gradually adopted by the less energy intensive sectors, eventually covering the entire[19] industry. Thus, ultimately all eligible industries would have an EMS implemented and operational. Links to EMS can potentially expand and vary afterwards after the initial links (e.g. export, government procurement) are well established.

Other tools used to create demand include improving the feasibility of waste heat recovery for electricity production to draw attention to heat wasted at the facility and its convenience as a resource, undermining the culture of waste at a facility (policy 3). Phasing out selected equipment is also proposed (policy 4) to increase demand on energy efficient equipment on one hand, but also expediting IEE in sectors not yet reached by EMS policies

Small and medium enterprises (SMEs), being most vulnerable to price increases, already realise the need for EE. Thus, the policy proposed (policy 5) for SMEs bridges the gap between the present need for EE and the actual demand for it by extending technological (in terms of equipment and services) and financial support from a dedicated entity[20].

As for energy intensive SMEs (e.g. bricks, foundries), from the onset only EE facilities will be allowed into the sector (policy 6). In parallel, a dedicated program directed to promote energy efficient technologies at energy intensive SMEs (See Box 3). This program should transform the small, energy intensive industries, creating a “critical mass” of industries with the aptitude to implement EMS, encouraging the rest of the sector to follow suit. While this “critical mass” is being built, the market for IEE supply will be taking form. Only then can EMS be introduced as a condition for state procurement from these industries and their license renewal.

[19] Excluding handicrafts, artisans and the like

[20] In a recent effort to support small and medium industries, early July 2015 the Social Development Fund signed a cooperation protocol with innovation and technology center under the ministry of industry entailing financial and non-financial support to new and existing small and medium industries. The support includes technical assistance, training, consulting services as well as providing finance for the different industrial sectors. Although not explicitly addressing energy efficiency, technical assistance could include provisions for IEE.

Box 2 : Program to change out-dated technologies in small, energy-intensive facilities (e.g. bricks)

Although the policies proposed can improve the energy performance of small, energy-intensive enterprises, a limited margin for reducing specific energy consumption exists due to the technological constraints.

Apart from this limited margin of energy savings, fundamental technological development is essential to achieve recognizable energy reduction.

As such an action cannot be undertaken solely through an EE policy, a comprehensive government program should be put in place to

- Develop existing range of products (e.g. sand-lime bricks versus fired bricks)
- Develop production process (e.g. tunnel furnaces versus open furnaces)

The government can also restrict technological options for new production facilities to only include efficient technologies (as per policy 6). In later stages, the government can acquire from a range of products serving the same purpose, the one with the lowest embodied energy. For instance, sand-lime bricks have an average embodied energy of 2.4 GJ/m^3 while conversely clay bricks have an embodied energy of 6.6 GJ/m^3.

A key step towards instilling the culture of energy efficiency in the industry is having the State and military-owned establishments take the lead whenever possible in implementing energy efficiency interventions and EMS. A further step in promoting a culture of EE can be to co-opt real estate companies and large contractors responsible for major construction projects to a government-led alliance through which they agree on acquiring products only from suppliers having an EMS. This will represent an important step in establishing the acquisition of materials whose manufacturing in energy efficient as a standard industrial practice.

In parallel to the policies proposed, public disclosure will be used as a tool to:

- Make the energy performance of the targeted sectors for each phase public, improving the accountability of the enterprises.
- Mitigate unfair practices by publicising criteria upon which a facility EMS deemed acceptable by regulators
- Mobilise equipment suppliers and service providers through informing them about current and upcoming trends
- Guide new comers to the market conditions (policy 6)

Communication and awareness means are discussed in policy 10.

Needless to say that EMS as a tool will result in the generation of data pertaining to the different facility activities and operations. Moreover, the implementation of other policies will lead to the generation of data as will be demonstrated in the coming section. Data collected will offer better insight into the performance of this industrial category as well as create the basis upon which this policy will be developed and other policies are devised. Thus, in recognition to the data challenges stated in section 5.4, stringent data verification mechanisms should be established to guarantee satisfactory data quality (see **Box 3**).

Moreover, as a result of the demand for IEE, EE Education should be included in curricula of higher education institutions and universities as early as possible. Vocational education institutes should train technicians and workers. EE education is not included in the policies proposed as the Ministry of Industry's role is limited to encouraging ministries representing education to include syllabi on energy efficiency. Furthermore, the impact of appear education on the industrial facilities will only on the long term and currently the impact on facilities does not exist.

Box 3: Data Verification

The quality of data reported by the facility could be insured through data verification mechanisms.

Analytical Assessment

Through comparing time series data of the same entity and data across entities, areas of potential flaws could be identified.

Cross checking

The same data collected from the facility could be cross-checked through energy suppliers. Both electricity and natural gas are metered and the consumption of a specific facility could be extracted from the distribution company records.

Similarly, the records of the distribution companies could be utilized to acquire information concerning liquid fuel, although it is not metered. All this information is stored and computerized.

However, as coding of the same facilities in the different energy suppliers' databases is not consistent, this issue needs to be resolved beforehand to be implemented on a large scale. However, when starting on a limited number of facilities, this issue can be surmounted.

Audits

On a selective basis, auditors should visit reporting facilities to confirm the sources of data from which its data has been prepared.

Facilities targeted by these audits are recommended to be from three groups:

- Those identified to potentially have reporting errors;

- Those not submitting their reports in a timely manner; and

- A random selection, as a deterrent to submitting deficient information.

The facility should ensure that all data which forms the basis of the reported data is retained for a period of not less than two years to permit audits to be carried out.

Qualified consultants in the fields of EMS and EE technologies and funding mechanisms as well as equipment energy performance standards are primary supply-side requirements that need to be fulfilled in order to complement the mechanisms proposed in the demand policies. In general, these supply policies (policies 7-11) need to be synchronised with demand policies to ensure the success of the overall system.

In other words, each demand policy will benefit from relevant support established through the supply policies. For example, EMS establishment as well as CHP installation will benefit from having certified consultants. Similarly, members of

industrial cooperatives[21] and FEI will benefit from Cooperatives Union fund and FEI-subsidised EE projects, respectively. Moreover, demand for energy efficient equipment can only be triggered after minimum energy performance standards (MEPS) have been established for the respective equipment. The links between the policies are further elaborated in the description of each policy.

IEE financing mechanisms proposed in the policies utilise existing and operational mechanisms. However, this does not exclude mechanisms such as the 130 million US dollar revolving fund to be established in agreement between the Egyptian Ministry of Industry and international donors. These could supplement our policies when it becomes operational.

However, first and foremost, policy and decision-making units need to be established at the competent executive industrial entity(ies) to ensure effective governance and decision-making to all related IEE policies and procedures. Thus, general demand policies will come to effect and carry out their activities after the policy and decision-making units have been set-up and supply policies are enacted.

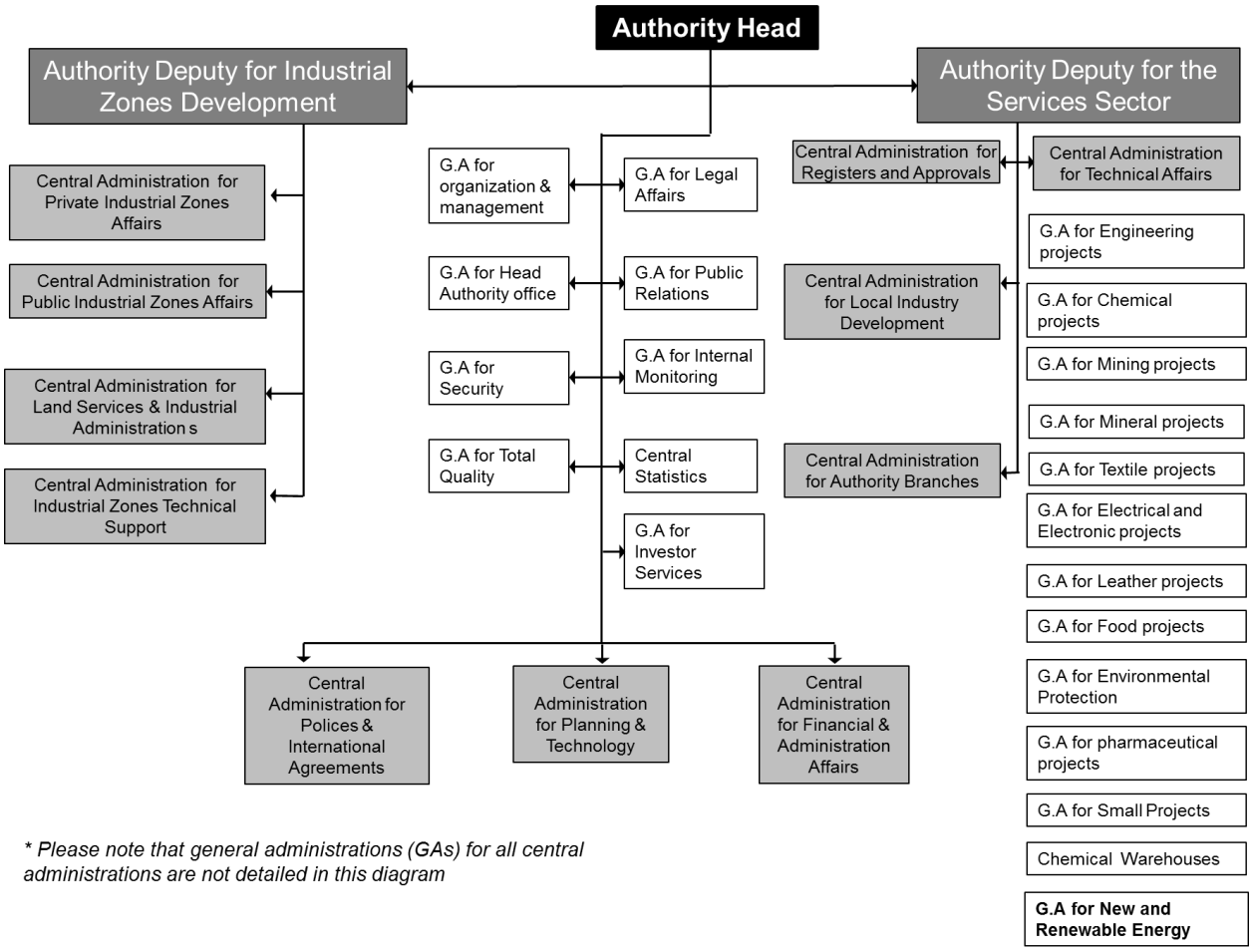


Figure 14: IDA organisational chart

[21] Industrial cooperatives represent a variety of small and medium industries that receive support (financial and otherwise) from the Cooperatives Union.

The unit in IDA concerned with energy management [22] should have its capacity built such that it has direct contact with IDA's upper management. This will enable it to coordinate effectively with the various internal entities and be responsible for issues cross-cutting across industries. This might entail that it is upgraded to a Central administration reporting directly to the Authority Head or his/her Deputy rather than a General Administration as is currently the case.

However, it is well understood that creating a new Central Administration can require substantial resources (e.g. financial, administrative, operational, etc.). Thus, an effective approach would be to upgrade an existing General Administration to report directly to upper management until it is upgraded to a Central Administration.

This unit at IDA might have to deal with entities external to MoI if the policy unit proposed in page 15 is not established.

There is an exception of one policy that does not necessitate enacted supply policies and can be initiated at the earliest. That is requiring an operative EMS from energy intensive industries with strong organisational capacity such as cement, iron and steel, fertilisers and petrochemicals. These do not need assistance in funding and will not be vulnerable to substandard consultants and can approach the existing consulting services.

Similarly, there are exceptions in the proposed policies that do not necessitate having the dedicated policy and decision-making units established. For example, under policy 3, electricity can be supplied to the grid from CHP capacities and applications. As well under policy 9, minimum energy performance standards (MEPS) for selected equipment can be established promptly as it will follow the existing procedures for setting standards. However, supply policies mainly addressing funding mechanisms need to be enacted to facilitate the acquisition of new equipment.

Generally, all of the policies proposed are continual, acting on, and expanding to different sectors, equipment, capacities, etc. over time.

[22] In a meeting with Eng. El-Saeed Ghozal of the Industrial Development Authority in June 2015, it was stated that energy efficiency has been merged with the existing renewable energy unit.

Demand Oriented

Policy 1: Incorporate EMS in export procedures

Driving Demand

1- Policy Summary

Description

Energy is virtually exported in the products. Thus, given the limited local energy resources, for exported products, energy should be used as rationally as possible at the facility.
To this end, this policy requires sectors exporting energy intensive goods (i.e. goods whose energy costs comprise more than a specific percentage of their cost structure[23]) to have the following[24],

- An operative energy management system (EMS)
- Reported energy data
- Approved and implemented EE plan

In order to avoid organizational over-burden and constraining limited pool of service providers, the policy first targets the most "mature" industries that have sufficient capacity to follow these procedures.
Artisans and craftsmen[25] are excluded from this policy.

Incorporating EMS for export can be carried out through two main routes, the export register and the export duty. The former is adding conditions (in this case EMS acquisition) to the export register, i.e. only manufacturers with an EMS can have an export register and thus export. However, this route is complex and its application will not be straightforward owing to a number of issues. For example, export registers are not restricted to manufacturers and export firms (intermediaries) can export as well. Thus, the control of goods produced from EMS facilities will be difficult. Moreover, this new condition will require amendments to law 118 /1975 governing import and export and its executive regulations. The latter route is more straightforward and directed towards particular goods. Unlike the export register, the export duty is imposed on all targeted goods whether it is being exported by the manufacturer or by the export office.

[23] CAPMAS undertakes surveys that include energy cost relative to the total costs for different industries.
[24] These requirements are further elaborated in Box 1 on page 50
[25] EMS will be burdensome to micro industries as they do not have the capacities to implement an EMS and their energy consumption is quite insignificant and they are addressed in other policies.

Thus it is advisable that this requirement becomes binding by introducing export duties [26] on targeted products.

It is proposed that an export duty is waived on a product if it is produced from a facility with EMS. The export duty is mandated by a decree drafted by the foreign trade sector and issued by the minister of industry and foreign trade. Before issuance, this duty is negotiated with the export council for the relevant products as well as with technical committees from FEI and can be revised periodically. It is worth noting that export duties can be raised when it does not serve its purpose i.e. when it is no longer perceived as a prohibitive and deterring factor.

The decree stating the export duty should include the targeted item and its customs code so as to avoid confusion. The decree will state that the export duty will be waived if a document is provided from IDA proving an "acceptable" EMS implementation status. It is recommended that state and military-owned facilities take the lead in implementing EMS.

According to the engineering export council[27], export support is extended to products on the basis of innovation under which EE is considered. To receive export support the facility needs:

- to prove that the specific energy consumption has been reduced by at least 10% from the average of the past two years
- to prove the presence of energy efficient equipment

The policy suggested will offer significant support under the export support scheme where the efficiency of existing equipment will be evaluated and information on production and utility bills will be compiled for data reporting.

Justification

Demand is primarily created when the industrial enterprise adopts EE as a core business issue and thus a regular part of its responsibilities. An issue becomes core to the business when it is essential for the business's successful operation and prosperity. To this end, an internal energy management system (EMS) has to be linked to those elements most substantial for the business's

[26] Export duties are already imposed on marble, granite, talc, feldspar, leather etc. to encourage adding value to the product rather than exporting it unprocessed. For energy saving purposes, this duty should be related to the energy content of products and be high enough to encourage compliance to the EMS condition.
[27] http://eec-eg.org/admin/upload/docss/limitation.pdf

prosperity. One of these elements is the ability to export economically.

Beneficiaries

EMS consulting firms will benefit as their services will be sought if the industrial facility does not have an internal energy management system or in-house capacity to establish it. Technical consulting firms will also benefit as they may be required to execute interventions stated in the EE plan. Equipment suppliers will also be supplying equipment required to undertake these interventions.

As for the facilities, other than cost savings, energy efficiency will lend the facility a “greener” image that can be useful in export and advertising, etc.

Risks

In order to mitigate unfair practices, criteria upon which EMS certification is offered to a facility as well as the criteria upon which EMS implementation is considered satisfactory will be clear and the assessment results will be transparent and publicly available. Public disclosure of information should be encouraged to improve public accountability.

Relation to other policies

This policy is complemented by policies 7 and 8 which ensure quality consulting services for energy management system and EE technologies, respectively through certification.

However, energy intensive industries with strong organizational capacity such as cement, iron and steel, fertilizers and petrochemicals will not rely on those policies as they will not be vulnerable to substandard consultants.

Policies 2 and 6 are also related to EMS implementation, they serve the same purpose and hence their outcomes have the same indicators. The data collected through these policies prepares for policy 12 and needs policy 13 for it to actualize.

2- Policy Goals (outcome)

Outcome	Description
A. Sustained energy consumption reduction	Facilities will be continuously seeking the best fit reduction in energy consumption per unit product for their facilities.

B. Extensive information on industries	Data generated periodically from the facilities in an agreed format providing a much needed information database

3- Policy Owner

Owner	Role Description
IDA	- IDA will assess the industrial facility's compliance - The following roles will be assumed by the new RE and EE unit under IDA (as discussed in page 48) to mobilize the different relevant units internally in IDA and coordinate with other external entities in the government and otherwise. Prior to the policy IDA will - Set systems for EE plans and data acquisition (as per Box 1), consulting the relevant industries - Set data verification (see **Box 3**), storage and analysis system Afterwards, IDA will - Receive, verify and process the data - Follow-up, assess and approve plans - Issue EMS status certifications - Maintain databases and feed energy data into a local database (to support decision-making) and ultimately into the national energy information system - Issue and disseminate reports[28]

4- Policy Activities :

This section enlists the required activities (the road to the policy):

Activity	Description
1. Set templates for data and plans for each sector	These templates and their level of detail will be set by IDA and agreed upon with the industry (FEI) before finalization. IMC/ENCPC could offer technical assistance.
2. Set mechanisms for data collection, assessment, analysis and revision.	Verification mechanisms can include undertaking sector and time analysis, random audits and cross checking from energy suppliers (See **Box 3**).
3. Set mechanisms for plan collection, assessment,	Those mechanisms will ensure all possible interventions are stated in the plan and are undertaken (through reporting, random checks and site visits)

28 These reports will include announcements to the industrial community findings on anticipated interventions as well as the energy performance for targeted facilities. These will be derived from the plans and published. This will direct suppliers to the future needs of the market.

analysis and follow-up.	
4. Personnel capacity building	Personnel at IDA should be increased and will receive necessary training in implementing the above mechanisms. The personnel should include trained and ultimately certified auditors.

5- Policy stakeholders

a. Support (Directly involved: Hands-on)

Stakeholders	Role Description
ENCPC	*Pre-policy* - Support in setting systems for EE plans and data acquisition, consulting the relevant industry
Export councils of relevant industries and FEI	Negotiate the appropriate export duty for goods
Foreign trade sector	Draft decree on export duty
Energy Planning Authority[29]	Maintain national energy information database

b. Facilitate (Not directly involved)

Stakeholders	Role Description
NQI	*Pre-policy* - Create an inventory of energy service providers/consultants catering for all industries. - establish a system to accredit EMS consulting firms as per policy 7
NQI / ITC	*Continuous* Train relevant personnel from the industries targeted on EMS implementation
Foreign trade training center	Introduce prospective and current exporters to the EMS system and its up-keep

c. Evaluate

Stakeholders	Role Description
	-
Policy Unit at MOI[30]	- Track and evaluate policy progress and extent of compliance.

6- Policy indicators :

a. Indicator A: Number of facilities exempted from an export duty

Description	The number of facilities producing targeted products exempted from an export duty relative to the total facilities exporting targeted products.

[29] According to policy 13, to be finalized after the meeting with the Minister of Industry.
[30] According to policy 13, to be finalized after the meeting with the Minister of Industry.

Measurement	# of facilities paying export duties/ total # of targeted facilities
Target (3 years after policy is in force for specific products)	0% [31]
Baseline	N/A
Data source and data responsible	Foreign trade sector, General Organization for Export and Import Control (GOEIC)
Responsible Entity	IDA

b. Indicator B: % Compliance to plans

Description	The savings actually achieved in comparison to the savings planned to be achieved according to the EE plan of all targeted facilities.
Measurement	A frequency distribution of the % $\frac{\textbf{Actual savings}}{\textbf{Planned savings}}$ for a specific year against the number of facilities.
Target (5 years after policy is in force for specific sectors)	This frequency distribution should be skewed towards the right (over 90% of facilities having their actual savings 70% or more of their planned savings for a specific year).
Baseline	N/A
Data source and data responsible	IDA
Responsible Entity	IDA

c. Indicator C: % facilities submitting correct data

Description	Data can be verified through sector and time analysis, random audits and cross checking from energy suppliers (See **Box 3**) Provisions should be made for the statistical challenges of sample calculations.
Measurement	% of targeted facilities submitting correct datasets
Target (3 years after policy is in force for specific sectors)	100%
Baseline	N/A
Data source and data responsible	IDA
Responsible Entity	IDA

7- Policy timeframe (phasing strategy) : Phasing philosophy

[31] In case the number of facilities paying export duties remains high, the value of the duty should be raised to become more prohibitive.

Phasing will be carried out according to the sector's energy intensity and size, starting with the large and most energy intensive as these industries are the most apt to implement EMS Announcements of the targeted industrial sector will precede the imposition export duties. The decree should state the sequence by which the export duty will be put into effect on the various products. However, the value of export duty will be stated for the products first in turn only. An adequate grace period (e.g. two years) should be provided to industries prior to the imposition of the export duty to allow for successful EMS implementation.

a. Phase 1 (2016-2019)

Large, energy intensive

Firstly, export duties will start being imposed on energy intensive products from large facilities such as cement, iron and steel, fertilizers, aluminum and copper.

Secondly, export duties to be imposed on large, medium energy intensive industries such as ceramics and glass

b. Phase 2 (2019 - 2024)

Large, non-energy intensive

Finally, export duties will start being imposed on industries such as textiles, food and beverage and paper.

The sequence of export duty imposition should be pre-announced.

Small, energy intensive

Towards the end of this phase, sectors targeted would have benefitted from the program to change outdated technologies (**Box 2**) Export duties can be imposed on foundry products and other products from small, energy intensive products.

Phasing is illustrated in Table 4.

8- Enabling Conditions :

a. Infrastructure

- Establish a communication and data transfer mechanism between IDA and foreign trade sector
- Establish database at IDA to keep track of facility performance, coordinated with the national energy information system.

- Create a mechanism of data transfer between entities in and outside the MOI (energy suppliers, utilities and IDA) for cross-checking.

b. Human capacity

- Build capacities, increase the number/ qualifications of workforce of RE and EE unit under the IDA, as per policy 12

c. Financial resources and budgeting

- Increased budget to hire more personnel, undertake sector and time analysis, audits.
- Financial resources for database set up and maintenance

d. Government support

- Issue a decree binding export duties to EMS implementation

The concept of this policy was discussed and generally agreed upon with Eng. Alaa Abdel Karim Board Chairman for the General Organization for Exports and Imports Control (GOEIC) in June 2015.

Policy 2: Incorporate EMS as a condition for state procurement

Driving Demand

1- Policy Summary

Description

The Egyptian government is considered to be the most substantial and influential consumer of a large number of goods. As the proponent of large scale building and infrastructure projects, that consume primarily energy intensive goods i.e. cement, steel, glass, etc. Apart from infrastructure projects, the government purchases various products to support its food rationing system and food programs in public schools, hospitals, prisons, etc. It also acquires large amounts of fertilizers to provide to farmers.

