

INDUSTRIAL DEVELOPMENT ORGANIZATION





INDUSTRIAL ENERGY EFFICIENCY IN EGYPT



Strategies and Policies Executive Summary









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 ituation	 Financial Institutional Legal Social 	• Existing Visions	• Existing Strategies	• Existing Policies	• Existing implementation Mechanisms	• Existing Monitoring Mechanisms
bata Si	• Macro level data	• 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
posal	• 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 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 energyintensity¹. In terms of size, the modal size of Egyptian industries is micro. The major contributors to employment are 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, and furniture and electric devices, which all happen to be low energy intensity sectors. (CAPMAS, 2006).

Energy intensive industries have less than 7% of total industrial labor expenditures (MoTI, 2007). They represent 1% of the number of factories and consume 65% of the industry energy share. (AFEX, 2013).

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.
or Issues	 Enjoy high political power May have international affiliations 	 Enjoy high political power Public companies? 		 Have antiquated/ outdated technologies 		 Large numbers Limited Skills Small energy contribution to costs
e Sect	Energy intensive indu	stries consume 65% of	tł	e industrial energy		
Core	Represent 0.5 % of est of industrial	ablishments and 35% employment		Represent 99% of est industrial	abl em	ishments and 60% of ployment

Figure 2: Industrial categories

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)
 - 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 IEE 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 may not have enough authorities to achieve its mandates, which sometimes leads to having weak enforcement mechanisms. It also includes personnel capacity in terms of number of personnel employed and their relative experience, capabilities and knowledge. This is one of the major constraints which 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).

Moreover, 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

Moreover, 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.

Furthermore, 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 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	Lack of comprehensive and reliable data that can be obtained by decision makers systematically
	industrial energy efficiency	No clear regulations in the IEE domain, so decision makers will be setting precedents
•	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	 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	Threats
•	Significant potential to save substantial amounts of	Primary energy pricing strategy for the industrial sector is not clear
	energy if any strong policies are put in place	 Industrial development strategy is not clear
٠	Many studies have been undertaken and include ideas	• The current institutional setup is currently ill-prepared to implement and monitor policies to
	that can be developed into policies and supportive	be issued, especially those requiring strong enforcement
	measures	• Major industrial sector players have strong lobbies that can push against any measures
•	Several development banks/agencies are interested to support industrial energy efficiency and thus provide	that force them to invest in energy efficiency measures
	funds to trigger and stimulate real actions in that	• Labour mensive mousines can push back on EE measures that can innuence their profitability in the short term with the excuse of putting their labour out of the job market
	domain	• Synchronization and integration between the main involved parties (Ministries of
•	Energy prices are expected to continue increasing	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 <u>optimum energy</u> <u>efficiency level economically viable</u> 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 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 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 reporting 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 challenges common to all three objectives which can be categorized under four categories:

- Government funding, mainly reflected in limited ability to subsidize EE investments.
- Data challenges including; availability, accessibility, reliability and consistency.
- 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.
- Micro-enterprises are challenging to address due to their large numbers, different affiliations, limited technical capacity, and nonbankability.



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, the strategy needs to take into consideration their sensitivity to the different objectives.

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 sessions 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 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 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 additionally 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 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

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.

The phasing strategy followed when establishing the policies takes size and energy-intensity categorization as its main reference. Policies are phased such that they target at first the most competent and organizationally, technologically and financially capable (i.e. predominantly large energy



intensive) industrial sectors. Additionally, the majority of policies proposed are continuous and 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 about 10 years.

As 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 entity³. 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
- Mobilise equipment suppliers and service providers through informing them about current and upcoming trends

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.



• 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.

The unit in IDA concerned with energy management should have its capacity built and have direct contact with IDA's upper management to be able to coordinate effectively with the various internal entities and entities outside IDA and external to MoI, until the missing policy unit in the ministry of industry is established. 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.



5.1 Policy Summary

Description	Owner	Stakeholders
Policy 1		
 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 following¹ 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 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 operational system for grid-connected combined heat and power (CHP) through a decree. The operational system should be established such	Eavpt ERA	Support: EETC
that the electricity prices encourage CHP and resolve any issues that might	-376	Facilitate: FEI



arise with regards to grid management; metering and accounting systems, etc. are resolved before the decree is issued.		Evaluate: Egypt ERA
Policy 4		
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		
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 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 	IDA	Support: ENCPC, Energy Planning Authority Facilitate: NQI



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.		Evaluate: Ministry of trade and industry-Policy unit
with.		
Policy 7		
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		
 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		
This policy requires Minimum Energy Performance Standards (MEPS) to be	Egyptian	Support: ENCPC, Mol Policy Unit,