The government has the right to stipulate certain conditions on the materials they acquire or have acquired by their contractors. The conditions could include that such materials are sourced from manufacturing facilities with an operative EMS system, which report energy data [32] and implement their plans to pursue EE. In case materials are not local, the manufacturing facility should hold an internationally recognized EMS certification (e.g. ISO 50001). Although savings in foreign resources is not targeted, this is essential so as not to compromise on the competitiveness of local bidders.

Thus, an effective way of restricting purchases to only those facilities with EMS is to add it as a condition in the project's tender documents where it is specified that contractors should source specific raw materials from facilities with EMS having an acceptable implementation status[33]. This is substantiated with a document from IDA showing the status of EMS of the chosen facility.

Another option considered is to add new contractor classifications to the Federation for Construction and Building Contractors (FCBC) where those contractors will be the ones sourcing their raw materials from facilities with EMS. In turn, the government tender documents will state that only contractors belonging to this new class can enter the bid. However, this will be difficult to execute as the status of EMS at a facility is not constant and thus the classification of the contractor cannot depend on it. This will

[32] These requirements are further elaborated in Box 1, page 49.
[33] General Authority for Government Services (GAGS) is the executing body that revises the tender documents and ensures its integrity.

require the contractor to constantly change suppliers to maintain their classification which poses an inconvenience.

As for the procurement of fertilizers, the Principal Bank for Development and Agricultural Credit agrees with fertilizer producers on the supply of fertilizers needed for a given time period. In turn, cooperatives request the fertilizer quantities required by their members from the producers, informing the Bank on the requested quantities. In its role, the Bank ensures that the producers satisfy the quantities requested by the cooperatives. In order to avoid supply bottlenecks, fertilizer producers will only be included in this system upon ensuring that the requested quantities can be acquired from a variety of facilities with an EMS. It is recommended that state and military owned facilities take the lead in implementing the EMS. This will not only ensure adequate fertilizer supply from facilities with EMS but also given that facilities that export fertilizers will have an established EMS, this will ensure that facilities that do not export have an EMS.

As for petrochemicals and refineries, the minister of petroleum has directly ordered the reduction of their energy consumption. In this light, EMS can be readily taken up in those facilities.

In order to avoid organizational over-burden and constraining limited pool of service providers, the policy targets first the most “mature” industries that have sufficient capacity to follow these procedures.

Bottlenecks will be avoided by ensuring that supply of materials from EE facilities should be sufficient to cover demand for this material.

Justification

Demand is primarily created when the industrial enterprise adopts EE as a core business issue and thus a regular part of its responsibilities. An issue becomes core to the business when it is in demand and is essential for the business’s successful operation and prosperity. To this end, an internal energy management system (EMS) has to be linked to those elements most substantial for the business’s prosperity. One of these elements is ensuring the government market for its products.

Beneficiaries

EMS consulting firms will benefit as their services will be sought if the industrial facility does not have an internal energy management

system or in-house capacity to establish it. Technical consulting firms will also benefit as they may be required to execute interventions stated in the EE plan. Equipment suppliers will also be supplying equipment required to undertake these interventions.

Risks

In order to mitigate unfair practices, criteria upon which EMS certification is offered to a facility as well as the criteria upon which EMS implementation is considered satisfactory will be clear, and the assessment results will be transparent and publicly available. Public disclosure of information should be encouraged to improve public accountability.

Relation to other policies

This policy is also complemented by policies 7 and 8 which ensure quality consulting services for energy management system and EE technologies, respectively through certification.

However, energy intensive industries with strong organizational capacity such as cement, iron and steel, fertilizers and petrochemicals do not rely on those policies as they will not be vulnerable to substandard consultants.

Policies 1 and 6 are also related to EMS implementation, they serve the same purpose and hence their outcomes have the same indicators.
The data collected through this policy feeds into policy 12

2- Policy Goals (outcome)

Outcome	Description
A. Sustained energy consumption reduction	Facilities will be continuously seeking the best fit reduction in energy consumption per unit product for their facilities.
B. Extensive information on industries	Data generated periodically from the facilities in an agreed format providing a much needed information database

3- Policy Owner

Owner	Role Description
IDA	- IDA will assess the industrial facility's compliance - The following roles will be assumed by the new RE and EE unit under IDA to mobilize the different relevant units internally in IDA and

	coordinate with other external entities in the government and otherwise. Prior to the policy IDA will - Set systems for EE plans and data acquisition (as per Box 1), consulting the relevant industries - Set data verification (see **Box 3**), storage and analysis system Afterwards, IDA will - Receive, verify and process the data - Follow-up, assess and approve plans - Issue EMS status certifications - Maintain databases and feed energy data into a local database (to support decision-making) and ultimately into the national energy information system - Issue and disseminate reports[34]

4- Policy Activities :

This section enlists the required activities (the road to the policy):

Activity	Description
1. Set templates for data and plans for each sector	These templates and their level of detail will be set by IDA and agreed upon with the industry (FEI) before finalization. IMC/ENCPC can offer technical assistance.
2. Set mechanisms for data collection, assessment, analysis and revision	Verification mechanisms can include undertaking sector and time analysis, random audits and cross checking from energy suppliers. See box 3.
3. Set mechanisms for plan collection, assessment, analysis and follow-up	Those mechanisms will ensure all possible interventions are stated in the plan and are undertaken (can include reporting, random checks and site visits).
4. Personnel capacity building	Personnel at IDA can be increased and will receive necessary training in implementing the above mechanisms. The personnel should include trained and ultimately certified auditors.

5- Policy stakeholders

a. Support (Directly involved: Hands-on)

Stakeholders	Role Description
NQI	*Pre-policy*

34 These reports will include announcements to the industrial community findings on anticipated interventions as well as the energy performance for targeted facilities. These will be derived from the plans and published. This will direct suppliers to the future needs of the market.

	- Create an inventory of energy service providers/consultants catering for all industries. - establish a system to accredit EMS consulting firms as per policy 7
NQI / ITC	*Continuous* Train relevant personnel from the industries targeted on EMS implementation
General Authority for Government Services (GAGS)	Revise the project's tender documents and ensure its integrity
Relevant ministries e.g. Ministry of Housing	Specify suppliers with EMS in the project's tender documents
Energy Planning Authority[35]	Maintain national energy information database

b. Facilitate (Not directly involved)

Stakeholders	Role Description
NQI	*Pre-policy* - Create an inventory of energy service providers/consultants catering for all industries. - establish a system to accredit EMS consulting firms as per policy 7
NQI / ITC	*Continuous* Train relevant personnel from the industries targeted on EMS implementation

c. Evaluate

Stakeholders	Role Description
	-
Policy Unit at MOI	- Track and evaluate policy progress and extent of compliance.

6- Policy indicators:

a. Indicator A: number of bidders for tenders

Description	The number of bidders for tenders (i.e. complying with specifications pertaining to EMS) relative to number of bidders to previous similar projects
Measurement	$\frac{\#\text{ of bidders for new tenders}}{\text{Bidders for old tenders}} > 1$
Target	Annual increase
Baseline	N/A

[35] According to policy 13, to be finalized after the meeting with the Minister of Industry.

Data source and data responsible	Government entity issuing the tender
Responsible Entity	GAGS

b. Indicator B: % Compliance to plans

Description	The savings actually achieved in comparison to the savings planned to be achieved according to the EE plan of all targeted facilities.
Measurement	A frequency distribution of the % $\frac{\textbf{Actual savings}}{\textbf{Planned savings}}$ for a specific year against the number of facilities.
Target (5 years after policy is in force for specific sectors)	This frequency distribution should be skewed towards the right (A high frequency of facilities having their actual savings 70% or more of their planned savings for a specific year).
Baseline	N/A
Data source and data responsible	IDA
Responsible Entity	IDA

c. Indicator C: % facilities submitting correct data

Description	Data can be verified through sector and time analysis, random audits and cross checking from energy suppliers for a specific year. Provisions should be made for the statistical challenges of sample calculations.
Measurement	% of targeted facilities submitting correct datasets for a specific year.
Target (3 years after policy is in force for specific sectors)	100%
Baseline	N/A
Data source and data responsible	IDA
Responsible Entity	IDA

7- Policy timeframe (phasing strategy) :

Phasing philosophy

Phasing will be carried out according to the sector's energy intensity and size, starting with the large and most energy intensive as these industries are the most apt to implement EMS.

a. Phase 1 (2016-2019)

Large, energy intensive

Industries feeding into the construction industry will be targeted at first. , Firstly, the tender documents for a project will specify that the contractors source cement, iron and steel, aluminum, copper etc. from facilities with EMS.

This will be followed by specifying that the contractors source ceramics and glass from facilities with EMS.

As for fertilizers, due to the potential risk of short supply if few manufacturers have EMS, the decision to only acquire fertilizers from manufacturers with EMS can be delayed till 2019, benefitting from the momentum created by export requirements and the early action by military and state-owner enterprises.

b. Phase 2 (2019-2024)

Large, non-energy intensive

The targeted sectors can include manufacturers of goods supplied under the food rationing system and food provided in government facilities (schools, hospitals, prisons, etc.)

Small, energy intensive

Towards the end of this phase, sectors targeted would have benefitted from the program to change outdated technologies (Box 2). The targeted sectors can include fired bricks, foundry products and others from small, energy intensive products

Phasing is illustrated in Table 4.

8- Enabling Conditions :

a. Infrastructure

- Establish a communication mechanism between IDA and the procurement units in the relevant ministries e.g. Ministry of Housing, Transportation, Agriculture, etc.
- Establish database at IDA to keep track of facility performance, coordinated with the national information system.
- Create a mechanism of data transfer between entities in and outside the MOI (energy suppliers, utilities and IDA) for cross-checking.

b. Human capacity

- Build capacities, increase the number/ qualifications of workforce of RE and EE unit under the IDA, as per policy 12

c. Financial resources and budgeting

- Increased budget to hire more personnel, undertake sector and time analysis, audits.
- Financial resources for database set up and maintenance

d. Government support

- Issue a Prime Minister decree requiring provisions for EMS in the ministries' tender documents, necessitating that contractors and/or suppliers hold EMS certifications.

The concept of this policy was discussed and generally agreed upon with Mr. Ayman Gohar Chairman of the board of the General Authority for Government Services at the Ministry of Finance in June 2015.

Policy 3: Establish system for grid-connected combined heat and power (CHP)

Driving Demand

1- Policy Summary

Description

According to the recent electricity law 87/2015, authorized electricity transmission and distribution companies are obliged to buy or pay the value of electricity produced from recovered energy with less than 50 MW capacity (clause 45). For capacities larger than 50 MW, electricity prices and contracts will be set on a case to case basis as electricity companies are not obliged by law to purchase electricity.

In fact, contracts for electricity supply from CHP already exist with a handful of facilities of different industries. Numerous precedents in waste heat recovery exist where electricity is generated and sold to the grid. Currently, the total installed capacity of CHP is 550 MW, yet this capacity is not fully utilized as some equipment has deteriorated and stopped functioning, and the price of electricity is no longer attractive to the facilities.

Upgraded systems of electricity purchase and reimbursement are currently being studied by Egypt ERA.
The operational system should be established such that the electricity prices encourage CHP and resolve any issues that might arise with regards to grid management, metering and accounting systems, etc. should have been resolved before the law is issued.

Justification

Electricity production from recovered waste heat is not always feasible when the supply of heat and electricity produced is not met by internal electricity demand. Supplying electricity from waste heat to the grid under a feed-in tariff system makes it more lucrative and increases its uptake by the potential industries.

Beneficiaries

Importers and local producers of CHP equipment who will be supplying facilities in need of CHP equipment.

Consultants will benefit as they will offer their services to facilities that want to procure CHP systems.

As the electricity grid will be supplied with electricity, less electricity will be produced in State power plants.

Possible risks

CHP capacities less than 50MW can be implemented in large and medium facilities. As certifying consultants in the field of CHP will take time, facilities of all sizes will work with uncertified consultants until the certification mechanism is enacted. However, given the novelty of the CHP feed-in tariff mechanism, large facilities might be the first to take the lead in adopting CHP systems.

Only after the system has been implemented and successfully operating amongst the larger facilities, medium industries will be encouraged to adopt the CHP system as well. Thus, the risk from having substandard consultants providing services to medium and small facilities is unlikely to occur.

Relation to other policies

This policy will benefit from policy 8 which ensures quality consulting services for EE technologies through certification.

2- Policy Goals (outcome)

Outcome	Description
A. Efficient use of resources	- Heat is reframed as a resource that would have been wasted otherwise
B. Widened scope of uptake	- Improved uptake of CHP among the different industries

3- Policy Owner

Owner	Role Description
Egypt ERA	The agency's objective is to organize, follow and monitor all activity of electrical energy production, transmission, distribution and consumption. Under this policy Egypt ERA will establish CHP feed-in tariff system to resolve issues that might arise with regards to grid management, metering and accounting systems, etc. prior to system initiation. It will also monitor and assess the amount of electricity supplied by CHP

	An economic price and general conditions for electricity supplied from CHP will be ensured

4- Policy Activities :

This section enlists the required activities (the road to the policy):

Activity	Description
1. Preparatory studies	*Pre-policy* - Undertake studies to estimate the potential of CHP in the industrial sector[36]. - To ensure adequate grid management, metering and accounting systems
2. Issue decree	Issue the decree for the executive regulations for the law governing CHP

5- Policy stakeholders

a. Support (Directly involved: Hands-on)

Stakeholders	Role Description
EETC	- Ensuring the network's capacity/ability to receive and transmit additional loads

b. Facilitate (Not directly involved)

Stakeholders	Role Description
FEI	- Inform local suppliers (under the chamber of engineering industries - FEI) of potential CHP equipment - Inform facilities with CHP potential on the potential CHP equipment and technologies to be installed

c. Evaluate

Stakeholders	Role Description
Egypt ERA	Ensure the successful uptake of CHP among the industries

6- Policy indicators :

a. Indicator A:percentage increase in the amount of electricity generated through CHP and supplied to the grid

Description	The amount of electricity generated through CHP and supplied to the electricity grid increasing from year to year. If the price is economically feasible more industries will adopt the system and supply the grid.
Measurement	Percentage increase in the amount of electricity generated through CHP and supplied to the electricity grid
Target (for the first 5 years)	At least 30% annual increase

[36] A study on the potential energy savings in the Egyptian industry was undertaken in 2010 by National Energy Corporation – Egypt (NECE), TARSHEED for the CDM Component-CCRMP at EEAA. The study included savings from waste heat recovery. This study can be updated, expanded and enhanced.

Baseline	Obtainable from Egypt ERA / EETC
Data source and data responsible	EETC
Responsible Entity	Egypt ERA

b. Indicator B: Installed CHP capacity

Description	The installed capacities of CHP relative to the total CHP potential of the industrial sector
Measurement	MW installed capacities of CHP /MW total CHP potential of the industrial sector
Target (in 5 years)	75% of potential
Baseline	Obtainable from Egypt ERA, study on CHP potential
Data source and data responsible	EETC, Egypt ERA
Responsible Entity	Egypt ERA

7- Policy timeframe (phasing strategy) :

Phasing philosophy

None, all capacities can be targeted at first with different provisions for capacities less than 50 MW and more than 50 MW[37].

8- Enabling Conditions:

a. Infrastructure

- Load management system in the grid
- Feed-in tariff system

b. Human capacity

- Minor additional human resources may be needed

c. Financial resources and budgeting

- Minor additional financial resources may be needed

d. Government support

- Ratify operational system for electricity supply from CHP

The concept of this policy was discussed and generally agreed upon with Dr. Hafez Salmawy Managing Director of Egypt ERA in June 2015.

[37] Dr. Hafez Salmawy, the managing director of Egypt ERA, confirmed that, there are no technical issues in the grid associated with having capacities larger than 50 MW. The problems that might arise are operational where large amounts of electricity should be managed effectively in the grid when it is introduced so as not to cause any disturbance to the grid.

Policy 4: Phasing out selected cross-cutting equipment

Driving Demand

1- Policy Summary

Description

Under this policy, selected installed cross-cutting equipment should be replaced over a specified number of years.
The criteria upon which cross-cutting equipment should be replaced are nameplate performance specification, size and age. The age of equipment is usually inversely related to its efficiency, unless it has always been well-maintained.

It is worth noting that the replacement of equipment (as seen feasible) paying back in less than 5 years (cross-cutting and not) is carried out through the EE plan under the EMS (policies 1 and 2). This policy addresses phasing out of cross-cutting equipment in facilities not targeted in policies 1, 2 and 6 AND equipment whose replacement might pay back in over 5 years[38].

It is proposed that Minimum Energy Performance Standards (MEPS) are the reference against which equipment replacement is obligatory, such that equipment whose efficiency is e.g. 80% that of the MEPS or less (depending on the case) will be replaced. The percentage should be set such that when replacing the majority of equipment, an acceptable payback period (less than 5 years) is achieved.

Energy specifications of equipment may not be readily available as name-plate information. Facilities will be required to carry out targeted audits to prove and maintain that the performance of equipment which age and capacity are beyond a certain level, is maintained at acceptable levels (e.g. more than 80% of MEPS) when information on efficiency is not readily available.

Financing for equipment whose replacement pays back in more than 5 years will depend on funds either provided by FEI ECO, as per policy 11, and abide by its conditions or loans provided by banks[39]. The payback for the equipment should be substantiated by an audit.

[38] The choice of efficiency level below which equipment should be replaced will attempt to still have pay back in 5 years.
[39] Banks financing industries include: Export Development Bank of Egypt, National Bank of Egypt, Industrial Development and workers bank of Egypt and Banque Misr

Soft conditions with suppliers can be centrally negotiated to facilitate and expedite replacement for the facilities. This is better done before issuing the requirements, otherwise suppliers will have a higher negotiation power.

ICA has guidelines for inspection that is routinely followed. It is worth mentioning that a code on boiler inspection is being drafted and an additional provision on inspecting equipment inefficiency is suggested to be added[40]. This should be undertaken at the earliest time possible so as to inform the facility of the in/efficiency of its boiler(s). This will be an important step in raising the awareness of facility owners even if no legal procedures will be taken against them.

Justification

Given the existing stock of substandard and obsolete equipment, improving their efficiency is often inconsequential and thus requires replacement. New, energy efficient equipment, to which MEPS apply, will also be insignificant in comparison to the size of existing stock.

Moreover, demand on energy efficient equipment needs to be mobilized to replace the tremendous existing stock of obsolete and inefficient equipment, and encourage local manufacturing.

Possible risks

In some cases, equipment whose performance is up to certain standards are more expensive than those with lower performance, paying back over a long period of time. Although the performance level of the equipment to be replaced should be set taking into consideration acceptable payback periods, there are bound to be exceptional cases where payback will not be acceptable. In this case, the replacement of such equipment will benefit from financial support under this policy.

Beneficiaries

- Local manufacturers and suppliers of energy efficient equipment
- Technical consulting firms as they will be providing audits as necessary

[40] ENCPC can extend support to ICA on EE provisions to be added to the code

Relation to other policies

Policies 1 and 2 address the replacement of equipment (as seen feasible) paying back in less than 5 years (cross-cutting and not). Replacement is carried out within the framework of the EE plan under the EMS.

This policy will only be effective through a decree after minimum energy performance standards (MEPS) for the selected equipment is established as in policy 9. Replacement will move efficient equipment through as only those become available on the market (policy 9).
Thus, this policy should be undertaken in close coordination with policy 9.

This policy is also complemented by policy 8 which ensures quality consulting services for EE technologies, through certification.

Policy 11 discusses the financing mechanism of EE projects under which equipment replacement can be considered.

2- Policy Goals (outcome)

Outcome	Description
A. Modernized equipment	Lower energy consumption for equipment producing the same output. Reduce maintenance costs associated with old equipment.
B. Stimulated local manufacturing	If technology specifications of energy efficient equipment are preannounced, local manufacturers of energy efficient equipment will be encouraged, on a condition that they have latent capacity. Alternatively, the decision to replace should take into account local manufacturer capacity, as reflected in the MEPS prioritization criteria stated in policy 9.

3- Policy Owner

Owner	Role Description
Industrial control authority (ICA)	With its history in inspection and taking legal proceedings, ICA will ensure targeted equipment is replaced.

4- Policy Activities :

This section enlists the required activities (the road to the policy):

Activity	Description
1. Undertake necessary study	Map out equipment and assess local equipment manufacturing capacities with support from the Industrial technology development sector [41] in conjunction with policy 9
2. Equipment selection	Select equipment for phasing out and replacement, in conjunction with policy 9
3. Specify replacement levels	This will make provisions for equipment age, efficiency and capacity in conjunction with policy 9.
4. Ensure financing	Ensure the adequacy of financing, if needed, to support obligatory equipment replacement
5. Schedule replacement	Set replacement schedules for selected equipment
6. Decree issuance	Issue a decree stating the replacement schedules for the selected equipment

5- Policy stakeholders

a. Support (Directly involved: Hands-on)

Stakeholders	Role Description
Industrial technology development sector (MoI)/ ENCPC	ENCPC has adequate knowledge of the equipment on the market and has been the counterpart for the said IFC study. It will map out cross-cutting equipment used in the different industrial sectors along with their status in order to select a set of equipment for phasing out and replacement, based on existing information. *Continuous* Updating studies to include more equipment and incorporate them in the scheme

b. Facilitate (Not directly involved)

Stakeholders	Role Description
Industrial technology development sector (MoI) / FEI	*Continuous* - Ensure that local capacity of production meets stimulated demand, as reflected in the MEPS prioritization criteria stated in policy 9.
FEI-ECO	*Continuous* - Provide financial support for selected industries to replace their equipment, as per policy 11

[41] An International Finance Corporation (IFC) project expected to conclude in 2015 will -among other things- identify and prioritize 5-10 technologies/products, using criteria such as: energy savings potential; relative competitive advantage; and investor interest; size of market; short- and long-term market potential. The result of this work will assist in mapping out existing equipment

FEI	*Continuous* - Negotiate soft conditions with equipment suppliers

c. Evaluate

Stakeholders	Role Description
Industrial Control Authority (ICA)	Assess the extent of equipment replaced through the policy.

6- Policy indicators :

a. Indicator A: % replaced equipment of total mapped out and targeted equipment

Description	The amount of equipment replaced compared to the amount of equipment to be replaced as per the specific decree
Measurement	replaced equipment / total targeted equipment
Target (one year grace period after decree issuance)	100% (unless proven efficient)
Baseline	N/A
Data source and data responsible	Industrial Control authority
Responsible Entity	ICA

7- Policy timeframe (phasing strategy) :

Phasing philosophy

Phasing of this policy will be done according to size (the larger first), age (the oldest first) and efficiency (the most inefficient first) simultaneously. This is to be coordinated in conjunction with policy 9 (MEPS). A minimum capacity for equipment to be phased out should be specified. As a safeguard for small and micro enterprises, equipment below this capacity will not be targeted for replacement.

Replacement sequence

The gradual replacement of the top cross-cutting equipment will be such that equipment whose efficiency is e.g. 80%-75% that of the MEPS, old and large in size will be replaced first.

Equipment will be introduced one at a time under this policy. In case more than one piece of equipment is scheduled for replacement, and simultaneously the number of equipment should be restricted to 3 so as not to overburden facilities[42]

[42] If facilities possess more than 3 equipment scheduled for replacement, it will be an inconvenience for the facility to be forced to replace them all as this will entail possible financial burdens and delays in operation.

As the top cross-cutting equipment in the market are moving closer towards satisfying the MEPS, the next cross-cutting equipment will start following the same sequence for phasing out.

8- Enabling Conditions :

a. Infrastructure

- Database of targeted equipment and means to follow-up (ICA)

b. Human capacity

- Build capacity both through training and increasing personnel to undertake the “mapping out” study in technological centers (MOI)
- Increase organizational and human capacities of ICA to ensure EE equipment compliance. Training of existing inspectors is also essential.

c. Financial resources and budgeting

- Increase financial resources of FEI to support more industries as per policy 11.[43]
- Financial resources to support mapping studies and hire consultants if needed
- Increase financial resources at ICA to ensure effective inspection on EE equipment compliance

d. Government support

- Issue MEPS for the selected equipment (policy 9)
- Channel financial resources of FEI to support more industries
- Issue decree imposing replacement.

The concept of this policy was discussed and generally agreed upon with Mr. Ibrahim El-Manesterly President of the Industrial Control Authority and Eng. Saber Sherif General Manager and Head of The Mechanical Industries Sector under the Engineering Department and Supervisor of Information Center in the Authority in June 2015.

[43] It is not expected that cooperatives will need their funds increased in this regard as their member facilities do not possess equipment of relatively large capacities that will be scheduled for replacement.

Policy 5: Strengthen industrial organizations to provide IEE support

Driving Demand

1- Policy Summary

Description

Small and medium industries have certain characteristics that necessitate targeting through a tailored approach. They are distributed over various sectors, are large in number and possess limited financial, technical and organizational capacities.

Given their large numbers and diversity, it is proposed that the industrial organizations are mobilized to provide tailored support to these industries.

Accordingly, this policy aims to build-up and strengthen the capacities of industrial organizations (chambers and cooperatives) such that they can independently support their members on matters regarding IEE. These organizations thus become the interface through which SMEs receive assistance. The government will follow-up on the progress of these organizations and provide direct assistance to industrial organizations if requested.

Industrial facilities are primarily affiliated with the FEI and/or the production cooperatives. The FEI has a history of supporting its members through finance and audits for EE purposes while cooperatives do not have this specific experience. Under this policy the capacities of FEI will be developed and extended to cater to more industries. Similar capacities for production cooperatives should be developed to undertake their role related to EE.

As announced in early June 2015 by the Egyptian President, a new entity will be established to cater for small and medium projects. It is proposed that the support extended to SMEs includes support on IEE, coordinating between different entities to serve SMEs.

It is proposed that the new entity catering for small and medium projects extends support on IEE to SMEs through:

1. Creating guidelines to outline energy saving opportunities for each sector of SMEs to be distributed through chambers and cooperatives. These guidelines will be based on existing audit reports complemented by targeted audits and be updated periodically to account for technological developments.

2. Creating recognition programs (e.g. annual awards) for best energy performance and improvement in SMEs. SMEs achieving the highest EE improvement, undertaking the most vigorous EE interventions and achieving savings will be awarded. Performance improvement is substantiated by audits. Data collected through this mechanism will offer better insight into the performance of this industrial category as well as create the basis upon which this policy will be developed and other policies are devised. It is worth mentioning that recognition programs are proposed instead of financial rewards (such as cash back) as these are politically expensive.

3. Directing needed financial support. Financial support can be channeled through the existing FEI fund (that should be expanded). Currently, FEI - Environmental Compliance Office (ECO) provides access to soft loans. Loan amounts could reach EGP 3 million per enterprise carrying a 2.5% annual interest rate with one year grace period and a repayment period up to five years. These loans could be obtained through the National Bank of Egypt or other participating banks.

   As for cooperatives, the Cooperative Union offers cooperative association's loans financed by the members' contribution with low interest rates (3% -7%), a grace period and minimum collaterals. In order to increase this fund, it is proposed that the Ministry of Finance (MOF) establishes a cooperation protocol with the Cooperative Union to finance its members on carrying out IEE based on certain terms and conditions. These conditions can include ,as will be discussed in Policy 11b, that data is being provided, audits are undertaken, transparent criteria are set, relatively long payback (more than 3 years) is proven.

   Funding requests need to be substantiated with audits. Data collected through this mechanism will offer better insight into the performance of this industrial category.

4. Extend necessary technical assistance. It is proposed that technical assistance is provided by cooperating with current education and training institutions as much as possible on the necessary technical support.

5. Design a "model system"[44] through which cooperatives will provide support on IEE to their members. These will be tailored by each cooperative who will be provided training on implementing the model.

[44] This includes channels for information exchange, finance and audits.

The anticipated entity concerned with supporting small and medium projects is expected to be mutually supportive of the existing cooperative associations. From the outset, the new entity should align and support the roles and responsibilities of all the entities concerned with SMEs (e.g. FEI, cooperatives, social fund for development, sector for the development of export policies for small and medium projects in MOI[45]) to avoid cross purposes.

Justification

Increasing energy prices pose a burden on small and medium enterprises and their need to raise the energy efficiency of their facilities is becoming more pressing. However, due to lack of guidance and assistance, amongst other things, there has been a gap between the need for EE and demand for it. The most direct channel to the large masses of SMEs is through their associations (chambers, cooperatives, etc.)

Possible Risks

There are expected to be plenty of issues on the agenda of the anticipated new entity and energy efficiency might not be a priority. Energy efficiency should be considered under resource efficiency and waste minimization which are pressing issues to improve productivity.

Relation to other policies

- Financing mechanisms is elaborated in policy 11 that capitalize on the FEI fund to subsidize IEE projects including financial schemes (soft financing) for SMEs. Policy 11b addresses increases the fund for cooperatives for IEE purposes.

- This policy is also complemented by policy 8 which ensures quality consulting services for EE technologies, through certification.

Beneficiaries

Technical consulting firms as they will provide audits when requested. Suppliers and manufacturers of EE equipment will benefit as well.

2- Policy Goals (outcome)

Outcome	Description

[45] This sector has no history of steady and continuous cooperation and reaching agreements with small industries. However, they extend support for SMEs based on requests.

A. Awareness	Heightened awareness regarding potential for EE with SMEs
B. Improved conditions	Alleviating burdens on SMEs due to energy price hikes
C. Capacity building	Strengthening the role of industrial associations
D. Better insight on SMEs	By obtaining energy data regarding SMEs industries from awards, audits and finance projects.
E. Institutional strengthening	Stronger reliance on, and affiliation to, industrial organizations

3- Policy Owner

Owner	Role Description
The announced new entity concerned with SMEs.	- Mobilize different capacities inside and outside the government, to support industrial organizations - Offer awards for best performing enterprises. - Create and publish guidelines - Design a “model system” through which cooperatives will provide support to their members.

4- Policy Activities :

This section enlists the required activities (the road to the policy):

Activity	Description
1. Map out and mobilize entities concerned with SMEs	Identify the chambers and cooperatives targeted according to each phase and get their buy-in on the program
2. Conduct audits to develop guidelines	As audits have already been undertaken in the past, more will only be carried out as needed. These audits will aim to find the energy saving opportunities common to each sector and those applicable to all sectors (e.g. power factor correction). Such opportunities will form the basis of the guidelines.
3. Engage financiers	- Funds from donor entities can be directed to support SMEs - Ministry of Finance will support industrial organizations that in turn finance EE investments needed by SMEs with certain terms and conditions.
4. Setting “model systems”	Such models will be based on the current system at FEI-ECO, feedback from beneficiaries and cooperative capacities. These models will be tailored by the cooperative of each sector, if needed.
5. Develop data templates	Such templates will be agreed upon with the targeted associations and coordinated with the

	industrial energy database at IDA and will serve as the basis upon which facilities will be assessed and awarded. It will also be used for reporting audit data.
6. Develop award programs and grant awards	The award will be required to have several ranks (e.g. 1st, 2nd, 3rd positions) for industries. This initiative will increase the demand for quality consultancy services as well as generate data for benchmarking purposes.
7. Publicize initiatives	Inform the industry about the support programs provided by the cooperatives and FEI, the award offered and the guidelines issued.

5- Policy stakeholders

a. Support (Directly involved: Hands-on)

Stakeholders	Role Description
Production cooperatives and FEI	- Communicate needs to support their members to new entity concerned with SMEs - Support their members in implementing IEE
FEI - ECO	- Extend their financial and technical services to include more facilities and sectors as per policy 11.
MOF	- Establish a cooperation protocol with Cooperative Union to provide it with additional funds to finance its members on carrying out IEE based of terms and conditions.
Industrial technological development sector (MoI) (including ENCPC)	- Undertake necessary audits and research to develop and update guidelines - Assist in assessing award nominees
IDA	- Receive, verify and process the data (including data from audits for financing and audits for awards). - Maintain databases and feed energy data into a local database (to support decision-making) and ultimately into the national energy information system

b. Facilitate (Not directly involved)

Stakeholders	Role Description
FEI and production cooperatives	Secure financing from possible donors

c. Evaluate

Stakeholders	Role Description

New entity concerned with SMEs	- Assess turnout on awards, and - Demand on funding.
Production cooperatives and FEI	Ensure active engagement of industrial organizations by number of audits for EE requested and amount of funds directed for EE

6- Policy indicators :

a. Indicator A: Guidelines issued relative to the targeted sectors

Description	Guidelines issued for the different sectors in comparison to the total targeted by the program. This indicates to what degree industrial organizations "bought-in" the initiative.
Measurement	Number of guidelines issued for the different sectors / the total number of sectors targeted by the program
Target (3 years)	100% of industrial sectors
Baseline	N/A
Data source and data responsible	New entity concerned with SMEs
Responsible Entity	New entity concerned with SMEs

b. Indicator B: Number of award applicants

Description	Number of award applicants from the small and medium industrial facilities of the targeted sectors relative to the number of awards given should increase from year to year. This indicates the degree to which the award is rewarding, prestigious and advantageous to the applicants.
Measurement	$\frac{\text{Number of applicants}}{\text{Number of awards}}$
Target (for the first 5 years)	More than 20% increase
Baseline	N/A
Data source and data responsible	New entity concerned with SMEs.
Responsible Entity	New entity concerned with SMEs.

c. Indicator C: Number of facilities requesting finance

Description	Number of facilities requesting finance and associated audits from year to year. Enterprises undertaking audits for financing purposes are likely to be the most "serious" ones about upgrading their energy performances.
Measurement	Number of facilities requesting finance from year to year
Target (for the first 5 years)	100% annual increase
Baseline	N/A
Data source and data responsible	Production cooperatives and FEI
Responsible Entity	New entity concerned with SMEs.

7- Policy timeframe (phasing strategy) :

Phasing Philosophy

This policy will be phased over SMEs according to their energy intensity, starting with the most energy intensive.

a. Phase 1 (2016-2019)

Guidelines on cross-cutting energy efficiency measures applicable to all industrial sectors will be issued at first.

The first phase will cater for the 4 chambers in FEI[46] representing small and medium industries with the highest energy intensity, namely chambers of building materials, chemical industries, engineering industries and metallurgical industries.

In parallel, the production cooperatives corresponding to those FEI organizations should be convened to introduce them to the program and assess their financial and technical needs. This will be complemented with the knowledge acquired about the industries from their FEI counterparts. Based on this assessment, the "model system" will be created and agreed upon with cooperatives, tailoring it to their specific needs. Technical assistance will be extended as much as possible through existing organizations. Afterwards, upon securing the necessary funds, cooperatives will be in full position to offer assistance to their members.

b. Phase 2 (2019-2025)

The second phase will cater for the next 10 organizations in FEI representing small and medium industries with the highest energy intensity.

Production cooperatives will be addressed in the same manner as phase 1, tailoring the "model system" to their needs.

8- Enabling Conditions :

a. Infrastructure

- Communication mechanism between FEI / production cooperatives and New entity concerned with SMEs to convey their requests.
- Communication mechanism between IMC/ENCPC and New entity concerned with SMEs to communicate guidelines.
- Communication mechanism between New entity concerned with SMEs and IDA to communicate energy data.

[46] The FEI currently has 16 chambers, 14 of which are concerned with manufacturing.

b. Human capacity

- Capacity to establish and update guidelines in IMC/ENCPC, if not out-sourced.
- Capacity to set-up and manage award program in the new entity concerned with SMEs, if not out-sourced.
- For data management at IDA.

c. Financial resources and budgeting

- Funds to establish guidelines
- Funds to set-up and maintain award program
- Increase financial resources (possibly through cooperation protocol) of FEI to support more industries as per policy 11.
- Increase financial resources of Cooperative Union by means of a cooperation protocol for IEE financing from MOF

d. Government support

- Channel financial resources to FEI, Production Cooperative Union to support more industries
- Include energy efficiency improvement and material productivity in the new entity's mandates.

The concept of this policy was discussed and generally agreed upon with Mr. Ahmad Zoheir Mostafa, Board Chairman of the Production Cooperative Union, in June 2015.

Policy 6: Ensuring efficient energy performance of new facilities, operations and processes

Driving Demand

1- Policy Summary

Description

This policy applies to new facilities as well as for operations and processes to be added or replaced in an existing facility. It is designed in a way that avoids imposing policies on new facilities such that they become uncompetitive with old facilities.

Under this policy, targeted facilities will only be licensed if:

- the production technology employed is at least at par with that of the most efficient decile of local manufactures/technologies[47]
- If they are committed to establish their EMS. It should be noted that the EE plan will not include significant interventions such as equipment change for some time.

If an industry does not have a precedent locally, international best practices should be the reference as there are no local plants to compare or compete with.

Studies on the technologies adopted in Egyptian industrial sectors are already undertaken for the most energy intensive industries. These studies can be replicated, in due time, for other industries. It should be noted that these studies could be of a qualitative nature, to illustrate the technologies used in the industry and identify the most efficient ones, and do not solely depend on the acquisition and analysis of micro-data.

The efficient local and international technologies should be continuously followed up and regularly updated and published to guide the facilities applying for licenses.

Artisans and craftsmen will not be targeted under this policy as they might not afford acquiring the technologies on the market.

Justification

Demand is primarily created when the industrial enterprise adopts EE as a core business issue and thus a regular part of its

[47] Studies of the technologies adopted in Egyptian industrial sectors are already undertaken for the most energy intensive industries. These studies can be replicated, in due time, for other industries to complement information collected through policies 1 and 2.

responsibilities. An issue becomes core to the business when it is essential for the business's successful operations and prosperity. To this end, an internal energy management system (EMS) and having modern efficient technologies has to be linked to those elements most substantial for the business's prosperity. One such element is having it as a licensing prerequisite. To avoid costly "retrofitting" energy efficiency interventions, new facilities should acquire efficient equipment from the outset.

Governing the new production technologies will be an integral component of the program regarding change of outdated technologies (see **Box 2**). Controlling the technological choices for certain industries (e.g. for bricks and foundries) from the outset will facilitate the shift to more efficient practices.

Risks

No risks are foreseen for this policy. However, when comparing technologies of new facilities with existing ones it has to be ensured that the facilities are similar in terms of production processes. If not, then the new facility should be compared to international best practice.

Beneficiaries

EMS consulting firms will benefit as their services will be sought out, since the industrial facility yet to be established will most likely not have an internal energy management system.

Technical consulting firms will also benefit as they will advise on the most efficient technologies

Relation to other policies

Knowledge on the most efficient plants can be partially acquired from policies 1 and 2 as well as other studies (e.g. UNIDO IEE project benchmarking reports, references 6- to 8-). At a later stage, mandatory reporting for registered facilities as stated in policy 12 will also contribute to acquiring such knowledge.

This policy is also complemented by policies 7 and 8 which ensure quality consulting services for energy management system and EE technologies, respectively through certification.

2- Policy Goals (outcome)

Outcome	Description
A. Sector upgrade	Introduction of EE technologies to the market, improving the sector's energy performance
B. Raising awareness	Signaling to the other market players that the best technologies are available and operative locally. This can be supported by case studies.

3- Policy Owner

Owner	Role Description
IDA	Modify licensing criteria for new facilities to include EE assurance

4- Policy Activities :

Activity	Description
1. Research local market	Researching and periodically updating the local (and international, if needed) processes and equipment for targeted industries
2. Database maintenance	Maintain database on performance of processes and equipment Issue periodical report on the most efficient local plants/technologies to represent a reference to new facilities

5- Policy stakeholders

a. Support (Directly involved: Hands-on)

Stakeholders	Role Description
ENCPC	*Pre-policy* - Support in setting systems for EE plans and data acquisition, consulting the relevant industry
Energy Planning Authority[48]	Maintain national energy information database

b. Facilitate (Not directly involved)

Stakeholders	Role Description
NQI	*Pre-policy* - Create an inventory of energy service providers/consultants catering for all industries as per policy 8. - establish a system to accredit EMS consulting firms as per policy 7
NQI / ITC	*Continuous* Train relevant personnel from the industries targeted on EMS implementation

[48] According to policy 13, to be finalized after the meeting with the Minister of Industry.

c. Evaluate

Stakeholders	Role Description
	-
Policy Unit at MOI	- Track and evaluate policy progress and extent of compliance.

6- Policy indicators :

a. Indicator A: Facilities rejected a license due to failure to abide by EE requirements

Description	New facilities whose licenses were rejected due to failure to abide by EE requirements relative to the total applications from the targeted sectors
Measurement	License applications rejected for energy performance issues / total applications per sector
Target	0%
Baseline	N/A
Data source and data responsible	IDA
Responsible Entity	IDA

b. Indicator C: % facilities submitting correct data

Description	Data can be verified through sector and time analysis, random audits and cross checking from energy suppliers. See **Box 3**. Provisions should be made for the statistical challenges of sample calculations.
Measurement	% of targeted facilities submitting correct datasets
Target (3 years after policy is in force for specific sectors)	100%
Baseline	N/A
Data source and data responsible	IDA
Responsible Entity	IDA

7- Policy timeframe (phasing strategy) :

Phasing philosophy

Phasing will be carried out according to the sector's energy intensity and size, starting with the largest and most energy intensive, as these industries are the most apt to implement EMS.

a. Phase 1 (2016-2019)

Large, energy intensive

Firstly, new facilities to be established in all large energy intensive industries will be targeted from the outset.

Large, non-energy intensive

Given their large number of large non-energy intensive industries, new facilities to be established belonging to the most energy intensive (e.g. textiles, food and beverage, etc.) will be targeted first. These will be directly followed by the other large, non-energy intensive industries.

b. Phase 2 (2019 - 2024)

Small, energy intensive

Sectors targeted would have benefitted from the technological change program mentioned in **Box 3**.

Phasing is illustrated in Table 4.

8- Enabling Conditions :

a. Infrastructure

Establish a communication mechanism between IDA and NQI and ENCPC

Maintain database on local processes and equipment as well as international best practice

b. Human capacity

Analyze data reported to draw and constantly update and publicize technological maps of different sectors.

c. Financial resources and budgeting

None, except those needed for additional human capacity.

d. Government support

Issuance of a decree stating changes in licensing criteria

Supply Oriented

Policy 7: Ensure Quality Of Energy Management System Consulting Firms Through Certification

Ensure responsive supply

1- Policy Summary

Description

To establish a **certification** mechanism for consulting firms and individuals in the field of Energy Management System in order to ensure that the quality of the services providers for energy management system to the industrial sector is up to standards.[49]

This mechanism aims to provide the market with a pool of certified consultants through:

- Establishing and continuously updating the prerequisite criteria that the consulting firm or the individual should fulfill to be able to apply for the certifications such as:
    - Documentation for the experience in the field of EMS,
    - The consulting firms expert's profiles,
    - A proof record of similar assignments/projects to ensure capabilities as well as all relevant training certificates / degrees that the consulting firm personnel have obtained in the field of EMS.

Moreover, the mechanism should ensure a renewal processes to the certification holders from the EMS consulting firms in order to ensure that they are actively operating in this field. Hence, those who got certified but are not materializing this into assignments / projects will be rejected which will lead to having a pool of qualified consultants that will be able to assist industrial facilities to reach their optimum energy savings

As for "in-house" energy managers / auditors, as large facilities already have their energy managers, should acquire the certification as stated below and perform as usual in their facility. This aids in the sustainability and operation of the facility.

In addition to this, consulting firms should be able to submit an executive summary of auditing reports that the certifying body for the number of industrial facilities served allowing for data gathering and analysis to build knowledge on sectorial trends and know how.

Finally, consulting firms should be categorized based on a point system that measures both their eligibility to attain the certification as well as their renewal

[49] It is worth noting that this policy is concerned with energy consulting services. If a consultancy service adopts the ESCO model, i.e. choose the implement their recommendations, the financing, the contract management and recovery of investments is up to them as part of their marketing strategy.

records, hence the ability to produce structured clusters of different levels of consultancies.

In order to ensure compliance, the template of the audits to be submitted by the industrial facilities should have the name of the consultant and the certification number (otherwise EMS plans will not be accepted) to ensure that EMS reports are issued by certified consultants. This, however, will start at a later stage after the certification system is operational in order not to hinder the demand side policies.

Justification

This policy is needed due to the foreseen rise of demand that will put pressure on the quality of the services performed in the field of EMS, hence this policy is needed to ensure a regulated market of services providers

Beneficiaries

It is worth mentioning that besides the industrial facilities that have the financial and technical resources to acquire the EMS services and that would directly contact the consulting firms to obtain the service; this policy will also serve the donor funded entities.
The donor fund entities in Egypt in the industrial sector and or the Energy sector (IMC for example) can secure the quality of their sponsored / financed assignment by short listing the certified consultants in the EMS.

Possible risks

The high cost of the EMS consultancies might hinder some local facilities (especially small and medium size) to approach the services which will result in an over supplied market with number of consulting firms or a ceiling on the price that will reject the bigger firms. This risk of being unable to govern the market prices is tackled via having a points system and categorizing registered and certified consultants (credentials, experience…etc.). This will allow for different pricing (as consultants with less experience will demand less fees) and thus, serving different categories as consultants with less experience may be adequate for small industrial facilities.

Relation to other policies

This policy is serving the objective of ensuring responsive supply which will be directly related to the demand policies that propose including EMS in export procedures as well as having EMS as condition for state procurement (policies 1 and 2 respectively). In as much as new facilities that will need to have an EMS system in place (policy 6). Also, small and medium enterprises are expected to demand EMS especially after reaching out to them through intermediaries (policy 5).
This policy will make use of policy 10, concerned with raising awareness, to announce certification criteria and certified EMS consultants.
Also, data from audits made by EMS consultants will be used to build up a data base and conduct analysis to help in decision making (policy 12)

2- Policy Goals (outcome)

Outcome	Description
A. Pool of qualified consultants in the field of EMS	A regulated market with certified consultant to ensure the standardization of the service offered
B. Satisfaction of the industrial consumers due to receiving quality services	Mapping the beneficiaries satisfaction ensuring continuous feedback mechanism to ensure receiving high quality services

3- Policy Owner

Owner	Role Description
National Quality Institute (**NQI)**	The NQI will be responsible to: - Administer the consultants acquiring the certification - Manage the certification issuance and renewal processes - Manage the database of registered and certified consultants to conduct analysis - Gather and analyze the data submitted from consultants - Set and continuously upgrade the certification criteria - Classify consultants based on the point system - Publish periodical report with the certified consultants data base and contacts

4- Policy Activities

Activity	Description
Identifying certification prerequisites	- Assess with stakeholders the technical and administrative criteria for consultants to be able to obtain the certification
Build the operating model of the certification processes	- Design all business / operational and administrative processes and procedures
Design templates and forms for certification	- Design all the templates needed for the certification: Applicants form, Registration template, Certification template, Consultants profiles etc…
Identify the certification renewal mechanism	- Design the processes for certification renewal and build the information data base
Build the organizational capacity of NQI	- Train and qualify the department assumed to undertake the certification responsibility
Gather data on consultants	- Identify and gather all consultants related data
Launch a communication strategy to all relevant stakeholders with the New activity of NQI	- Design and implement a communication plan that has all relevant forms and templates needed for acquiring the certification, as well as ensuring access to the consultants' database to be available for beneficiaries.