developed with a focus on equipment that comply with the following	Organization	Ministry of Finance, Industry and
prioritization criteria:	for	technology development sector
	Standardization	(Mol)
Have high potential energy saving, where priority is to those with highest	and Quality	
potential	(EOS)	Facilitate: FEI
• Are used across a large number of industries, where the most cross-		Evaluate. Custom outborition IDA
cutting are given priority		Evaluate: Custom authonities, IDA,
Are imported, where priority will be for imported equipment rather than		within the second secon
the ones manufactured locally		unit
Policy 10		
Establish a mechanism/platform responsible for raising awareness on the		Support: IMC
benefits of energy efficiency in Egypt, targeting both direct and indirect		Facilitates IDA NOL FOR MOF
stakenoiders. This including banks, government, industrial sector, with its	Federation of	Facilitate: IDA, NQI, EOS, MOF,
whore indicated across the other policies	Egyptian	ERA, Barks, Industrial Sector,
owners indicated across the other policies.	Industries (FEI)	Energy Consulting Services
Awareness is also raised on tonics including IEE financing ontions		Evaluate: FEL Ministry of trade
technologies and announcing relevant strategies and policies		and industry-Policy unit
Policy 11a		
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).		
	FEI	Support: Ministry of Finance
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).		
Policy 11b		
Augment the funds available to the Productive Cooperative Union in order to	New entity	Support: Ministry of Finance, IMC
finance industrial energy efficiency projects for its members. In order to	concerned with	and Industrial technological
increase this fund, it is proposed that the ministry of finance (MOF) establishes	SMEs	development sector (Mol)
a cooperation protocol with the Cooperative Union to finance its members in		(including ENCPC), IDA



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		Facilitate: NQI /ENCPC Evaluate: Energy Planning Authority, IDA, New entity concerned with SMEs, Production Cooperatives
Policy 12		
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	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
deliver the required data and face risks of having their license revoked if they do not deliver or deliver inaccurate data.		Renewable Energy, Ministry of Petroleum and Mineral Resources, Supreme Energy Council
Policy 13	l	
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
	L med El												
Undertake studies on local technologies to identify most	L non- El (Tier 1)												
efficient ones	L, non- El (Tier 2)												
	3, LI												
Encuring EE of now facilities	L, med. Li												
	L, HOH- EI (Tier 1)						-						
							-						
	3, EI												
									1			T	
Bropara and issue degrees which exampt facilities with EMS							-					-	
from export duties	L, med. El						-						
	L, $HOH-EI$ (Hei I)						_						
Export duty and exemption (where explicitle)	L, IIIEU. EI												
Export duty and exemption (where applicable)													
) S, El					<u> </u>							
Drogrom to change out deted technologies	<u>е Е</u> І	1										1	
Frogram to change out-dated technologies	о, EI												
												1	
Incorporate new conditions on EMS for contractors in State	L, med. El												
tender documents	L, non- EI (Tier 1)			_						_		-	
	S, El			-		_						-	
	L, non- EI (Tier 2)												
ENO as a l'ille a fac Otata anna anna it (a bana ann l'asbla)				_									
ENIS condition for State procurement (where applicable)	L, non- EI (Tier 1)			_		_	-						
	S, El			-		_							
	L, non- EI (Tier 2)												
			Т										
				_		_	-						
Consider performance based regulations	L, med. El			_		_							
	L, non- El (Tier 1)												
			Т										
		-											
	L, med. El	-				-							
Data reporting for license renewal	L, non- El (Tier 1)												
	S, El												
	L, non- El (Tier 2)												
												1	
	L, med. El						_						
Promote EMS in entire sector	L, non- El (Tier 1)												
	S, El												
	L, non- El (Tier 2)				1								
					1		1						
	L, med. El												
EMS as condition for license renewal	L, non- El (Tier 1)												
	L, non- El (Tier 2)								ļ				
	S, El	<u> </u>											
Table 1: Evolution of EMS coverage	e across the different indus	trial sectors											
L, LI: e.g. cement, steel, fertilizers, alumin	um, copper and petrochem	licals											
L, med. EI: e.g. ceramics, porcelain, metal prod	ucts and glass												
L, non- EI: e.g. textiles, food and beverage, par	per, rubber and plastics		(
S, EI: e.g. bri	CKS,		toundries	,			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					
Dolioy 12	1. Create Policy Unit					
Policy 13	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.				
		 Identify resources and capacity required to be able to perform its function 				
Policies	7	2. Identifying certification prerequisites				
and 8		Build the operating model of the certification processes				
		4. Design templates and forms for certification				
Delioy 6		1. Create an inventory of energy service providers/consultants catering for all industries as per policy 8.				
Folicy 6		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	 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.
	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 0	 Data collection and Identify Inefficient Equipment (utilizing IFC study)
FUILCY 9	Develop an action plan (phasing the equipment for MEPS)

Industrial Development Authority (IDA)		
Policy and 2	1	 Set templates for data and plans for each sector Set mechanisms for data collection, assessment (data verification tool), analysis and revision. 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		 Identify resources and capacity building required for the new unit concerned with energy efficiency and renewable energy to perform its role Identify data to be collected

EGYPT ERA		
	1. Undertake studies to estimate the potential of CHP in the industrial sector.	
Policy 3	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	 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	 Identify the chambers and cooperatives targeted according to each phase and get their buy-in on the program Conduct audits to develop guidelines, if needed.
	3. Engage financiers (funds from donor entities and the ministry of Finance)
	 Setting "model systems", based on the current system at FEI-ECO, feedback from beneficiaries and cooperative capacities.
Policy 11b	1. Assess financial needs
	Establish the protocol's terms and conditions
	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	 Communicate needs to support their members to new entity concerned with SMEs 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