5- Policy stakeholders

a. Support (Directly involved: Hands-on)

Stakeholders	Role Description
IDA	- Comply with policy standards so as not to accept audits by consulting services in the field of EMS without being certified / renewed (noting that this will not be active from the start). This can be done through integrating the name of the consultant and the certification number in the EMS report template (otherwise EMS plans will not be accepted) to ensure that EMS reports are issued by certified consultants.
FEI	- Communicate periodically to all FEI beneficiaries the latest updated consultant list and their service offering. - Manage the satisfaction feedback and survey and coordinate with NQI

b. Facilitate (Not directly involved)

Stakeholders	Role Description
Donor Funded projects	- Align with NQI on their standard requirement from service providers to be eligible for the shortlisting processes - Comply with policy standards not to use the services of a consulting service in the field of EMS without being certified / renewed

c. Evaluate

Stakeholders	Role Description
Ministry of trade and industry-Policy unit (or Egyptian Accreditation Council) (EGAC))	- To assess the compliance and performance of NQI on the implementation of this policy

6- Policy indicators

Indicator 1: Number of consulting services providers accredited

Description	To measure how many consulting firms received the accreditation/ certification which indicates that the market is triggered and demand is rising
Measurement	Number of certified consultants
Target	Not applicable
Baseline	Not applicable (new KPI)
Data source and data responsible	NQI
Responsible Entity	NQI

Indicator 2: satisfaction rate of beneficiaries

Description	To assess the satisfaction level of beneficiaries from the service offered by EMS services providers
Measurement	Sum of all satisfaction ratings / number of beneficiaries surveyed
Target	>75%
Baseline	Not applicable
Data source and data responsible	IMC / FEI : they are responsible to conduct the survey and collect the data
Responsible Entity	NQI is responsible to report the final satisfaction report and take necessary measures

Indicator 3: Growth rate of non-renewed consulting firms of total registered firms

Description	To measure the number of consulting firms dropping out of the NQI data base due to non-renewal approval in order to assess the market activity for this service and maintain a focused qualified consultant market
Measurement	Number of non-renewed for a certain period / total registered number for the same period
Target	Outflow of consultants (% dropout) should be less than the inflow (the additional number in the database-newly registered-) to maintain a rich pool.
Baseline	Not applicable
Data source and data responsible	NQI
Responsible Entity	NQI

Indicator 4: Number of ISO 50001 EMS certificates issued

Description	To assess the number industrial facilities who used quality consulting services and got the ISO 50001
Measurement	Number of ISO 50001 EMS certification issued
Target	150facility / year (Target to be increasing gradually)
Baseline	Not applicable
Data source and data responsible	NQI
Responsible Entity	NQI

7- Policy Timeframe

Phasing Philosophy:
Given that the certification system should be established and enough consultants should be certified, for the demand policies to be confidently introduced:

- This policy will start as of 2016. To set up the system, agree on the certification standards, setting up the database…etc.
- Limiting EMS consulting service providers to the certified ones will start by 2018. A grace period will be provided, that is, till the certification system (including training) is operational. All industries implementing EMS prior to 2018 will not acquire EMS consultancy services from certified consultants. Additionally, all in-house energy managers will need to be certified to be able to operate in their facilities.
- According to the sequence implied in policies 1 and 2, industries will acquire EMS according to the sector's energy intensity and size, starting with the large and most energy intensive as these industries are the most apt to implement it. In order not to delay policies 1 &2, only industries that will start implementing EMS in 2018 and onwards will have to acquire certified consultancy services or certify their energy managers if present. That is, after the certification system is set in place and operational and the grace period have been provided

8- Enabling Conditions

1- Infrastructure

- Build sectorial and geographical coverage for NQI
- Enhanced access through online processes
- Establish communication mechanism between NQI and the different stakeholders (FEI/ IDA…etc.)
- Customer interaction mechanism that provides support and feedback

2- Human capacity

- Train and qualify personnel that can manage and run the certification / renewal processes
- Analytical skills to be developed to issue periodical reports to support decision making with regards to certification criteria

3- Financial resources and budgeting

- Revenue streaming from the certification / renewal fees to develop the capacity within the NQI and avail automation platform for remote certification renewal In later stages

- Financial resources are required to perform studies with regards to the standards/ requirements for EMS certification

4- Government support

- Drive beneficiaries to comply to NQI standards in certification: template of the audits to be submitted by the facilities should have the name of the consultant and the certification number (otherwise, starting 2018, EMS plans will not be accepted) to ensure that EMS reports are issued by certified consultants
- Emphasize on the importance of having a regulated market through a national recognition campaign: For example, certified consultants with the most points get awarded/ recognized (to encourage other consultants to get certified). The awareness mechanism (policy 10) can be utilized for that purpose too.

The concept of this policy was discussed and generally agreed upon with Dr. Hany El Dessouki, Chairman of the National Quality Institute, in June 2015.

Policy 8: Link Qualified Consulting Firms To Rising Demand On Energy Efficiency Technologies

Ensure responsive supply

1- Policy Summary

Description

The policy aims to provide the market with qualified technical consulting firms / individuals in different engineering fields (mechanical – electrical – chemical-engineering). This qualification process includes:

- Registration
- Setting the technical standards for the consultant's know-how
- Then there is a technical assessment by a central accreditation body that will ensure compliance to international standards in this field
- Finally consultants get the awarding certificate to be able to operate in the market.

To make sure that service providers are following the government direction to ensure quality supply of consulting services, this policy is divided into 2 stages.

8-A: Capacity-based

The first stage of this policy facilitates the registration of Energy Consulting firms in the different engineering fields (technical consulting firms) through developing well designed criteria that ensures coherence and compliance.

This criteria is general, and includes:

- Documentation of the experience in the respective engineering field
- The experts' profiles that belong to the consulting firms

This sets the scene for the second stage as it drives all technical consultants to register under the authorization of one entity in order to provide the market with a pool of technical consultants that are eligible to provide technical consulting services based on minimum registration standards.

8-B: Technology-based

The second section of the policy is concerned with establishing an accreditation mechanism for energy consulting firms and individuals in the main engineering fields (electrical – mechanical – chemical) in order to ensure the supply of quality engineering consulting services to the industrial sector.

This system of accreditation and certification is based on continuous assessment through:

- Establishing a set of criteria that the consulting firm / the individual should fulfill to be able to acquire the accreditation, such as:
  - Knowledge on the specific fields, for example CHP in the first phase. This will be done through technical assessments.
  - A proof record of similar assignments/ projects to ensure capabilities as well as all relevant training certificates/ degrees that the consulting firm personnel have obtained in its engineering field.

- Creating a renewal processes to the accreditation holders from the engineering consulting firms in order to ensure that they are actively operating in their respective fields. This renewal process would reject those who got accredited but aren't materializing this into assignments /projects in a pre-defined time period, to ensure a focused pool of qualified consultants. It should be noted, however, that in case of rejection, rejected firms/ individuals need to apply to get the accreditation again (start the process from the beginning).

Finally, the consulting firms should be categorized based on a point system that measures both their eligibility to attain the certification as well as their renewal records, hence their ability to produce structured clusters of different levels of consultancies.

Due to the need for a focused strategy to ensure timely and efficient implementation, this policy will be first applied to consulting firms and individuals in the field of **Combined Heat and Power (CHP)** and waste heat recovery.

Justification:

This policy is needed due to the foreseen rise of demand that will put pressure on the quality of the services performed in the different engineering fields. This demand is specifically foreseen for CHP resulting from the demand policy that proposes the establishment of a mechanism for grid-connected combined heat and power (CHP) that allows the facilities to sell the electricity produced from recovered energy to the grid.

Hence, this policy will ensure a regulated market of services provides which will guarantee its sustainability.

Beneficiaries:

- The industrial facilities that have the financial resources to acquire the Technical consulting services and hence capitalize on their energy saving potential via a qualified consulting service in the needed engineering field.
- Industrial facilities that have waste heat and would benefit from recovering this in the form of energy to be used within the facility and save on the energy bill, or sell to the grid and generate revenues.
- The donor fund entities in Egypt in the industrial sector and or the Energy efficiency in the industrial sector can secure the quality of their sponsored / financed assignment by short listing the accredited consultants in the respective engineering field. Not only that, but if the engineering field in which those entities operate in has no implemented accreditation system

yet, a list of registered entities in this field, available through the registration phase, can be easily targeted for a bidding process.

Possible risks:

Possible exclusion of capable entities in other fields than the ones being stated in each phase. For example, if there are consulting firms that are capable in electric motor systems, however, they won't get accredited in the first phase since the focus is on CHP. However, a communication plan will be developed that clearly states the strategy and the focus in the next years (along with the reason for this phasing, the criteria). Also, they can still perform their work as there will be no recommendations or shortlisting within the registered entities on accreditation basis (until an accreditation mechanism is implemented in their engineering field).

Relation to other policies:

This policy serves the demand side policies by providing qualified consultants in the field of CHP in the first phase, which directly serves policy 3 (grid connected CHP). That is because when MEPS is introduced on equipment, accredited consultants in that specific field can advise on phasing out inefficient equipment and optimizing efficiency.

2- Policy Goals (outcome)

Outcome	Description
A. Pool of qualified technical / engineering consultants	A regulated market with accredited consultants to ensure that the service offered is up to standards
B. Satisfaction due to receiving quality services	Mapping the beneficiaries satisfaction ensuring continuous feedback mechanism to avoid defaults

3- Policy Owner

Owner	Role Description
NQI	NQI will be responsible to: - Manage the registration and renewal processes - Formulate with a steering committee the training syllabus outline in order to avail it for training centers to be delivered - Manage the processes of the technical assessment with ITC - Accredit the technical consultants in a specific engineering field (mechanical – electrical – processes) - Classify consultants based on the point system - Manage the database of registered consultants and produce analysis

4- Policy Activities :

Activity	Description
Establish the registration mechanism	- NQI to start the process of registering the technical consultants
Identifying accreditation prerequisites	- Assess with stakeholders from FEI / MOTI the technical and administrative criteria for consultants to be able to obtain the accreditation
Build the operating model of the accreditation processes	- Design all business / operational and administrational processes and procedures
Design templates and forms for accreditation	- Design all the templates needed for the accreditation: Applicants form, Registration template, Accreditation template, Consultants profiles etc… - Align with ITC on the assessment form (examination) that should test the consultants in specific technologies
Identify the certification renewal mechanism	- Design the processes for certification renewal and build the information data base
Identify and Provide training	- NQI along with a steering committee including ITC to decide on the syllabus of the required training for consultants to get the accreditation. International trainers can be hired on a train the trainer program to have a pool of training expertise in each specific field
Enhance the organizational capacity of NQI	- Setting the stage within the NQI to be able to manage the accreditation processes via Train and qualify the department assumed to undertake the certification responsibility
Launch a communication strategy to all relevant stakeholders with the New activity of NQI	- Design and implement a communication plan that has all relevant forms and templates needed for acquiring the certification, as well as availing access to the consultants' database to be available for beneficiaries.

5- Policy stakeholders

a. Support (Directly involved: Hands-on)

Stakeholders	Role Description
Industrial Training Center (ITC)	ITC is responsible to: - Qualify the training centers that will be eligible to deliver a specific technical training - Set the consultant's examinations (assessments) and generates the results. This should be in collaboration with NQI
IMC / FEI	- Formulate a technical committee that will help NQI set the accreditation standards and criteria - Comply with policy standards to prohibit, in due time, a consulting service to take place without being accredited

	- Communicate periodically with all IMC and FEI beneficiaries with the latest updated consultant list and their service offering. - Manage the satisfaction feedback and survey and coordinate with NQI

b. Facilitate (Not directly involved)

Stakeholders	Role Description
Technical training centers	- To register the new training modules on the different technical fields to be able to train the consultants
Donor Funds	- Align with NQI on their standard requirement from service providers to be eligible for the shortlisting processes - Comply with policy standards not to allow a consulting service in a specific technical field without being accredited / renewed

c. Evaluate

Stakeholders	Role Description
Ministry of trade and industry (or EGAC)	- To assess the compliance and performance of NQI and ITC on the implementation of this policy

6- Policy indicators :

Indicator 1: Number of consulting services providers registered

Description	To measure how many consulting firms has registered in the NQI
Measurement	Number of registered consultants
Target	Not applicable
Baseline	Not applicable
Data source and data responsible	NQI
Responsible Entity	NQI

Indicator 2: Number of consulting services providers accredited in specific technical field

Description	To measure how many consulting firms has applied to get the accreditation in a specific technical field which indicates that the market is triggered and demand is rising
Measurement	Number of accredited consultants in specific technical fields
Target	Not applicable
Baseline	Not applicable
Data source and data responsible	NQI

Responsible Entity	NQI

Indicator 3: satisfaction rate of beneficiaries

Description	To assess the satisfaction level of beneficiaries from the service offered by technical consulting services providers
Measurement	Sum of all satisfaction ratings / number of beneficiaries surveyed
Target	>75%
Baseline	Not applicable
Data source and data responsible	IMC /FEI : they are responsible to conduct the survey and collect the data
Responsible Entity	ITC is responsible to report the final satisfaction report

Indicator 4: % of non-renewed consulting firms of total registered firms

Description	To measure the number of consulting firms dropping out of the NQI data base due to non-renewal approval in order to assess the market activity for this service and maintain a focused qualified consultant market
Measurement	Number of non-renewed for a certain period // total registered number for the same period
Target	< the 1st registration growth rate (the number of consultants out to be less than the additional number in the database to maintain a rich pool)
Baseline	Not applicable
Data source and data responsible	NQI
Responsible Entity	NQI

7- Policy Timeframe:

Phasing Philosophy:

This policy will start as of 2016. The first phase will focus on setting up the registration and certification systems. When the system is operational, focus will be directed to CHP technologies. However, up till the systems are established, no restrictions will be imposed regarding the engineering consultancy services facilities decide to acquire.

Phase 1: (2016-2019)

This phase will focus on:

- **Setting the registration mechanism:** Noting that it should take into consideration time allocation for applications to avoid overburden
- **Building the capacity of the current system to be able to register, accredit and train**

- **Setting the accreditation system for waste heat and energy recovery particularly CHP:**
    - Given its nature (cross cutting with numerous industries) and it combines both thermal and electrical
    - The energy saving potential
      Roughly one-third of the energy consumed by industry is discharged as thermal losses directly to the atmosphere or to cooling systems.[50]

Following CHP, focus should be on Electric Motor Systems:

- Given their nature (cross-cutting with numerous industries)
- The energy saving potential
- In anticipation for MEPS on electric motors which will create a demand for energy consulting services in the field of electric motors to optimize energy efficiency. It is worth mentioning that EOS started working on developing MEPS for Electric motors.

Eventually, the policy should include all energy saving technologies.

It should be noted that:

- Specifying accurately the start date of each technology and their phasing is too operational and is to be decided by NQI given its capacity and access to resources.

8- Enabling Conditions :

a) Infrastructure

- Build sectorial and geographical coverage for the registration mechanism
- Enhanced access through online processes
- Build customer database, develop customer interaction mechanism to be able to provide support and feedback
- Establish communication mechanism between NQI/ EGAC/ FEI and IMC.

b) Human capacity

- Trained and qualified caliber that can manage and run the accreditation / renewal processes
- Analytical skills to be developed to assess success of the accreditation criteria, identify areas for development and support decision making.

[50] Engineering Scoping Study of Thermoelectric Generator Systems for Industrial Waste Heat Recovery, Terry Hendricks, Pacific Northwest National Laboratory, William Choate, BCS Incorporated, Report to U.S. DOE Industrial Technologies Program, November 2006.

c) Financial resources and budgeting

- Direct the revenue streaming from the accreditation / renewal fees to build the capacity within NQI and provide automation platform for remote certification renewal In later stages
- Direct a budget to hire international experts in specific technologies and to train the trainers

d) Government support

- Emphasize on the importance to have a regulated market through a national recognition campaign: For example, accredited consultants with the most points get awarded/ recognized (to encourage consultants' accreditation). The awareness mechanism (policy 10) can be utilized for that purpose too.

The concept of this policy was discussed and generally agreed upon with Dr. Hany El Dessouki, Chairman of the National Quality Institute, in June 2015.

Policy 9: Minimum Energy Performance Standards (MEPS)

Ensure Responsive Supply

1- Policy Summary

Description

Minimum Energy Performance Standards (MEPS) specify the minimum level of energy performance that industrial equipment must meet before they can be offered for sale.

Minimum Energy Performance Standards should cover:

- Product definitions
- Performance levels
- Test method requirements (the test method, performance measures and test materials)
- Registration requirements

MEPS can take several forms, it can specify requirements for the design (features within the control, management and supervision systems), it can also cover types of fuel firing.

This policy requires MEPS to be developed with a focus on equipment that comply with the following prioritization criteria:

- Are high on Potential Energy Saving (priority is to those of higher potential)
- Are used across a large number of industries utilizing it (most cross-cutting is a priority)
- Priority will be imported equipment rather than the ones manufactured locally

MEPS for imported equipment are the starting focus, as it is easier for importers to change their purchase orders. It should be noted that this policy takes into account a grace period for importers who already placed their orders. A grace period will be provided to notify importers since orders can be made months prior to delivery.

MEPS for locally manufactured equipment will follow. This will allow for a grace period between notifying them and enforcing the policy, during this time these manufacturers will be able to take the necessary production process modifications. This is expected to take more time as it requires capacity building to:

- Identify local manufacturers (using IFC study)
- Identify the equipment produced locally and how it can comply to MEPs
- They must be granted a grace period

Justification

There is a large potential for energy savings in the industrial sector resulting from the use of inefficient equipment. For example, The introduction of MEPS for electric motors in Brazil prevented the construction of 350 MW hydro-power plants (Garcia et al., 2007). Electricity was saved at a cost of around US$ 22/MWh, which is far below market prices. Also, energy savings in boilers can reach up to 25-30%.

Since MEPS are a regulatory tool, it is expected to be a fast and effective energy saving mechanism regarding equipment. Particularly as new facilities will have to use the energy efficient equipment and existing facilities who are replacing their inefficient (according to policy 4: phasing out) and depreciated equipment.

Possible risks

Even though it could be argued that high-performance equipment are expected to be more expensive, relatively, to the industrial facilities, oin the long term these facilities will benefit from the energy savings which will be reflected in cost savings. Therefore, a communication plan is to be developed for this policy that financially justifies the extra investments in terms of savings in operating costs.
Also, a policy is dedicated to increasing the financial services available to IEE to help in applying MEPS and replacing current equipment especially to SMEs.

Beneficiaries

This policy will help open market for local manufacturers who will benefit from this policy as it will increase demand for the high-performance equipment.

Relation to other policies

MEPS will depend on the policy concerned with raising awareness (policy 10) to communicate the specific standards set on the equipment to:

- The industrial facilities
- The local manufacturers
- Equipment importers
- Energy Consulting services

This policy also serves as a pre-requisite to the policy mandating the obligatory replacement and phasing out of selected equipment (policy 4) below specified performance standards, and above a certain size and age in a set number of years.

2- Policy Goals (outcome)

Outcome	Description
A- MEPS on all equipment	Remove/ replace the least energy-efficient products from the market which reduces energy consumption and energy waste.
B- Energy Saving across all industries	Since many of the inefficient equipment are cross-cutting as they are used by numerous industries, focus on cross-cutting equipment will eventually achieve energy savings across all industries.

3- Policy Owner

Owner	Role Description
Egyptian Organization for Standardization and Quality (EOS)	The Egyptian Organization for Standardization and Quality is the accredited national reference and the only entity in Egypt mandated with doing all the activities regarding the specifications, quality, tests industrial calibrations in order to raise the quality of Egyptian products to make them competitive in the international and domestic markets. EOS is also concerned with consumer and environmental protection EOS develops standards for industrial equipment.

4- Policy Activities

Activity	Description
Data collection	- Gather market data regarding the current status of industrial equipment being used by the industrial facilities (type, size….etc.). For this activity, International Finance Corporation (IFC) project, expected to conclude in 2015, can be used.
Identify Inefficient Equipment	- Analyze current data to categorize equipment according to energy consumption, the number of industries using it, high level potential energy savings…etc.
Develop an action plan	- Agree on prioritizing criteria (potential energy savings, number of industries utilizing this equipment, locally manufactured or imported….) - Identify key equipment to work on and phase accordingly
Identify standards	- Compare standards and test applicability to the Egyptian market - Identify the most suitable set of standards
Issue MEPS	

Develop a communication plan	Develop a communication plan that:
	- Clearly states the standards and the equipment
	- Specifies the time of the policy activation
	- Identify the position of the different stakeholders:
	  - The grace period to the importers
	  - The existing facilities(In conjunction with policy 4)
	  - New facilities…etc.
	- Using results of demonstration projects, communicate the potential energy savings and translate it into cost saving/ benefits for industrial facilities

5- Policy stakeholders

1- Support (Directly involved: Hands-on)

Stakeholders	Role Description
ENCPC	Identify inefficient equipment by performing the necessary studies and agree on the equipment to have MEPS with EOS
MoI Policy Unit	- Set a plan for the equipment needing MEPS: which equipment will have MEPS imposed and their respective timeframe., in coordination with Industrial Control Authority and ENCPC - Coordinate between ENCPC and EOS as well as with ICA and the ministry of finance
Ministry of Finance	To develop the capacity of the customs authorities by securing training on the appropriate tools to avoid non-compliance with MEPS
Industry and technology development sector (MoI) / FEI	Identifying local manufacturers and capacity to produce EE equipment

Facilitate (Not directly involved)

Stakeholders	Role Description
FEI	Communicate the MEPS to the industry

2- Evaluate

Stakeholders	Role Description
Custom authorities	Measuring the increase of demand on imported equipment following the MEPS and the % non-compliance
Industrial Development Authority	Tracking the increase in the local equipment manufacturers who are entering the market for the specified equipment
MoI Policy Unit	Ensure that EOS is covering the planned equipment in the set timeframe

6- Policy indicators

Indicator A: Number of Standards issued

Description	This indicator measures the number of standards issued to indicate the coverage of possible IEE saving potential
Measurement	Number of standards issued and are in implementation phase in comparison to the equipment that needs upgrading at a given stage according to the mapping out study
Target	To be set according to the plan
Baseline	N/A
Data source and data responsible	EOS
Responsible Entity	Ministry of Trade and Industry

Indicator B: Compliance rate of imported equipment to MEPS

Description	This indicator measures the extent of commitment to the minimum energy performance standards issued on equipment by the importers
Measurement	Percentage of equipment at the custom services that do not comply to MEPS
Target	0%
Baseline	N/A
Data source and data responsible	Custom Authorities
Responsible Entity	Custom Authorities

7- Policy timeframe (phasing strategy)

Phasing Philosophy

- First phase will focus on Equipment of highest energy saving potential and most cross-cutting equipment.
- While both importers and local manufacturers will be targeted, locally manufactured equipment will be delayed to inform local manufacturers on the new performance standards and give them a chance to prepare for them in order not to negatively impact their competitiveness.
- Other phases will include more equipment according to criteria

It should be noted that:

- Specifying accurately the start date of MEPS for each equipment and the specific equipment for each phase is too operational and is to be decided by EOS given its capacity and access to resources and communicated to the anticipated policy Unit in the Ministry of Industry- to be taken into consideration in the planning of this policy.

8- Enabling Conditions:

1- Infrastructure

- A data system is needed to be able to track the list of importers and local manufacturers of equipment with specified MEPS.
- Communication mechanisms between EOS and the different parties (FEI, MoF…etc.)

2- Human capacity

- Capacity building for the custom authorities to detect non-compliance.

- Capacity building (whether recruiting new employees, training or using international expertise, for example in comparing standards) for the EOS to be able to cover the planned equipment in the planned time.
- Trained personnel are needed to be able to analyze the data and identify the local manufacturers, their fields and the means to reach them.

3- Financial resources and budgeting

- EOS needs financial support to be able to complete the studies, pilot phase, issue standards

4- Government support

- Incentives may be provided to local manufacturers to have a competitive edge (provide the equipment on installment basis, hence helping out the industrial facilities)

Policy 10: Create an awareness mechanism that leverages integrated information related to IEE

Ensure responsive supply

1- Policy Summary

Description

The aim of this policy is to establish a mechanism/platform responsible for raising awareness of the benefits of energy efficiency in Egypt. This mechanism is responsible for justifying why energy efficiency is crucial on both the corporate and national level, as well as providing solutions on how this can be achieved, and the associated costs of implementation.

Furthermore, awareness is to be highlighted with regards to the following factors:

- Financing options: in terms of both methodologies available and supporting mechanisms
- Technology: know-how and emerging trends in industrial energy efficiency.
- Strategy and Policies: relevant policies and areas of focus that are targeted in the upcoming phase. Also requirements from different facilities will be publicized, for example criteria upon which EMS is offered.
    - Public disclosure: lead by example (raising awareness about success stories) through analysis of recent/planned activities sought out by Egyptian industrial facilities. This can also be achieved through making the energy performance of the targeted sectors for each phase public, improving the accountability of the enterprises.

The mechanism should aim to target both direct and indirect stakeholders, including banks, government, industrial sector, with its various sizes and activities, and Energy Consulting Services, in addition to all owners indicated across the other policies. To be successful, this mechanism should aim to cover Egypt in its entirety, and all the industrial facilities within the nation.

In order to warrant active communication with all stakeholders, it is essential to dedicate a unit within an entity to be solely responsible for ensuring the mechanism/platform is up to date and dynamically working to support this cause. To achieve this, a communication plan is required.

Mechanisms of this sort rely primarily on modern media and means of communication to disseminate awareness across stakeholders. This entails the use of two-way communication platforms, such as round-table discussions or a website with a portal that allows for inquiries, and the use of one-way communication platforms, such as a monthly magazine publication.

Stakeholders play a crucial role in enabling the success of this mechanism. Each stakeholder will participate in contributing to raising awareness by providing all data related to industrial energy efficiency. The Federation of Egyptian Industries and Industrial Development Agency should provide up-to-date news and changes in policies and standards, and Energy Consulting Services will contribute in terms of research and recommendations and the services they provide. Other stakeholders, such as Original Equipment Manufacturers (OEMs) and banks, can take advantage of this mechanism through promoting their

products and services. OEMs provide insights with regards to advancements in technological equipment, and banks are able to advertise financing options and loans to assist in the transition towards energy efficiency.

Justification

There is a need to tackle various social challenges and barriers towards IEE, and the general lack of information and awareness regarding Energy Efficiency Moreover, not all industrial facilities are on the same level of awareness regarding the potential for IEE.

As such, this mechanism's main purpose is aimed at countering the stigma often associated with energy efficiency is that it is costly and a continued burden on industrial operations. This policy is also much needed to ensure transparency and better accountability as well as better market integration.

This mechanism will facilitate awareness amongst different stakeholders within various industries regarding the long-term financial gains and/or net cost reductions (after the amortization of initial investment/procurement costs of implementing energy efficient equipment. Given the equipment replacement policy and other policies, industries should have their awareness raised through this policy regarding the equipment to be purchased. Industrial facilities should know what to seek and check when purchasing new equipment (e.g. product specifications, warranty and guarantee details). This will help them appreciate the value-for-money of equipment before acquiring it.

Furthermore, this platform will save on marketing for Industrial energy efficiency in the banking sector. This is more effective since this platform allows for knowing other financial facilities offerings and facilities to industrial energy efficiency projects in Egypt which allows for competition.

It is worth noting that raising awareness may not be sufficient for encouraging change, and upfront financial incentives and/or subsidies may be demanded from industries.

Risks

No risks are foreseen for this policy

Beneficiaries

Besides the industrial facilities;

- OEMs will benefit as their energy efficient equipment get advertised for. Also, as they are informed about current and upcoming trends, this will help them to be mobilized accordingly.
- Consulting firms (whether technical or processes) will benefit as they gain publicity. They also gain access to knowledge about trends and expected rise in demand, allowing them to act fast.
- Training providers will also benefit and the demand rises on the services they provide

- Banks and financial institutions will be able to announce the different services they offer for funding/facilitating IEE as they know what other financial institutions offer, allowing them to compete.
- The whole Industrial energy efficiency ecosystem will benefit from having a more integrated market. Especially that this platform will announce the policies and the focus of the government in the current and upcoming period in the field of IEE which will allow the different sectors and suppliers to plan accordingly.

Relation to other policies

This policy is a support policy required to ensure the dissemination of information to the whole system and not a standalone policy. Therefore, it affects all demand side policies as it helps in raising awareness and steer demand. Also, it integrates the different supply policies as it provides a platform that continuously announces the services provided. So it would announce the accredited and certified consultants in policies 7 and 8. As well as the new and trending IEE equipment that will help in policies 4 and 9. Besides the financial services in policy 11. Government direction and focus areas are a key factor that is handled by this platform, facilitating policies 1, 2, 3 and 5.
This policy also helps in guiding new comers to the market, which directly affects policy 6.

2- Policy Goals (outcome)

Outcome	Description
A. A more integrated systems that works collectively towards boosting energy efficiency	- The government can perform its role more effectively (planning, regulating, and monitoring). - Greater integration between Energy Consulting Services, OEMs and training entities as they need to be aware of the new technologies available and vice versa.
B. Increased support from the banking sector	- Banks are more aware of the different needs, technologies and nature of the energy efficiency.
C. Increased awareness across different industrial facilities	- A decreased awareness gap between the different industrial facilities regarding the potential savings, technologies, services, financing and focus areas.

3- Policy Owner

Owner	Role Description
Federation of Egyptian Industries (FEI)	FEI is set to enhance the performance and productivity of the Sector members in addition to providing tools that facilitate the overall commercial and business effectiveness. It is also home for 16 Industrial Chambers. Accordingly, for this policy it is expected to dedicate a unit concerned with communication and awareness to be: - Responsible for initiating the policy mechanism, including chosen platforms that this mechanism will be built upon. - Ensuring that a communication plan is set annually with milestones, key activities, and those responsible to carry out those tasks. - Ensuring participation and retrieval of all relevant information from all stakeholders. - Monitoring publications, round-table discussions, and inquiries and that these activities take place periodically.

4- Policy Activities

Activity	Description
Choosing communication platforms	- Assessing the potential reach and choosing different platforms that will be used to communicate with stakeholders (e.g. website, round-table discussions, magazine publications)
Resources to establish platform	- Gain access to resources that will be used to establish platforms (e.g. technical capabilities, publishing company)
Developing a communication plan	- Developing an annual communication plan that dictates when activities will be done and on what platforms - Develop a campaign that will announce the launch of this mechanism
Compiling and filtering information received	- Compile the information received from different stakeholders and filter for relevance and accuracy
Monitor the impact of this mechanism	- Monitor the impact of this mechanism on the level of awareness of energy efficiency, and the different products and services that enable efficiency

5- Policy stakeholders

1- Support (Directly involved: Hands-on)

Stakeholders	Role Description
IMC	- Ensure the participation of its members and their registration on the platform - Collect and gather feedback from its beneficiaries and report to FEI

2- Facilitate (Not directly involved)

Stakeholders	Role Description
IDA, NQI, EOS, MOF, ERA, Banks, Industrial Sector, Energy Consulting Services	- To contribute to raising awareness through providing information pertaining to research, latest trends, advanced technologies and machinery available

3- Evaluate

Stakeholders	Role Description
FEI	- To assess the contribution and participation of stakeholders on the implementation of this policy - To measure the impact of this mechanism through monitoring a set of chosen KPIs.
Ministry of Trade and Industry	- To track the overall effectiveness of the policy

6- Policy indicators

Indicator 1: Number of data requests

Description	To assess the effectiveness of the platform as an outcome of the coverage, data collected, research… Data requests should be analyzed by the type of data requested to help identify the information gaps
Measurement	Number of data requests / year
Target	Not applicable
Baseline	Not applicable
Data source and data responsible	FEI
Responsible Entity	FEI

Indicator 2: Reach of platform

Description	To assess the reach and coverage of the platform across Egypt. An assessment of the number of hits (visits) and registrations needs to be done by sector (banks, industrial facilities…etc.)
Measurement	- % of banks who are subscribers - % of industrial facilities who are subscribers

	- % of Energy Consulting Services who are subscribers
Target	>50%
Baseline	Not applicable
Data source and data responsible	FEI
Responsible Entity	FEI

7- Policy Timeframe

There is no phasing for this policy.

8- Enabling Conditions:

1- Infrastructure

- Build the different platforms for communicating with stakeholders
- A communication mechanism between FEI and ENCPC to use the studies done by ENCPC regarding growing trends, new products and services, best practices and case studies, etc.
- Acquiring the required tools and mechanisms to enhance research and communications
- Enhance sectorial and geographical coverage for platforms
- Audience interaction and providing support and feedback

2- Human capacity

- Analytical skills to be developed to issue periodical reports to assess the impact of these platforms on raising overall awareness

3- Financial resources and budgeting

- A budget dedicated to establishing the platform, and covering the on-going costs of maintaining the platform
- A mechanism to set registration fees, report prices, subscriptions, advertisements…etc.

4- Government support

- Encouraging participation and data-sharing from all entities within the industrial sector such as IDA

POLICY 11: Augment Soft Financing to SMEs

This policy aims to provide support SMEs through offering affordable financial services. This policy is divided into two sections (11a and 11b) and elaborates on existing mechanisms in FEI and cooperatives where the experience accumulated in the former will be transferred to the latter.

POLICY 11a: Capitalize on FEI fund to subsidize Industrial Energy Efficiency Projects

1- Policy Summary

Description

This policy aims to capitalize on the Federation of Egyptian Industries funds in order to subsidize Industrial Energy Efficiency Projects with special focus to Small and Medium Enterprises.

This is in line with the FEI vision to develop realistic, value-rich programs designed to uplift the performance of the Industrial Sector and proactively tackle their problems in order to create a globally competitive industrial society.

FEI has recently taken a focus towards energy related endeavors and support services to its members. FEI currently offers the following relevant services:

- Loans (reaching 3 million EGP) with administrative fees estimated by 2.5% to help the industrial enterprises to ensure environmental compliance.
- Technical consultations and labor training in the field of cleaner production executed by its" Environmental Compliance Office".

This policy capitalizes on the framework, operating model and incentive set by which FEI directs funds towards subsidizing member companies in their efforts towards taking part in industrial energy efficiency projects including equipment replacement (policy 4).

In order to provide financial support, particularly to SMEs, the FEI fund can be capitalized on (either by direct government investment or by re-directing grants) to increase the fund.

This strategy/policy of capitalizing on the fund, driving investments and grants towards the fund and skewing its spending towards energy efficiency projects would allow for greater coverage and extended services

In order to ensure that these funds are being put to best use, a ceiling can be set (maximum amount of money per facility). This ceiling will be more attractive to smaller facilities (as larger ones may need larger amounts).

Justification

Some IEE projects (such as equipment replacement according to MEPS) may come at a cost that would be considered high for some facilities. This makes facilities,

especially small ones hesitant to make the investment without external support of subsidization of some sort. Therefore this policy opens the doors to industrial facilities to get on board and overcome their energy challenges.

Moreover, with the reform to the energy subsidy structure, these facilities are looking at incrementally higher energy bills. Hence this policy provides a framework by which these facilities are given access to support with regard to industrial energy efficiency projects which will enable them to use energy more efficiently as well as potentially convert some of their industrial waste heat into useful energy.

Possible risks

This policy may face risks that pertain to the implementation side, a strong monitoring and evaluation process must be put into place to guarantee that funds are managed in a transparent manner and that they are channeled to facilities that would stand to benefit from them.

Beneficiaries

All members of the FEI are potential beneficiaries from this policy.
Small and Medium Enterprises will particularly benefit from this policy as the loans are most likely to attract SMEs due to the ceiling. The FEI itself as a manager of this fund is a partial beneficiary. Some industries are poised to benefit more than others due to their energy intensive nature.

Relation to other policies

This policy serves the demand side policies as it provides the financial support for SMEs to phase out the equipment and replace them according to policy 4 , or by providing cheaper methods of funding to Small and Medium Enterprises (policy 5)

2- Policy Goals (outcome)

Outcome	Description
Increased reach of SMEs through intermediaries	This policy should enable FEI to channel energy efficiency subsidization efforts to deserving small and medium enterprises that otherwise would not be able to afford the investment.

3- Policy Owner

Owner	Role Description
Federation of Egyptian Industries (FEI)	FEI as an entity is a collective of industrialists with the following mandates: - To directly represent members' interests before governmental and legislative bodies, as well as other local and international associations.

	- To participate in developing policies and legislations that result in encouraging investment and developing suitable environments conducive to rapid growth of national economy. - To advocate structural reform that leads to transparency in governmental legislative and enforcement practices. - To contribute to the development of Egyptian industry by adopting new technology and international quality standards. - To provide information to its members via its databases, publications, seminars etc… in order to serve their requirements. In this context FEI would be responsible for managing the fund, defining criteria for fund disbursement, evaluating the eligibility of the different facilities, finance the projects and monitor and evaluate outcomes.

4- Policy Activities

Activity	Description
Develop the fund	In this context FEI would be responsible for earmarking a portion of existing funds to this policy objective. This would include reviewing the mechanism for fund disbursement and allocating a fund manager to oversee implementation.
Set up the mechanism for evaluating and selecting from applicants	This activity aims at ensuring the sustainability of the policy and ensuring that the funds are allocated to the most deserving. This mechanism will form the guiding framework for evaluating the different SMEs or facilities that apply for funding with regard to industrial energy efficiency programs.
Put forward a fund-raising and lobbying party	This activity requires FEI to lobby and coordinate with the different stakeholders in order to ensure that energy efficiency is high on the national agenda. FEI will work towards growing the fund through liaising with the Ministry of Finance, donor funds and any domestic or international grants earmarked for energy efficiency programs.
Build a database of approved service providers	In order to ensure that the funds are well spent, FEI through this program needs to build a database of certified technical service providers, consultants (using the database from NQI-policies 7and8), and all the clients (industrial facilities) that will execute industrial energy efficiency projects at the different facilities. These service providers must be evaluated after each project and their ratings on the database reviewed. Cases of fraud or miss-dealings will result in service providers being omitted from the database. (Data sources and data collected in other policies can be used to cross-check data submitted for this policy and build the database).
Manage fund disbursement	Establish a mechanism by which funds are disbursed to the suppliers.
Establish a monitoring and evaluation system	Setting up a system to monitor the disbursed funds and the progress across the different projects. This will be used to

	both evaluate the beneficiaries, the selected energy efficiency solutions as well as the service providers in question.

5- Policy stakeholders

1- Support:

Stakeholders	Role Description
Ministry of Finance	Infuse and/or direct funds to FEI

6- Key Policy indicators

Indicator 1: Disbursed funds

Description	Total cash volume of funds disbursed to subsidize industrial energy efficiency projects through FEI
Measurement	Measured every quarter to track quarter over quarter growth in reach
Target	N/A
Baseline	N/A
Data source and data responsible	N/A
Responsible Entity	FEI

Indicator 2: % Energy saved due to implementing IEE projects from FEI loans

Description	Energy saved due to implementing IEE projects from loans provided by FEI
Measurement	Energy saved from projects implemented from loans /total energy consumed (sum for all facilities)
Target	N/A
Baseline	N/A
Data source and data responsible	N/A
Responsible Entity	FEI

7- Policy timeframe (phasing strategy)

Phase 1:

- The first stage will focus on- but not be exclusive to- SMEs with the highest energy intensity as they are the most sensitive to price increases.

Phase 2:

- Once the policy proves its success it will be rolled out to SMEs with lower energy intensity requirements.

8- Enabling Conditions

1. **Infrastructure**
   - An interactive system and database to be able to run the fund disbursement and monitoring and evaluation systems.

2. **Human capacity**
   - Hiring and training additional FEI-ECO staff to cater a wider scope of energy efficiency projects.

3. **Financial resources and budgeting**
   - Availing a dedicated budget and fund by FEI.

4. **Government support**
   - Injecting support funds into the FEI fund.

Policy 11b: Augment cooperatives fund to finance industrial energy efficiency projects

Ensuring supply

1- Policy Summary

Description

This policy aims to augment the funds available to the Productive Cooperative Union in order to finance Industrial Energy Efficiency Projects for its members.

The Cooperative Union currently offers cooperative associations loans with lenient conditions. The fund is financed by the members' contribution with low interest rates (3% -7%), a grace period and minimum collaterals.

It is proposed that this fund is augmented in order to finance EE projects and interventions undertaken by cooperative members that are all small establishments. In order to increase this fund, it is proposed that the ministry of finance (MOF) establish a cooperation protocol with the Cooperative Union to finance its members in order for them to undertake EE projects and interventions based on certain terms and conditions. The flow of funds will only be sustained if data is provided, audits are undertaken, transparent criteria are set, relatively long payback (more than 3 years) is proven.

The protocol should specify the amount of finance to be made available to the Union over the different stages where the amount gradually increases over time according to the interest expressed by the SMEs and the success of projects undertaken by them. The request for fund increase should be substantiated with energy data on the facilities and figures on the energy saved. Given the government's limited financial ability and the need to focus on both bankable and non-bankable SMEs facilities, interest rates will only be subsidized for SMEs.

In turn, MOF can source funds from the national budget and/or from donors and international banks.

Justification

Increasing energy prices pose a burden to small and medium enterprises and their need to raise the energy efficiency of their facilities is becoming more pressing.
As the awareness about EE increases, the need to implement EE interventions will increase and the associated financing should be secured.

Given that the Cooperative Union already has a strong outreach to its members and an existing fund to support them; it is advisable to secure financing needed through this fund. However, as this fund is sourced from its members only, additional sources of finance must be sought to be directed to energy efficiency projects.

Possible risks

The fund may be used to finance projects other than energy efficiency projects or remain under-utilized. Thus, apart from specifying the amount of finance to be made available to the Union, the protocol states that the amount will gradually increase over time in accordance with the interest expressed by the SMEs, the success of projects undertaken by them. Funds can ultimately be called back in case of non-compliance.

The other risks pertain to the implementation side, a strong monitoring and evaluation process must be put in place to guarantee that funds are managed in a transparent manner and that they are channeled to facilities that achieve actual energy savings.

Beneficiaries

Energy efficiency consultants as they will be providing audits
Suppliers and manufacturers of EE equipment.

Relation to other policies

This policy serves the demand side policies as it provides the less expensive methods of funding to small enterprises to undertake EE projects. For example to phase out the equipment, undertake efficiency improvements and adopt efficient technologies for new facilities (policies 4, 5 and 6).

2- Policy Goals (outcome)

Outcome	Description
A- Increased reach to SMEs	This policy enables cooperatives to provide a channel for the finance associated with energy efficiency projects to deserving small enterprises that otherwise would not be able to afford the investment nor would be successful at applying for grants to finance it. Moreover, some small enterprises do not deal with banks, limiting their financing options.
B- Overcome the challenge with non-bankable facilities	This policy establishes a framework for financing outside the traditional banking infrastructure. To this end it is able to reach and provide support to the non-bankable segment of SMEs and facilities that face challenges and obstacles in their access to finance.
C- Improved conditions	Alleviating burdens on SMEs due to energy price hikes
D- Institutional strengthening	Stronger reliance on, and affiliation to, industrial organizations
E- Better knowledge on small industries	Micro-data of the different small industries will be acquired

3- Policy Owner

Owner	Role Description
New entity concerned with SMEs	- Establish a cooperation protocol with the Cooperative Union to finance its members in order for them to undertake EE projects and interventions based on certain terms and conditions (according to policy description).

4- Policy Activities

Activity	Description
Assess financial needs	Assess the financial needs of the cooperative associations to implement EE projects
Establish the protocol's terms and conditions	Agree with the cooperatives on the criteria upon which progression will be assessed and funds expanded.
Set up the mechanism for evaluating and selecting from applicants	This activity aims at ensuring the sustainability of the policy and ensuring that the funds are allocated to the most deserving according to the terms and conditions of the protocol. This mechanism will form the guiding framework for evaluating the different SMEs or facilities that apply for funding with regard to industrial energy efficiency programs.
Establish cooperation protocol	
Manage fund disbursement	Establish a mechanism by which funds are disbursed to the service providers and equipment suppliers against completed work at the different facilities. This will entail auditing on progress and proving that progress has been made. This should be included in the model system mentioned on page 77
Establish a monitoring and evaluation system	Setting up a system to monitor the disbursed funds and the progress across the different projects. This will be used to both evaluate the beneficiaries, the selected energy efficiency solutions as well as the service providers in question. This system should also be included in the model system mentioned on page 77

5- Policy stakeholders

1- Support:

Stakeholders	Role Description
Ministry of Finance	- Infuse and/or direct funds to cooperatives union fund - Source funds from the national budget and/or direct funds from donors and international banks
IMC and Industrial technological development sector (MoI) (including ENCPC)	- Undertake necessary audits to assess progress and communicate progress to IDA
IDA	- Receive, verify and process the data (including data from audits). - Communicate goals met to MoF - Maintain databases and feed energy data into a local database (to support decision-making) and ultimately into the national energy information system

2- Facilitate (Not directly involved)

Stakeholders	Role Description
NQI /ENCPC	*Pre-policy* - Create an inventory of energy service providers/consultants catering for all industries. - Contribute to the establishment of a system to accredit consulting firms as per policy 8

3- Evaluate

Stakeholders	Role Description
Energy Planning Authority	- Maintain energy information database
Industrial Development Authority	- Track and evaluate progress and compliance.
New entity concerned with SMEs	- Assess turnout on funds
Production cooperatives	- Ensure active engagement by # of audits for EE requested and amount of funds directed for EE

6- Key Policy indicators

Indicator 1: Increase in disbursed funds

Description	Total cash volume of funds disbursed to subsidize industrial energy efficiency projects through Cooperatives Union.
Measurement	Measured every quarter to track growth in reach
Target	N/A
Baseline	N/A
Data source and data responsible	N/A
Responsible Entity	MOF

Indicator 2: Increase in loan applications

Description	Total applications for loans to improve the energy efficiency of a facility.
Measurement	Measured every quarter to track growth in reach
Target	N/A
Baseline	N/A
Data source and data responsible	N/A
Responsible Entity	MOF

Indicator 3: % Energy saved due to implementing IEE projects from Cooperatives Union

Description	Energy saved due to implementing IEE projects from loans provided by Cooperatives Union
Measurement	Energy saved from projects implemented from loans /total energy consumed (sum for all facilities)
Target	N/A
Baseline	N/A
Data source and data responsible	N/A
Responsible Entity	Cooperatives Union

7- Policy timeframe (phasing strategy)

Phasing philosophy

The amount of finance to be made available to the Union will gradually increase over time in accordance to the interest expressed by the SMEs and the success of projects undertaken by them.

8- Enabling Conditions

a. Infrastructure

- Platform to run the fund disbursement and monitoring and evaluation systems.
- Communication mechanism between IMC,ENCPC, cooperative and IDA
- Communication mechanism between IDA and New entity concerned with SMEs

b. Human capacity

- Capacity to assess and audit the progress in IEE (IMC,ENCPC)

c. Financial resources and budgeting

- Financial resources to support additional human capacities

d. Government support

- Channel financial resources to Cooperative Union to support their members

Institutional

Policy 12: Mandatory reporting for registered facilities as a condition to renew their license

Enable Government

1- Policy Summary

Description:

Data is the cornerstone of decision making, especially when building a strategy and determining performance targets. This policy aims at creating robust data (i.e. reliable and consistent) to enable effective decision making. It covers the whole knowledge creation cycle, from data collection, verification and cleansing, data storage, as well as analyzing this data to create information that will later be disseminated with the aim of creating a body of knowledge about Energy Efficiency in Egypt's industrial sector.

This policy should enhance the capacity to collect and analyze statistical data regarding the demand of energy to learn the current situation in Egypt as well as forecast demand structure in years ahead according to macro-economy and other key drivers.

This data will also support decision makers in designing future energy efficiency policies as well as assess the effectiveness in the implemented policies.

While there are several ways to collect this data, an effective way to ensure the timely and accurate collection of data is by linking it to industrial license renewal. Noting that license renewal is every 5 years, it is a requirement that yearly data must be submitted on time. As such, industrial facilities will be obliged to deliver the required data and face risks of having their license revoked if they do not deliver or deliver inaccurate data.

Additionally, this will also have the benefit of assigning institutional responsibility for Energy Efficiency data collection and dissemination to a designated entity. This in turn will encourage the sustainability of data collection and storage and put pressure on the institution to deliver timely and accurate reports.

The data to be collected or compiled from other sources will include :

- **General data and information** at the whole industrial sector level, subsectors and individual plant level. Examples of this data include total industrial sector value added and share of total Gross Domestic Product (GDP), set of industrial plants affiliated to each industrial subsector, individual plants' contact information and respective capital investment.
- **Data on industrial production** which includes data on total production of different industrial products disaggregated by quantity, value, time horizon, etc. Similarly to general data and information this data could also be categorized or disaggregated by the whole industrial sector, subsector and industrial plants.
- **Data on energy consumption** that includes data and information on the quantity and value of different types of energy commodities consumed by different industrial plants. This data can also be categorized by industrial activity, process, technology and equipment utilized.

Justification

This policy is of critical importance for all other Energy Efficiency initiatives as it serves as the backbone for all planning and designing tasks. This is because it will help identify the gaps that need to be bridged and also serve as a tool for evaluating these initiatives once they are implemented. It will also enable policy makers to put quantitative targets and monitor the different policies progressions and allow for benchmarking against international performance indicators and keep the public aware of Egypt's Energy Efficiency status.

Several previous reports about Energy Efficiency in Egypt have identified data availability as a core issue that needs to be solved to enable other policies. Data issues include lack of accessibility in terms of type, quality, time horizon, all this both on the macro and micro levels. Another key issue is the lack of coordination between different entities which makes it difficult to collect data from different sources since their format and categorization are inconsistent. This is particularly aggravated by the fact that different institutions can report different values for the same data item, and due to a lack of transparency about data collection, there is no way of identifying which source is correct.

Specific issues that will be resolved by this policy are:

- Lack of coordination and consistency between different data sources
- Scarce amount of knowledge about SMEs, especially those outside of major cities and industrial zones
- Lack of full coverage as most data focus on certain industrial sectors but lack statistical account of distribution of establishments within sectors
- Weak demand side micro-data, notably in terms of consumption at the process unit level and energy saving potential and comprehensive set of data for energy intensive industries
- Inaccuracy as some industrial facilities tend to hide or corrupt/ fabricate data
- Gap in institutional support and commitment to collect and analyze data to create policies

Beneficiaries:

This policy will have a multitude of beneficiaries, ranging from government institutions and policy makers that are involved in drafting new energy efficiency policies and regulations, to international development funds assessing the country's energy profile, but also industrial facilities that need to identify their Energy Efficiency gaps or benchmark their energy consumption patterns with other facilities within the sector.

Possible risks

There are of course several risks and constraints associated with this policy. Most notably:

- Weak information technology/measurement tools
- Issues with constructing and analyzing database
- Finding the right caliber of people to collect and analyze the data

- Resistance from industrial consumers who are sensitive about sharing information about their business
- False reporting from the industrial facilities.

Data verification methods will be used to mitigate such risks (See **Box 3**). This includes data assessment (comparing data of the facility with data from other facilities), cross checking (comparing data from facility with data provided by the suppliers) and random audits.
This will ensure that facilities are reporting, and that the data reported is accurate. Data verification will also assess the system's accuracy.

Relation to other policies:

Some policies prepare for this policy as they help develop data collection abilities. For example, reaching out to SMEs through intermediaries" and the information to be collected in policies 1,2, and 6 since data reporting is required in the Energy Management Systems in those policies and they are chronologically sequential with this policy.
Also, other policies are based on accurate and consistent data availability e.g. "Ensuring efficient energy performance of new facilities, operations and processes".

2- Policy Goals (outcome)

Outcome	Description
A. Robust Database	A database that is accurate, reliable , consistent and continuously updated
B. Overcoming Data Challenges	As mentioned above there are several hurdles to energy efficiency caused by data challenges. This policy aims at solving these challenges
C. More Credible Decision Making	If policies are drafted using a strong database with clearly identified gaps, the different stakeholders affected by the policy will have more acceptance to change. This acceptance will be stronger even once policies are evaluated using clear metrics
D. Performance standards	Once the database is sufficiently populated and data collection become consistent, the government will be able to put ambitious yet realistic performance standards

3- Policy Owner

Owner	Role Description
IDA	Energy Efficiency has been included under the new and renewable energy unit within IDA as stated in page 49. This unit will be the official custodian of all energy efficiency related data. It will be responsible for: - Identifying data to be collected - Create data templates - Collect data in a timely and consistent manner - Verify accuracy of data collected - Format and store this data - Issue periodical reports and ensure their dissemination to all concerned entities - Renew industrial facilities' licenses when all data collection conditions have been met

	- Coordinate with the national energy system

4- Policy Activities

Activity	Description
Build unit's capacity	- Provide required training for staff - Set-up IT infrastructure and a reliable data collection and storage system
Identify data to be collected	- Review current data available - Meet with various stakeholder to understand the requirements and capabilities - Identify which data items are relevant and can be realistically collected - Define the different data items and categories
updating templates and data collection tools	- update survey and questionnaire templates needed for data collection when needed - Identify other possible data collection tools and methods and select most advantageous ones
Data analysis and Verification	- Acquire the necessary analysis tools - Analyze the data collected - Issue reports with the required information from the different entities - Verify the data through data assessments, cross checking and random audits
Revisit license requirements	- Identify all industrial licenses to be linked to the data collection initiative - Draft new license requirements to ensure industrial facilities abide by the data collection policy
Launch data collection pilot phase	- Start collecting data from a diverse selection of industrial facilities to test data collection abilities and identify any potential constraints or risks
Launch a communication strategy to all relevant stakeholders	- Design and implement a communication plan that has all relevant forms and templates needed for acquiring the license. - Provide feedback on any concerns identified by major stakeholders

5- Policy stakeholders

1- Support (Directly involved: Hands-on)

Stakeholders	Role Description
IMC	- Developing the communication plan - Developing a survey to measure satisfaction
Central Agency for Public Mobilization and Statistics (CAPMAS)	- Support on database creation - Ensure data and the database at IDA is compatible with that of CAPMAS

• Ministry of Industry • Ministry of Electricity and Renewable Energy • Ministry of Petroleum and Mineral Resources • Supreme Energy Council	Identifying data required: report the information they need in their decision making process (their current information gaps) to the IDA to integrate in the report templates and the data to be collected from the different facilities.

2- Facilitate (Not directly involved)

Stakeholders	Role Description
FEI	Communicating the necessity of providing data using the affiliation of various industries

3- Evaluate

Stakeholders	Role Description
• Ministry of Industry • Ministry of Electricity and Renewable Energy • Ministry of Petroleum and Mineral Resources • Supreme Energy Council	The beneficiaries from the government would evaluate the success of the policy implementation namely through the acquisition of the data (the % of data collected from data requested), quality of the data provided (the depth of the data and information collected and analyzed) and the contribution of this data in decision making (how helpful was the data).

6- Policy indicators

Indicator 1: Number of licenses issued

Description	To measure how many industrial facilities have provided the required data
Measurement	Number of industrial licenses issued
Target	
Baseline	
Data source and data responsible	IDA
Responsible Entity	IDA

Indicator 2: % of licenses renewed

Description	To measure how many industrial facilities have provided the required data (or failed to provide the required data in the case of non-renewal
Measurement	Number of industrial licenses renewed/ number of industrial licenses applied for renewal
Target	

Baseline	
Data source and data responsible	IDA
Responsible Entity	IDA

Indicator 3: % of data validated is accurate

Description	To make sure data collection process results in accurate and reliable data
Measurement	Sum of incorrect data items/Sum of validated data items
Target	
Baseline	
Data source and data responsible	IDA
Responsible Entity	IDA

Indicator 4: satisfaction rate of beneficiaries

Description	To assess the satisfaction level of beneficiaries from the service offered by IDA
Measurement	Number of satisfied beneficiaries (according to survey results)/ number of beneficiaries surveyed.
Target	>75%
Baseline	Not applicable
Data source and data responsible	IMC / FEI : they are responsible to conduct the survey and collect the data
Responsible Entity	IDA

7- Policy timeframe (phasing strategy):

Phasing Philosophy:

The first phase will focus on Building Capacity and Capable System by:

- Hiring right caliber of employees
- Provide training to bridge any existing gaps
- Build IT infrastructure
- Include Data reporting as a criteria to acquire the license

Accordingly, phasing will be based on sectors whose data is being collected through audits. In other words, given that the system will be built in the first phase, data collection should start with a small number of sectors, and then move to targeting all sectors in later phases.

Phase 1 (2016-2019):

Collecting and processing yearly data for facilities in the following:

- Sectors exporting energy intensive goods that are required to have an operative energy management system (EMS) according to Policy 1

- Suppliers of the State's administrative authorities that are required to have an operative energy management system (EMS) according to Policy 2

Phase 2 (2019-2024)

Full Implementation:

- The third stage is to rollout data collection to all industrial facilities starting with 50 employees or more. This can be further phased to start with facilities over 500 employees, then over 100 then over 50.

8- Enabling Conditions :

1- Infrastructure

- IT infrastructure and database software:
  - The current IDA website and Information management system needs to be enhanced to be more interactive for data to be submitted online.
  - Data collection tools need to be developed as well for example, issuing data templates and providing them online to be filled and submitted.
  - Data assessment tools need to be acquired to be able to issue reports
- Customer interaction and providing support and feedback

2- Human capacity

- Capacity building is required, both in terms of number of people and training for the employees.
- Analytical skills to be developed to issue periodical reports to support decision making with regards to certification criteria and to be able to verify data

3- Financial resources and budgeting

- Allocate part of the license fees to fund the unit
- Financial resources are required for data collection, verification, storage, analysis and dissemination

4- Government support

- A ministerial Decree from the Minister of Industry is required to make provision of data a requirement for industrial license renewal
- Align different administrative authorities on data to be collected and ensure their support of IDA

The concept of this policy was discussed and generally agreed upon with Eng. El-Saeed Ghozal, Industrial Development Authority in June 2015.

Policy 13: Ensure proper and effective governance mechanism of all related IEE policies and procedures[51]*

Enable Government

1. Policy Summary

Description

Industrial Energy Efficiency Governance refers to the process of Planning, Regulation and Execution of energy efficiency and the monitoring of the whole system.

Planning of energy efficiency can take several forms:

First is the national energy efficiency strategy which defines the main objectives for energy efficiency and sets strategic initiatives to achieve national targets

Then there is the energy efficiency policy recommendations set, which sets the required support system (policies and procedures) and the policies needed to achieve this strategy. Finally, the national energy efficiency strategy and the policy recommendations set should be cascaded onto more operational levels.

Monitoring in planning is carried out to ensure that the process of generating the plans is done according to the required quality standards and in a timely manner. Therefore, it is the mandate of the planning entity to highlight any deviation from the set plan and update the plan accordingly.

It was announced in 2014 that an Energy Planning Authority is to be established. This entity will report to the Prime Minister to ensure its independence from the Ministry of Electricity and the Ministry of Petroleum. Also, it will be mandated to develop the Integrated Energy strategy and integrated energy policy which includes energy efficiency.

However, there is a need to identify policy units at the sectorial level, in our case within the Ministry of Industry to specifically handle industrial energy efficiency. That is, own the current document and detail and update the industrial energy efficiency strategy and policies and report to the Egyptian Energy Planning Authority that will identify the status of energy efficiency on the national level and not just on the ministerial level. The unit will be reporting directly to the minister. It is suggested that members of this unit are recruited internally, from the ministry of industry.

Finally, for the policy unit to function efficiently, energy governance on the national level needs to be more efficient to avoid duplication of roles and build capacities of entities responsible for the different arms of energy governance.

Justification

[51] This policy is to be finalized after the meeting with the Minister of Industry.

There is an institutional gap when it comes to IEE and EE at large which creates the need for institutional reform (see section 2.2). The current structure does not support accumulating data, knowledge and analysis necessary to create strategies and policies and carry out efficient planning and monitoring.

There is a dire need for a policy unit to coordinate industrial energy efficiency activities on both the supply and demand sides and be held accountable for creating industrial energy efficiency strategies and policies and monitor their implementation. Moreover to alleviate the burden of coordinating with entities outside the ministry.

Possible risks

Since this unit will have a monitoring role over the implementation of the plans, this may be perceived as a threat to other entities. However, it should be clarified that this entity's monitoring role is just to ensure that the plans of other entities, and hence the implementation of the plans are aligned with the strategy that has been created in collaboration with the respective entities.

Beneficiaries

This policy will benefit the energy and the industrial sector in Egypt as it establishes a clear owner for the IEE strategy and policy and sets a direction for energy efficiency and ensures the coordination of the different entities within the industrial sector and the energy sector as well.

Relation to other policies

This policy ensures the existence of an integrated system that is a key success factor for other policies to be implemented effectively in a system of accountability. Ideally, this unit should be updating and refining /expanding these policies and monitoring their implementation.

2. Policy Goals

Outcome	Description
A- An integrated energy efficiency governance system	• Integrated planning that sets the strategy and the supportive policies for industrial energy efficiency on the national level • Setting high level direction for both regulation and execution (the other arms of the governance system) • Better coordination of all Industrial energy efficiency activities in Egypt • Better monitoring and follow up
B- Accountability	• Having one unit responsible for setting a strategy and cascading it to different levels will create sense of ownership and hence accountability

3. Policy Owner

Owner	Role Description
Ministry of Industry- Policy Unit	To achieve accountability and effectiveness of the industrial energy efficiency policies, the industrial energy efficiency policy unit within the ministry of Industry will have the following roles: 1- Creating a national level industrial energy efficiency strategy and policies. 2- Ensuring effective cascading of the strategy on more operational planning levels and monitoring the implementation. This can be done through: a. Set the performance indicators b. Identify accountability c. Set the baseline and agree targets 3- Follow up on the strategy and policies to ensure effective planning and implementation 4- Monitor implementation (for example through random audits)

4. Policy Activities :

Activity	Description

5. Policy stakeholders

a. Support

Stakeholders	Role Description

b. Facilitate (Not directly involved)

Stakeholders	Role Description

c. Evaluate

Stakeholders	Role Description
Minister of Industry	Approve the need for this entity and take the necessary steps for its establishment

6. Policy indicators :

Policy indicators are not applicable for this policy

7. Policy timeframe:

Phasing is not applicable for this policy

8. Enabling Conditions :

d. Infrastructure

- Establish the unit with adequate personnel as described below
- A communication mechanism is required to be able to plan for industrial energy efficiency is the continuous collaboration and alignment with other entities in the energy efficiency governance system.

e. Human capacity

- Given the role of this entity, capacity building is key as it requires high caliber employees to perform tasks such as research, benchmarks, analysis and to be able to propose strategies and policies in alignment with other ministries and resources.

f. Financial resources and budgeting

- Allocated necessary financial resources to be able to pay its running costs and to do its research and its activities

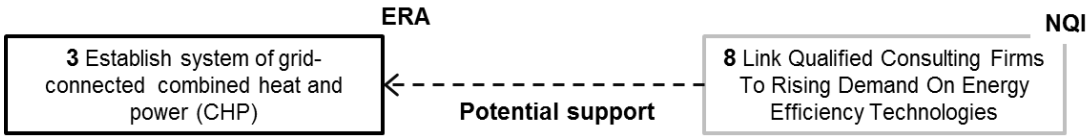
g. Government support

- A decision from Central Agency for Organization and Administration (CAOA) is required to establish this unit, clearly stating its responsibilities and its role
- This entity must be delegated from the minister all authorities it requires to perform its tasks

Integration and mutual support

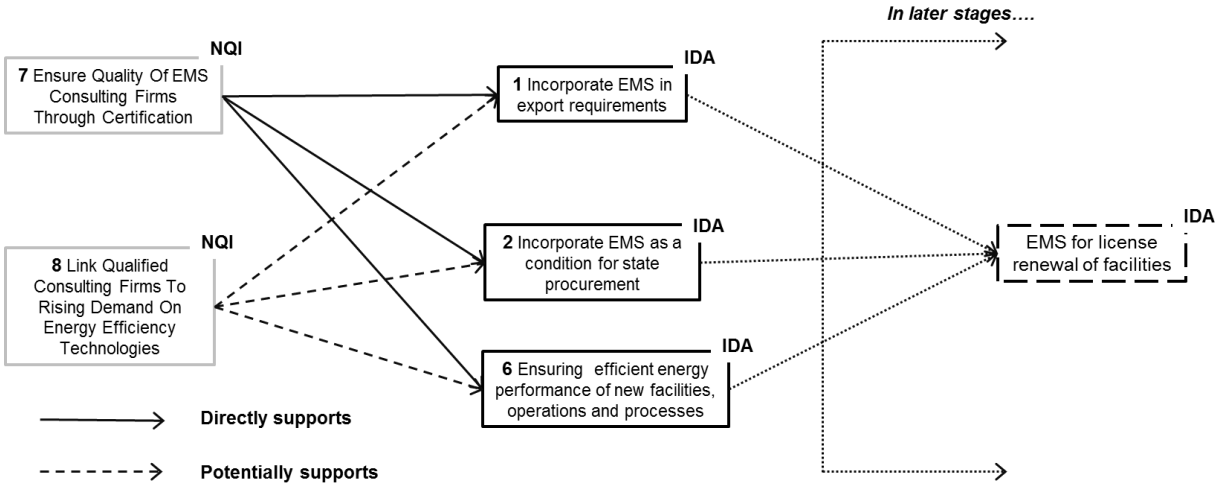
Policies proposed are to be implemented as “packages” to ensure the presence of necessary support and their success. The “packages” can be carried out in parallel, with the priority given to those needing the least prerequisites for implementation.

Package 1: CHP package



Given that the electricity law has already been issued with the executive regulations governing CHP expected by early 2016, the system for acquiring CHP electricity as mentioned in policy 3 should be devised prior to the finalization of the executive regulations. The uptake of CHP will extend and be further reinforced upon having an adequate pool of consulting firms certified to undertake CHP.

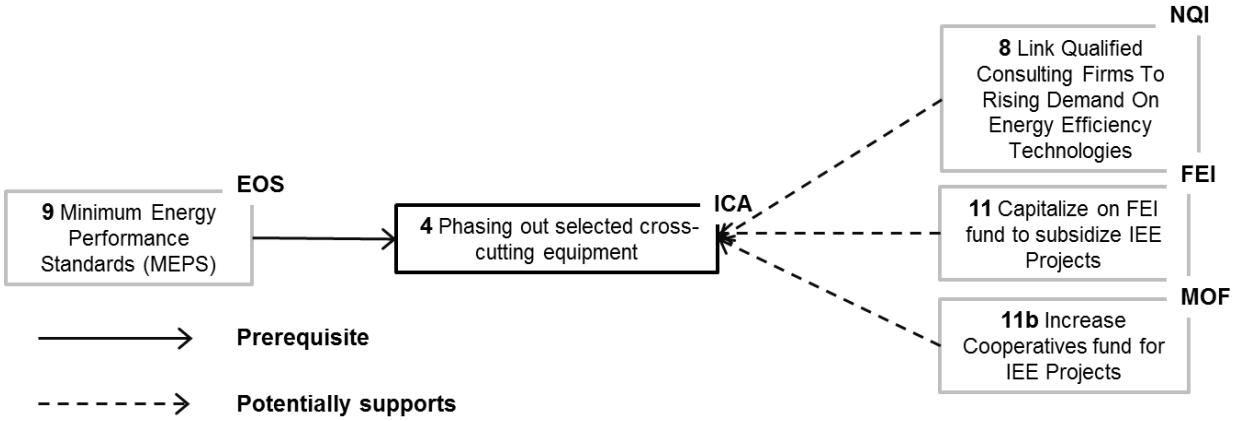
Package 2: EMS package



In the first stage, three policies entail the implementation of EMS. The sectors targeted by these policies rely, with varying degrees, on EMS consultants to implement the system in their facilities.

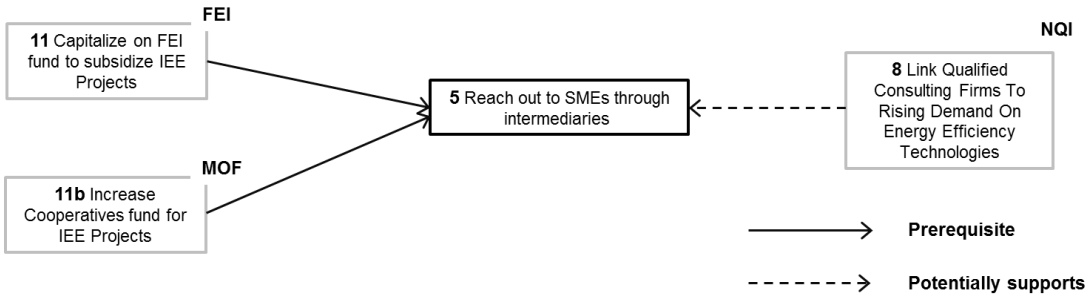
Moreover, in case audits conclude that EE technologies need to be acquired, the facility will guarantee the quality of the service provided when it is provided by a qualified consultant. Similarly, when designing the manufacturing process for a new facility, qualified consultants will advise on the most energy efficient technologies to be utilized.

Package 3: Equipment upgrading package



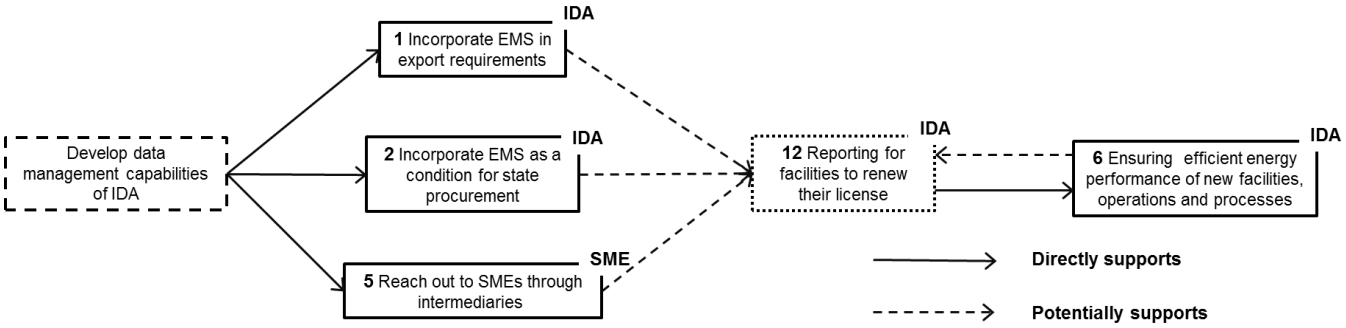
MEPS for a selection of equipment will be established according to certain criteria. Taking MEPS as a reference, part of this equipment will need to be replaced. When replacing the equipment some facilities will need to seek external assistance either financial or technical. Accordingly, the replacement of equipment will be successfully undertaken after securing relevant funds and ensuring the quality of consulting services the facility may need.

Package 4: SME Support



Apart from the technical support extended to SMEs, finance is crucial to ensure that facilities have the means to undertake the required interventions. Thus funds must be guaranteed prior to policy implementation to ensure that cooperatives and chambers are apt to support their members. Qualified consulting services will also be needed as some SMEs can choose to undertake audits or seek advice on EE interventions.

Package 5: Data acquisition and processing



Facilities adopting EMS will be generating data regarding their production and energy consumption. As EMS becomes operative in targeted sectors, reporting on their data will be criteria upon which their license is renewed. In turn, data collected will offer a better and more informed basis upon which technologies of new facilities are assessed.

Apart from the policies “packages” illustrated above, policy 10 undertakes the crucial and supplementary role of ensuring the dissemination of information among all policies. Thus, it serves demand side policies as it helps in raising awareness and steer demand. Moreover, it integrates the different supply policies as it provides a platform that continuously announces the services provided.

Similarly, in order to oversee the execution of all the policies (1 to 12), policy 13 ensures proper and effective governance mechanism of all related IEE policies and procedures.

6.6 Long Term Preview

With regards to driving demand for EE, EMS is considered the most "tailored" and comprehensive tool, giving detailed insight into the inner workings of each industrial sector; ultimately, it is aspired to have it in all industrial facilities of all sectors[52]. It is also the principal tool to instil the culture of EE among the industry.

For each sector, a portion of the existing enterprises will implement EMS to become exempt from export duties and to be eligible to supply State projects. New entries to the industry will adopt exclusively energy efficient technologies and an EMS. Only after a "critical mass" is created within a sector, it will be possible to oblige the remaining enterprises in the sector to report data and eventually have an implemented EMS to have their licence renewed. [53] When mandating data reporting as a condition to license renewal, a program to promote EMS will be put in place in parallel to raise the industry's awareness. This program will have the benefit of using case studies from the same sector in Egypt as demonstration cases. After a given time period, EMS will also be mandated as a condition to license renewal.

For policies entailing EMS implementation (policies 1, 2 and 6) an important indicator is the progress in policy coverage in the industrial sector. This is detailed below

Description	The amount of energy consumed (e.g. TOE) by facilities reporting their data in comparison to the total amount of energy consumed by industry. This indicates the progress in policy coverage in the industrial sector. *The feasibility of applying this indicator to sub-sectors will be considered depending on the availability of related data*
Measurement	The amount of energy consumed by facilities providing data acquired from submitted data and EMS reports / total energy consumed by the industrial sector
Target	75 to 100% depending on the sector
Baseline	None
Data source and data responsible	IDA, EEHC, natural gas companies, EGPC, EEAA (for coal). Or energy data compiled by CAPMAS
Responsible Entity	IDA

Table 2: Facilities involved as % of industrial energy consumption – in conjunction with policies 2, 6

Another indicator not directly pertaining to the proposed polices is the number of ISO 50001 EMS certificates issued. An ISO certification can be acquired by an enterprise for other export or recognition purposes. It is expected that the EMS requirement of the proposed policy set will help facilities take this extra step. This is detailed below:

[52] The facilities of concern are those with a number of workers above a certain number, e.g. 50.

[53] The more limited the number of enterprises in a sector the better as those who establish the EMS will be able to influence the rest of the sector.

Description	Number of ISO 50001 EMS certificates issued in case the enterprise decides to acquire an ISO certification for other export or recognition purposes.
Measurement	[(Number of facilities targeted by policy and granted ISO 50001 /number of facilities targeted by policy)/(number of facilities granted ISO 50001 /total number of facilities)]
Target	More than 1
Baseline	Available from NQI
Data source and data responsible	NQI
Responsible Entity	NQI

Table 3: Number of ISO 50001 EMS certificates issued

With State and military-owned establishments taking the lead, this cumulative set of tools and regulations will guarantee that over a certain period of time the entire sector will report on their data and undertake the necessary measures to improve their energy performance. These conditions on licensing will not represent a novel requirement for the enterprises that already implemented EMS in order to be exempt from export duties and being able to bid for State projects. Only those enterprises that do not export or bid for state projects will have new requirements when renewing their license. The acceptance of these license requirements will be much facilitated after a “critical mass” is created within a sector.

While this scheme is underway and operating for a given targeted sector, it will be introduced to another sector(s) to follow the same sequence. After having this combination of tools operative and moving from one sector to the less energy intensive sector for a period of time, a substantial part of the Egyptian industry will considerably improve their energy efficiency.

At a given point in time over the coming years, the status of EMS implementation will be as follows:

Activity	Target	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Onwards
Undertake studies on local technologies to identify most efficient ones	**L, EI**												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
	S, EI												
Ensuring EE of new facilities	**L, EI**												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
	S, EI												
Prepare and issue decrees which exempt facilities with EMS. from export duties	**L, EI**												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
Export duty and exemption (where applicable)	**L, EI**												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
	S, EI												
Program to change outdated technologies	**S, EI**												
Incorporate new conditions on EMS for contractors in State tender documents	**L, EI**												
	L, med. EI												
	L, non- EI (Tier 1)												
	S, EI												
	L, non- EI (Tier 2)												
EMS condition for State procurement (where applicable)	**L, EI**												
	L, med. EI												
	L, non- EI (Tier 1)												
	S, EI												
	L, non- EI (Tier 2)												
Consider performance based regulations	**L, EI**												
	L, med. EI												
	L, non- EI (Tier 1)												
Data reporting for license renewal	**L, EI**												
	L, med. EI												
	L, non- EI (Tier 1)												
	S, EI												
	L, non- EI (Tier 2)												
Promote EMS in entire sector	**L, med. EI**												
	L, non- EI (Tier 1)												
	S, EI												
	L, non- EI (Tier 2)												
EMS as condition for license renewal	**L, EI**												
	L, med. EI												
	L, non- EI (Tier 1)												
	L, non- EI (Tier 2)												
	S, EI												

Table 4: Evolution of EMS coverage across the different industrial sectors

Where,

L, EI: e.g. cement, steel, fertilizers, aluminum, copper and petrochemicals
L, med. EI: e.g. ceramics, porcelain, metal products and glass
L, non- EI: e.g. textiles, food and beverage, paper, rubber and plastics
S, EI: e.g. bricks, foundries, glasswork, paper etc.

Policies will initially target large, energy intensive industries. Afterwards, given their diversity, large non-energy intensive industries will be approached in order of sub—group energy intensity (tier 1 and tier 2).

Ensuring the EE of new large, energy-intensive facilities will benefit from the recent studies by the UNIDO IEE project and can therefore be initiated with the shortest delay. As for large less and non- energy-intensive industries, time will be needed to accumulate data on the most efficient local plants through similar studies. Those studies will be used to draw the cost-saving curve for energy efficiency, differing from one sector to the other.

Again, it is reiterated that these studies have a qualitative nature and do not depend on micro-data to be acquired and analyzed. Rather, these studies will illustrate the technologies used in the industry and identify the most efficient ones. This will be substantiated with a review of technology information rather than data analysis.

After establishing the regulatory system, the variety of means and leverages employed in the future by the government by which EMS is ensured in a facility can be expanded. One such leverage is the food rationing system. As part of the food rationing system, ration cards are provided to underprivileged citizens, entitling them to quotas of subsidized commodities. The card-holder uses the card to acquire subsidised commodities and credit on the card can be used to purchase other goods. The State can restrict the goods covered under this system to only include goods from producers who have an operative EMS. Another similar leverage can be ensuring food provided in state and army hospitals, prisons, schools and factories etc. are sourced from facilities with operative EMS.

The performance of industrial equipment will be considerably enhanced during the first phase where the worst performing equipment should be eliminated. The majority of remaining stock will have a performance comparable to that of the highest-performing equipment. Over time the specifications for the highest performing equipment will change and thus more equipment will be replaced accordingly.

At later stages, if the need arises, a wider variety of tools can be employed to further drive down energy consumption for selected industries such as quantitative performance-based agreements and regulations (yearly benchmark of savings and costs for specific sectors). Moreover, after having EMS deeply instilled in large and energy intensive industries, those industries can enforce supply chain policies that limit their material supply to those enterprises having energy efficiency measures.

Performance-based regulations require a legislative framework implemented through a regulator with a strong inspection and enforcement capacity which is not currently available. Moreover, performance-based regulations should be based on micro-data that is currently unavailable. The implementation of the proposed policies for a number of years should relax these two critical constraints.

It is worth noting that quantity restrictions on fuel cannot be set given the recent developments in the energy market by which fuel can be acquired by each facility independently (while it can use State infrastructure for transportation) and will not rely on supply from the government. Thus, the State will not have the leverage to control or restrict fuel supply, and managing such restrictions under these conditions will be complicated. Furthermore, quantity restrictions have to take into account the specific

energy consumption for different products and the government lacks the micro data to generate it (e.g. different energy consumption values for different cement types as well as different process units).

Additionally, an established culture of IEE could in the future facilitate voluntary agreements where the enterprises of the same sector voluntarily commit to carry out certain EE activities or reach a certain EE improvement level in return for economic rewards and information.

This confirms the need for the goals set for the first 10 years (achieving EE, establishing an EE culture and widen the scope of policies for the following years) and their importance.

7. Immediate Action Plan

The last two steps of the framework followed are implementation and monitoring. For each proposed policy, the activities required were stated (detailing the road to policy) and the stakeholders' were identified to perform numerous roles varying from owning the policy implementation, to supporting implementation or facilitating it or monitor this policy through evaluating the implementation and through a set of performance indicators.

However, in order to ensure the structured implementation of the proposed policies in due time, an immediate action plan is proposed. The action plan states the activities required from the different entities in order to initiate the implementation of the policies and hence, achieve the desired outcomes of optimizing energy efficiency in the industrial sector.

Accordingly, this section addresses the actions needed from the various entities pertaining to the proposed policies within the **first 6 months** after approving and adopting this document. The following tables list the activities that should be primarily **initiated** to be able to proceed with the remaining policy activities.

It should be noted that this is not a comprehensive list of entities involved nor the activities required from each entity as this action plan is concerned with only the first 6 months after approving and adopting this document.

Ministry of Industry	
Policy 13	1. Create Policy Unit 2. Undertake the pivotal role of coordinating all activities below
Policy 4	Allocate resources and build organization capacity of Industrial Control Authority
Policy 7 and 8	Allocate resources and build organization capacity of NQI
Policy 12	Allocate resources to build the capacity of the new unit concerned with energy efficiency and renewable energy

Ministry of Finance	
Policy 5	Establish a cooperation protocol with the Cooperative Union to finance its members on carrying out IEE
Policy 11	Establish the system to infuse and/or direct funds to FEI and cooperatives union funds to support IEE sign protocols

National Quality Institute	
Policy 1	Create an inventory of energy service providers/consultants catering for all industries.
Policies 7 and 8	1. Identify resources and capacity required to be able to perform its function 2. Identifying certification prerequisites 3. Build the operating model of the certification processes 4. Design templates and forms for certification
Policy 6	1. Create an inventory of energy service providers/consultants catering for all industries as per policy 8. 2. Researching the local (and international, if needed) processes and equipment for targeted industries

Federation of Egyptian Industries (FEI)	
Policy 3	1. Inform local suppliers of potential CHP equipment (under the chamber of engineering industries - FEI) 2. Inform facilities with CHP potential on the potential CHP equipment and technologies to be installed
Policy 5	1. Communicate needs to support their members to new entity concerned with SMEs 2. Support their members in implementing IEE
Policy 8	Formulate a technical committee that will help NQI set the accreditation standards and criteria
Policy 10	1. Choosing communication platforms 2. Allocate resources to establish platform

FEI- ECO	
Policy 11a	1. Develop the fund (along with the Ministry of Finance) 2. Lobby and coordinate with the different stakeholders in order grow the fund through liaising with the Ministry of Finance, donor funds and any domestic or international grants earmarked for energy efficiency programs. 3. Set up the mechanism for evaluating and selecting from applicants
Policy 5	Extend their financial and technical services to include more facilities and sectors as per policy 11.

Egyptian Organization for Standardization (EOS)	
Policy 9	1. Data collection and Identify Inefficient Equipment (utilizing IFC study) 2. Develop an action plan (phasing the equipment for MEPS)

Industrial Development Authority (IDA)	
Policy 1 and 2	1. Set templates for data and plans for each sector 2. Set mechanisms for data collection, assessment (data verification tool), analysis and revision. 3. Set mechanisms for plan collection, assessment, analysis and follow-up. 4. Personnel capacity building
Policy 6	Start the process of modifying licensing criteria for new facilities to include EE assurance
Policy 12	3. Identify resources and capacity building required for the new unit concerned with energy efficiency and renewable energy to perform its role 4. Identify data to be collected

EGYPT ERA	
Policy 3	1. Undertake studies to estimate the potential of CHP in the industrial sector. 2. Undertake studies to ensure adequate grid management, metering and accounting systems 3. Issue the decree for the executive regulations for the law governing CHP

Industrial Control Authority (ICA)	
Policy 4	1. Identify resources and capacity needed to perform its role 2. Initiate equipment selection for phasing out and replacement, in conjunction with policy 9

New entity concerned with SMEs	
Policy 5	1. Identify the chambers and cooperatives targeted according to each phase and get their buy-in on the program 2. Conduct audits to develop guidelines, if needed. 3. Engage financiers (funds from donor entities and the ministry of Finance) 4. Setting "model systems", based on the current system at FEI-ECO, feedback from beneficiaries and cooperative capacities.
Policy 11b	1. Assess financial needs 2. Establish the protocol's terms and conditions 3. Set up the mechanism for evaluating and selecting from applicants

ENCPC	
Policy 1	Support in setting systems for EE plans and data acquisition, consulting the relevant industry
Policy 4	Assist in map out cross-cutting equipment used in the different industrial sectors along with their status in order to select a set of equipment for phasing out and replacement, based on existing information.
Policy 6	Support in setting systems for EE plans and data acquisition, consulting the relevant industry
Policy 9	Identify inefficient equipment by performing the necessary studies and agree on the equipment to have MEPS with EOS

Egyptian Electricity Transmission Company (EETC)	
Policy 3	Ensuring the network's capacity/ability to receive and transmit additional loads

Production Cooperatives	
Policy 5	1. Communicate needs to support their members to new entity concerned with SMEs 2. Support their members in implementing IEE

Industrial Modernization Center	
Policy 8	Formulate a technical committee that will help NQI set the accreditation standards and criteria

8. Concluding Remarks

This report provides an implementation package of policies following a clear strategy aiming to achieve an ambitious vision of industrial energy efficiency (IEE) in Egypt. In a way, this report is the last in a series of reports addressing IEE in Egypt, but could be claimed to be different in a number of aspects.

1- It benefited from a more exhaustive survey of previous efforts relative to other reports addressing the same issue.

2- It followed a strictly participatory approach in all its phases, reflected in meetings, workshops, interviews and presentations to decision makers. It thus can be, in a way, considered a collective product in which the consultant played the pivotal role of a researcher, facilitator and integrator. This has surely had its costs in terms of time but the benefits of this approach should highly justify these costs.

3- It also followed; rather strictly, the framework proposed for the policy value chain and did not proceed from one of its links to the following until it was settled to a large extent. Each link was also benefitted from further revision and refinement based on the constraints and challenges that arose while working on the following links.

4- Managing the energy at the facility through the proposed EMS will have a "resonating effect" on the management of all resources consumed in the facility as the flow and logistics of all the process input entails energy consumption.

5- Most importantly, all proposals in this report were in full awareness of the major challenges facing IEE in Egypt, especially with regards to data, technical and regulatory capacity as well as other characteristics specific to the industrial, energy and administrative environment in Egypt. We could then claim that one of the major hurdles for the implementation of a number of previous proposals is effectively neutralized. In other words, effort is directed to using existing capacities and tools to achieve progress rather than aiming at implementing an idealized state while lacking its basic elements. Early success, even if limited in progressing towards achieving objectives, is the best instigator of change in the wider context.

The consultant believes that the proposed package can take IEE a long may forward. Existing industrial facilities consumed 22.261 million TOE in 2011/2012 representing 37% of total national energy consumption[54]. Based on UNIDO benchmarking studies and EMS case studies, interventions exploiting the low-hanging fruits (low and no-cost) in energy intensive industries (EII) will result in savings between 4% and 8% from the consumption of existing facilities. Thus, we estimate that in the first 10 years will yield at least 20% savings in EII. Moreover, it can safely be assumed that for low energy intensity industries more or less 20% energy savings can be attained from existing consumption, without substantial technological advancements. Potential

[54] Source: Environics' own research – unpublished, August 2013

savings are only expected figures and cannot be taken as a forecast or a strict binding commitment in negotiations.

However, the ownership of this package is a critical element without which it will likely become just another report along the way. Ownership demands much more than mere consent, clearance, approval or support for it to materialize. To hold genuine ownership, there has to be the will, determination and capacity to update, refine and modify based on the experiences gained during implementation and monitoring. It is only when this is achieved that this report can be considered a first and concrete step towards the sustainable improvement of IEE in Egypt.

9. Bibliography

1- CAPMAS 2006 Number of operating establishments, number of employees and their categories by economic activity sections,

2- MoTI, 2007 Booz|Allen|Hamilton, "Energy Pricing Framework for Industry", Ministry of Trade and Industry (MoTI), 2007.

3- JICA, 2010 The Japan Economic Research Institute Inc., “Fact-Finding study Project on energy Conservation in Industrial Sector in The Arab Republic of Egypt”, Japan International Cooperation Agency (JICA), 2010.

4- OME, 2011 Modeling and Monitoring Division of the Observatoire Méditerranéen de l'Energie (OME), “The Mediterranean Energy Perspective – Case Study of Egypt (MEP)”, OME, 2011.

5- AFD, 2012 Environics, “Program to Stimulate Energy Efficiency in Energy Intensive Industries in Egypt”, French Development Agency (AFD), 2012.

6- Austrian Energy Agency and Eng. Ayman Al Zahaby, "Benchmarking Report for Iron and Steel Sector", United Nations Industrial Development Organization (UNIDO), 2014.

7- Austrian Energy Agency and Dr. Amr Osama, "Benchmarking Report for Cement Sector", United Nations Industrial Development Organization (UNIDO), 2014.

8- Austrian Energy Agency and Dr. Fatheya Soliman, "Benchmarking Report for the Fertilizer Sector", United Nations Industrial Development Organization (UNIDO), 2014.

Annexes

INDUSTRIAL ENERGY EFFICIENCY IN EGYPT PROJECT

PROJECT NO: GF/EGY/12/001

TERMS OF REFERENCE
DEVELOPMENT OF AN INDUSTRIAL ENERGY EFFICIENCY POLICY and STRATEGY

Post Title:	National Consultant in Energy Policy
Duration:	1 Year
Date required	November 2013
Duty Station:	Cairo, with possibility of travel within Egypt
Counterpart:	Egyptian Environmental Affairs Agency, Ministry of Industry and Foreign Trade, Federation of Egyptian Industries.

General

This **Terms of Reference** (ToR) should be used as the guideline for applying to undertake services related to the "Development of an Industrial Energy Efficiency Policy and Strategy". The ToR outlines the main responsibilities and duties of the National Consultant to provide technical input to the following Activities:

1. Activity I: Baseline Assessment
2. Activity II: Industrial Energy Efficiency Strategy
3. Activity III: Industrial Energy Efficiency Policy

Interested candidates are required to submit their proposals. The proposal should contain a detailed description of the services to be provided and the resumes of the key experts/personnel undergoing the entailed tasks. The proposal should also contain the total costs associated with the Services and their breakdown by activity (See Annex 1).

The National Consultant will carry out the scope work described in this ToR with the aid of an International Consultant. The duties and responsibilities of the National Consultant are detailed in the "DUTIES" section of this ToR.

Project Summary and Objectives

1 Project Summary

The objective of the IEE Project is to ''facilitate energy efficiency improvements in the industrial sector through supporting the development and implementation of a national energy management standard and energy efficiency services for Egyptian industry as well as the creation of demonstration projects".

The project consists of the following five components, which are expected to deliver five respective outcomes:

Component	Outcome
1. National Program to define energy benchmarks and EE policy	Supportive policy instruments (EnMS, benchmarks) for delivering EE in industry and contributing to international competitiveness
2. Awareness raising on industrial EE and management in industry	Widespread awareness on EE and energy management
3. Technical capacity building on EE services	A cadre of specialized /certified energy management and system optimization experts is available
4. Access to finance for EE improvement projects	Increased access to financial assistance for implementing EE projects
5. Implementation of Energy Management systems and System Optimization	State-of-the-art energy management practices and EE measures are demonstrated

2 Project Focus

The focus of the project is to support the energy efficiency market and the industry to promote Energy Efficiency (EE) in the industrial sector in Egypt. The project is expected to complete its mission by:

- Strengthening the policy and regulatory framework in Egypt inducing a wide scale dissemination and adoption of energy efficiency, energy management standards in energy intensive industries;
- Improving productivity and competitiveness of energy intensive industries by reducing their reliability on energy consumption and hence their operational costs by promoting compliance with national energy efficiency and energy management standards;
- Increasing awareness on industrial energy efficiency and energy management in Egypt.
- Building capacity of stakeholders (industrial enterprises, policy makers, national consultants, etc.) to develop and implement energy efficiency projects.

DUTIES

The Services required in this ToR part of Component 1 of the IEE project. The Services are divided into three Activities that shall be performed consecutively.

1 ACTIVITY I: BASELINE ASSESSMENT

Several reports have been previously developed aiming to assess the current situation of energy efficiency in the industrial sector in Egypt. For example, recently The French Development Agency (AFD) has developed a report proposing a program to stimulate energy efficiency in Egypt for intensive industries in 2012; also the World Bank has produced two reports "institutional framework for implementation of energy efficiency in Egypt" and "institutional framework for improving energy efficiency in Egypt" in 2012 and 2011 consecutively. These reports, amongst others, provide a good understanding of IEE baseline. In order to avoid any duplication of work, the Consultant shall carry out this activity with the approach presented in "**Table 2 Activity I Datasheet**".

The Datasheet provides details about tasks that need to be carried out in order to complete the activity. It also presents the structure of collaboration between the national and international consultants.

Table 2 Activity I Datasheet

Tasks		Level of Responsibility/Involvement	
		National Consultant	**International Consultant**
A	Review existing reports relevant to IEE. Identify key findings and conclusions.	Owner[55]	Support upon request
B	Identify and Review existing and proposed policies that are relevant to Industrial energy.	Owner	Support upon request
C	Describe the status quo of IEE institutional setup and current IEE activities in Egypt	Owner	Support upon request
D	Identify Existing resources that could be used for IEE activities in Egypt (human, financial, etc.)	Owner	Support upon request
E	Assess IEE situation and IEE economics in Egypt in comparison to international experience including the international benchmark for EE policies concerning all items shown in table 3 below	Support in data collection	Owner
F	Prepare a report describing IEE baseline in Egypt based on the information obtained in Tasks A to E and preliminary recommendations for improving IEE setup in Egypt from **[DELIVERABLE]**	Owner	Technical Input and Review

[55] A task owner is expected to be the main responsible to perform the services and carry out their obligations with all due diligence, efficiency and economy, in accordance with generally adopted professional techniques and practices

The National Consultant shall attend a workshop to present the report findings to various stakeholders and project partners. The workshop will be hosted by the Ministry of Environment or the Ministry of Industry

2 ACTIVITY II: INDUSTRIAL ENERGY EFFICIENCY STRATEGY

The Consultant shall prepare a "short/medium term strategy" for improving IEE in Egypt. The aim of the IEE Strategy is to present a plan and allocate the necessary resources (financial, human, etc.) to implement the IEE Policy. The Strategy should provide a clear road map for the next TEN years.

The Consultant shall carry out this activity with the approach presented in "**Table 2 Activity II Datasheet**". The Datasheet provides details about tasks that need to be carried out in order to complete the activity. It also presents the structure of collaboration between the national and international consultants.

The National Expert, in collaboration with the International Expert, should be guided by the outline presented in "**Table 3 IEE Strategy Outline**".

Table 2 Activity II Datasheet

Tasks	Level of Responsibility/Involvement	
	National Consultant	**International Consultant**
A IEE Strategy development methodology and approach	Input	Owner
B Develop IEE Strategy report for the industrial sector in Egypt **[DELIVERABLE]**	Owner	Co-Owner

Table 3 IEE Strategy Outline

SECTION	DESCRIPTION/NOTES
Vision and Goals	*Define how the strategy envisages to move policy resolutions into implemented actions while clearly defining priorities and goals and the rationale behind them*
Status Quo Energy Intensity and Energy Availability Energy Supply (Primary Energy Supply and Sectorial Usage) Measurement of Energy Efficiency Barriers to Energy Efficiency Energy Efficiency Initiatives	*This section will present information that is relevant to the strategy in a more concise and focused form. Most of the data presented in this section should have been acquired earlier in the "Baseline Assessment" activity*
Targets	*Define a set of measurable targets for the goals defined in the first section of the Strategy, e.g. awareness, diversification, SEC, etc.*
Implementing Instruments Technical Instruments Financial Instruments	*Define the needed resources, technically and financially, to achieve the set goals.* *Define the degree of availability of these resources* *Define how additional resources can be obtained/developed/mobilized in order to achieve the set goals with a clear roadmap*
Strategic Implementation Outline	*Present in a higher level of details the approach of how to achieve the vision and goals.* *The implementation outline should present all actions and activities for implementation versus their allocated technical and financial instruments within a defined timeframe*
Performance Monitoring and Future Review	*Define monitoring and review methodology for strategy implementation*

3 ACTIVITY III: INDUSTRIAL ENERGY EFFICIENCY POLICY

Several reports and publications that tackled the energy situation in Egypt claim that there is generally a large room for improvement for energy efficiency in Egypt and specifically in the industrial sector. Most of these reports identify the lack of a clear policy as one of the main barriers. It is the purpose of the Project to prepare a comprehensive IEE Policy and communicate it to the GoE. Based on the recommendations in the prepared strategy. The Consultant shall be responsible for the development of policy recommendations necessary to complement this strategy.

The Consultant shall carry out this activity with the approach presented in "**Table 4 Activity II Datasheet**". The Datasheet provides details about tasks that need to be carried out in order to complete the activity. It also presents the structure of collaboration between the national and international consultants.

The National Expert, in collaboration with the International Expert, should be guided by the outline presented in "**Table 5 IEE Policy Recommendation Outline**". The IEE Policy Recommendation should address legal and institutional issues as in addition to those in the Table 3.

Table 4 Activity III Datasheet

Tasks		Level of Responsibility/Involvement	
		National Consultant	**International Consultant**
A	Review international experience in IEE Policy and prepare "**International Experience in IEE Policy Report**". The report should present a brief key findings and lessons learnt from international experience that are relevant to the situation in Egypt	Support upon request	Owner
B	Policy development methodology and approach	Input	Owner
C	Develop IEE Policy recommendation report in for the industrial sector in Egypt **[DELIVERABLE]**	Owner	Co-Owner

Table 5 IEE Policy Recommendation Outline

SECTION	DESCRIPTION/NOTES
1. Vision	*Define overall industrial energy efficiency policy approach to reduce energy use and CO_2 emissions cost-efficiently*
2. Perspective Measures 2.1. Regulations 2.1.1. Regulations for equipment efficiency 2.1.2. Regulations for process efficiency and configuration 2.2. Agreements	*Define how equipment and processes that should be regulated as well as how they should be regulated, e.g. minimum energy performance standards (MEPS).* *The policy should identify the most energy consuming processes and equipment in the industrial sector in Egypt.* *Define how negotiated agreements/contracts/covenants between industrial sectors and the government are established and their foreseen scope and role*
3. Economic Measures 3.1. Taxes 3.2. Direct Financial Incentives 3.3. Cap and Trade Schemes	*Define the most suitable economic policy regarding IEE in Egypt by identifying the relation between IEE and financial incentives/penalties*
4. Supportive Measures 4.1. Identification of Opportunity 4.2. Cooperative Measures 4.3. Capacity Building	*Define IEE policy approach to knowing opportunities for energy saving, e.g. surveying, statistics reporting, auditing, benchmarking, energy management systems, etc.* *Cooperative measures should show how international support and voluntary companies' plans fit within the IEE policy defining the three-way interaction between the government, international support programs and the industry* *Define capacity building policy for different IEE measures, e.g. labeling, best practice information sharing, advisor services, etc.*
5. Direct Investment	*Define policy approach to direct investment in IEE, e.g. preferential loans, subsidy*

TIME SCHEDULE

The total duration for the whole assignment is estimated to be 12 months starting at contract award. As previously mentioned the Consultant shall present a provisional time schedule as part of their proposal.

REPORTING

In collaboration with the International Consultant, the Consultants are expected to submit the reports as described below:

- Monthly progress reports to be submitted starting one (1) month after contract award. The report should include a summary of ongoing activities and their outputs completed for the reporting period as well as an updated work plan and a summary of planned activities for the next reporting period. The report should also include the findings of the workshops held during the reporting period.

- A Final Report, to be submitted at the end of contract duration. The report should present a comprehensive summary of the work carried out.

CRITERIA OF EVALUATION

- Compliance with the requirements of the terms of reference. (See Annex1 for proposals outline)

- Proven experience in similar projects (e.g. energy policy formulation);

- Proven work experience with governmental institutions (experience in Egypt or similar locations is considered advantageous);

- Proven experience with international organizations/donors;

- Ability to coordinate with the International Consultant to ensure timely implementation of all activities with all due diligence;

- Project team experience.

Additional DUTIES

- Coordination with the International Consultant to ensure timely implementation of all activities in accordance with all due diligence.

- The Consultant shall attend a kick-off meeting at the beginning of his assignment

- The Consultant shall be responsible to perform all additional work necessary to perform their services in accordance with professional standards. This includes but not limited to organizing stakeholders' consultations, attending progress meetings, reporting, organizing and holding workshops.

- In Consultation with the International Expert, the National Consultant is expected to formulate a "Think Tank" which consists of a group of experts and representatives from relevant ministries, private sector and non-governmental organizations. The consultant should be ready to propose a list for the experts to the Programmed Management Unit (PMU) within 1 month from signing the contract.

- This group should meet every month to undertake consultation meetings on the policy and strategy formulation. Meeting arrangements and logistics shall be carried out by the consultant. Meetings will be hosted in EEAA or the Ministry of Industry. The meetings should be

facilitated by the National Consultant in close cooperation with the PMU. It is expected that the consultant will carry out 10 meetings with the group of experts.

- The Consultant shall be responsible for organizing and holding additional stakeholders' consultations necessary to carry out their obligations and to ensure ownership of the GoE over the produced deliverables. At least FOUR (4) stakeholders' consultations shall be arranged, one (1) at each the beginning and end of Activity II and Activity III. The Consultant shall keep written record stakeholders consultations meetings.

- The National Consultant will consolidate the discussions in an annex to the policy and strategy recommendation reports.

- The Consultant shall be responsible for organizing and holding three (3) workshops to disseminate "IEE Policy recommendation", three (3) workshops to disseminate "IEE Strategy Recommendation" and One (1) Final Workshop to present the aforementioned deliverables to policy makers in the GoE.

- The Consultant shall attend and present his work at the conclusion of each Activity to policy makers and governmental officials.

Note that the International Consultant shall be responsible for the following duties:

- *Overall management of all activities. The international consultant shall be responsible for the overall management of all activities to ensure that the output of both himself/herself and the National consultant are in compliance with international standards and best practices.*

- *The Consultant shall attend a kick-off meeting at the beginning of his assignment (1 mission)*

- *The Consultant shall attend workshops at the conclusion of each activity (3 missions)*

- *The Consultant shall attend the meeting with the Think-Tank (1 mission) --- See below*

- *Any work related to Activity II and III shall be done in close consultation with key policy makers. The International expert shall ensure that the national expert is in continuous communication with policy makers and will be responsible to attend a presentation/review workshop at the conclusion of each activity, along with the national consultant, with policy makers and other relevant stakeholders.*

OUTPUTS

- Performing the services and carrying out all obligations with all due diligence, efficiency and economy, in accordance with generally adopted professional techniques and practices.

- Acting as faithful advisers to the Client, and shall at all times support and safeguard the Client's legitimate interests.

- Issuing draft reports for review by UNIDO prior issuance of any deliverable document. The Consultant is responsible to manage this activity ensuring adequate time available for review.

- Timely implementation of the overall responsibilities and duties in accordance with the project-planned schedule and within the planned budget.

REQUIRED QUALIFICATIONS AND COMPETENCY

Required Experiences and qualifications:

- All Personnel: Advanced university degree, at least 3 years relevant experience
- Team Leader:10 years or more of experience, with at least 5 years' experience in energy policy and planning
- Experience working with Government and/or donors and/or civil society and/or international organization ;

REQUIRED LANGUAGE: Fluency in English and Arabic

REPORTING LANGUAGE: English

Suitable and interested candidates are invited to send their proposals to the UNIDO IEE Project Office in Cairo (41 street 9 Maadi, 1st floor apartment #2). The proposal should include a critical review of the entailed technical services including comments and suggestions on the ToR (See Annex 1 below). Correspondence will be undertaken only with candidates who are being considered at an advanced phase of the selection process. Short-listed candidates will be invited for interview. Dead Line for submission of the proposals is *Thursday 3 October 2013*

Contact Details:

Email: g.bayoumi@unido.org
IEE National Project Coordinator
Tel: +202 2380 0357
Fax: +202 23593204

Annex 1:

Proposed outline for the proposal

SECTION	NOTES
1. Consultant 1.1. Association Rationale 1.2. Consultant(s) Organizations 1.3. Consultant(s) Experience	*If Services are to be carried out by the Consultant in association with any other individuals or organization, the association rationale should be described in this section.* *A description of the Consultant organization and its experience should be covered in this section as well as the associated individual/organization. No details about previous projects should be presented in this section but rather a general overview.*
2. Concept and Methodology 2.1. Critical analysis of the objective and the TOR 2.2. Technical approach and methodology	*The Consultant shall present a critical review of the entailed technical services including comments and suggestions on the TOR as part of their proposals.* *A general description of the technical approach and methodology for performing the required services shall be presented.* *A more detailed description on the methodology and approach of performing each activity shall also be presented.*
3. Work Plan, Time Schedule and Budget 3.1. Organization, Association and Logistics 3.2. Time Schedule	*The Consultant shall present the work plan for performing the entailed Services.*
4. Proposed Personnel 4.1. Project Organization Chart 4.2. Proposed personnel	
5. Annex 5.1. CVs 5.2. Previous Relevant Projects 5.3. Other	

Annex 2: Participants

Table 1: Think tank attendees

Name	Position / Affiliation
1- Abla Abdel Latif	Professor of Economics
2- Ahmed Fikry Abdel Wahab	Chairman, Arab German Automotives
3- Ahmed Gaber	Professor of Chemical Engineering
4- Attwa Hussein Attwa	Head of Environmental Management Sector (EEAA)
5- Ayman Korra	Chairman, ConsuKorra
6- Hossam Allam	Hassan Allam Sons
7- Tamer Abu Bakr	Head of energy committee, FEI
8- Samir Mowafy	Energy Advisor for the minister of State for environmental affairs
Ahmed Elsewedy	Chairman, El-sewedy Cables
Mahmoud El Garf	Former head of IDA
UNIDO IEE Program members	
Members of the consortium of Environics/Logic Energy (National Consultant)	

Table 2: Workshop 1 attendees

24th of February 2015

Organization	Presented by
Egypt National Cleaner Production Centre	Ali Abo Sena
Egyptian Competition Authority	Nourhan Tawfik
Egyptian Environmental Affairs Agency	Mohamed Samir Issa
Egyptian Organization For Standardization and Quality	Mohamed Ayad
	Esraa Ahmed Abd El-aziz
Energy Efficiency Unit	Abdul Rahman Ammar
Federation of Egyptian Industries – Environmental Compliance Office	Wafaa Ismail Mohamed
Industrial Development Authority	Marwa Mansour Hamed
	Mohamed Attia Mohamed
	Hanan Adel
	El Saeed Ghozal
Industrial Modernization Center	Ayman Zaki
Ministry of Industry	Hanan El Hadary
Ministry of Petroleum	Ahmed Abdrabo

Table 3: Workshop 2 attendees

25th of February 2015

Organization	Presented by
Egypt National Cleaner Production Centre	Ali Abo Sena
Egyptian Competition Authority	Norhane Tawfik
	Dr. Mona El Garf
Egyptian Environmental Affairs Agency	Sherif Abd El Rahim
	Ahmed Abul Soud
	Dr. Aisha Mohammad
	Mohamed Samir Issa
	Maysoun Nabil
Egyptian Organization For Standardization and Quality	Nagwa Hamed
Energy Efficiency Unit	Abdelwahab Qamar
Federation of Egyptian Industries – Environmental Compliance Office	Wafaa Ismail
General Authority for Investment and Free Zones	Mohamed Hamdy
Industrial Development Authority	Mohamed Attia Mohamed
	ElSaeed Ghozal
Industrial Modernization Center	Ayman Zaki
Industrial Training Council	Mohamed Boraie
Ministry of Electricity	Mostafa Hasaneen
Ministry of Finance	Sherif Khairy
Ministry of Industry	Shaimaa Ali Ali
	Hanan Elhadary
Ministry of Petroleum	Ahmed Abdrabo
United Nations Industrial Development Organization	Giovanna Ceglie

Table 4: Industry members meeting attendees

Organization	Presented by
Federation Of Egyptian Industries	Hatem El Menoufy
Federation Of Egyptian Industries – Environmental Compliance Office	Wafaa Ismail
Chamber Of Chemical Industries	Mohamed Abo Harga
Chamber Of Engineering Industries	Farouk Shalash
Chamber Of Metal Industries	Mohamed Hanafi
Chamber Of Textile Industries	Khaled El Beheiry
Egypt National Cleaner Production Centre	Ali Abo Senna
Egyptian Environmental Affairs Agency	Aisha Abu Laban
	Elham Refaat
	Sherif Abdel Raheim
	Mahmoud Abdel Hafez
	Amany Salah
Egyptian Organization For Standardization and Quality	Nagwa Hamed

	Esraa Ahmed Abdel Aziz
Industrial Development Authority	Hanan Adel
	El Sayed Ghozal
Industrial Modernization Center	Ayman Zaki
Ministry Of Industry	Hanan Al Hadari
United Nations Industrial Development Organization	Giovanna Cegile

Table 5: Industry and State interviewees

Name	**Position**
Ahmad Zoheir Mostafa	Board Chairman of the Production Corporative Union
Ayman Gohar	Board Chairman of the General Authority for Government Services – Ministry of Finance
Alaa Abdel Karim	Board Chairman for the General Organization for Exports and Imports Control (GOEIC)
Khaled Ahmad Abdel Moneim	General Manager of Evaluation And Follow-Up At the Sector for Small and Medium Projects
Hussein Kamel Hashem	Deputy Minister Chairman of the Central Administration for Programs Supporting the Competitiveness of Small and Medium Projects.
Ebrahim Elmanesterly	President of the Industrial Control Authority
Saber Sherif	General Manager and President of The Mechanical Industries Sector Under the Engineering Department Supervisor of Information Center in the Authority

Annex 3: IEE Stakeholders

Name	Apprivation	Role / Activity													Web Page Address
		Input		Vision	Startegy	Policy					Implementation			monitoring	
		Information Dissemination	Studies & Research	Vision	Strategy	Policy Making	Training & Cpacity Building	Education	Awareness	legisliations, norms & Standards	projects & Programs Financing	Projects Implementation	technology Transfer	Monitoring	
The Ministry of Foreign Trade and Industry	MFTI	√	√	√	√	√	√	√	√	√	√	√	√	√	http://www.mfti.gov.eg/
The Industrial Development Authority	IDA	√	√	√	√	√	√	√	√	√	√	√	√	√	http://www.ida.gov.eg/
Industrial Modernization Center	IDMC	√	√	●	●	●	√	√	√	●	√	√	√	√	http://www.imc-egypt.org/
Tabbin Institute for Metallurgical Studies	TIMS	√	√	●	●	●	√	√	√	●	√	√	√	√	http://www.tims.gov.eg/
Egyptian organization for standardization	EOS	●	●	●	●	●			●	√		●		●	http://www.eos.org.eg/
Federation of Egyptian Industries	FEI	√	●	●	●	●	√	√	√	●	√	√	√	√	http://www.fei.org.eg/
Consumer Protection Agency	CPA	●	●	●	●	●			●	√				●	http://www.cpa.gov.eg/
The Supreme Energy Council	SEC	√	√	√	√	√	●	●	●	√	√	√	√	√	http://www.cabinet.gov.eg/
Energy Efficiency Unit	EEU	√	√	√	√	√	●	√	√	√	√	√	√	√	http://www.cabinet.gov.eg/
Ministry of Petroleum	MoP	√	√	●	●	√	●	●	●	√	●	●	●	●	http://www.petroleum.gov.eg/
Egyptian General Petroleum Corporation	EGPC	√	●	●	●	√	●	●	●	√	●	●	●	●	http://www.egpc.com.eg/
Egyptian Natural Gas Holding Company	EGAS	√	●	●	●	√	●	●	●	√	●	●	●	●	http://www.egas.com.eg/
Ministry of Electricity and Energy	MEE	√	√	●	●	√	●	●	●	√	●	●	●	●	http://www.moee.gov.eg/
Egyptian Electricity Holding Company	EEHC	√	√	●	●	√	●	●	●	√	●	●	●	●	http://www.egelec.com/
New and Renewable Energy Development Authority	NAREA	√	√	●	●	●	●	●	●	●	●	●	√	●	http://www.nrea.gov.eg/
Egyptian Electricity Utility and Consumer Protection Regulatory Agency	EEUCPRA	●	●	●	●	●	●	●	●	√	●	●	●	●	http://www.egyptera.com/
Ministry of Finance	MoF	●	●	●	●	√	●	●	●	√	√	●	●	√	http://www.mof.gov.eg/
Regional Center for Renewable and Energy Efficiency	RECREE	√	√	●	●	●	●	√	√	●	●	√	√	●	http://www.rcreee.org/
Ministry of State for Environmental Affairs	MSEA	●	●	●	●	√	●	●	●	√	●	●	●	●	http://www.eeaa.gov.eg/
Egyptian Environmental Affairs Agency	EEAA	●	●	●	●	√	●	●	●	√	●	●	●	●	http://www.eeaa.gov.eg/
Ministry of Investment	MoI	●	●	●	●	●	●	●	●	●	√	●	●	●	http://www.investment.gov.eg
Ministry of International Cooperation	MOIC	●	●	●	●	●	●	●	●	●	●	●	●	●	http://www.moic.gov.eg/
Central Agency for Public Mobilization and Statistics	CAPMAS	●	●											●	http://www.capmas.gov.eg/
Development Research and Technological Planning Center	DRTPC	√	√	●	●	●	√	√	√	●	√	√	√	√	http://www.drtpc.org/
Energy Research Center - Cairo University	ERC	√	√	●	●	●	√	√	√	●	√	√	√	√	http://www.eng.cu.edu.eg/
World Energy Council National Committee	WECNC	●	●	●	●	●	●	●	●	●			●		http://www.wec-egypt.org.eg/
Egyptian Information and Decision Support Center	IDSC	●	●	●	●					●					http://www.idsc.gov.eg/
Academy of Scientific Research and Technology	ACSRT	●	●	●	●				●	●	●	●	●	●	http://www.asrt.sci.eg/
World Bank	WB	√	√	●	●	●	√	√	√	●	√	●	√	√	http://www.worldbank.org/
United Nation Development Program	UNDP	√	√	●	●	●	√	√	√	●	√	●	√	√	http://www.eg.undp.org/
United Nation Environmental Program	UNEP	●	●	●	●		●	●	●	●	●	●	●	●	http://www.unep.org/
United Nation Industrial Development Program	UNIDO	√	√	●	●	●	√	√	√	●	√	●	√	√	http://www.unep.org/
Global Environmental Facility	GEF	●	●	●	●		●	●	●	●	●	●	●	●	http://www.thegef.org/gef/
Egyptian German Joint Committee for Renewable Energy, Energy Efficiency and Environmental Protection	JCEE	√	√	●	●	●	√	√	√	●	●	●	√	●	http://www.jcee-eg.net/
German Academic Exchange Service	DAAD	●					●	●	●				●		http://cairo.daad.de/
World Energy Council	WEC	●	●				●	●	●						http://www.worldenergy.org/
United States Agency for International Development	USAID	√	√	●	●	●	√	√	√	●	√	√	√	√	http://www.usaid.gov/egypt

√ : Directly related.

● : Indirectly or partially related.

Appendix: Baseline Report