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Industrial energy efficiency policy

**– Approach for developing an IEE strategy and
roadmap for Egypt**

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Preface

This report presents the written deliveries of Ea Energy Analyses and Aura Energi in the UNIDO technical assistance on *Development of an industrial energy efficiency policy and strategy in Egypt*¹ and the amendments outlined in the Inception Report, dated 1st March 2014.

The technical assistance project is just one of several sub-projects under the UNIDO funded industrial energy efficiency (IEE) project which started in January 2013 and is expected to run for 5 years². This larger project consists of 5 components. A team of Egyptian consultants were been assigned to carry out Task 1.6 “IEE policy”, namely Logic Energy Consulting and Envirionics SAE. The core of the assignment given to Ea Energy Analyses A/S and Aura Energi has been to develop the methodology and framework for strategy and policy development and to provide support to the Egyptian team.

UNIDO project
1: National program to define energy benchmarks and EE policy
– 1.1 Support in the adoption and dissemination of EMS
– 1.2 Structure in place for M&V of compliance with EMS
– 1.3 Industrial energy database and energy consumption benchmarks developed.
– 1.4 EMS practical guide development
– 1.5 Post-project action plan
– 1.6 IEE policy
2: Awareness raising on industrial energy efficiency and management in industry
3: technical capacity building on energy efficiency services
4: Access to finance for EE improvement projects
5: Implementation of energy management systems and system optimisation

Figure 1: Work components of the industrial energy efficiency project. This deliverable is part of 1.6.

The present report contains the two last of three deliveries foreseen in the contract, namely: “Strategy methodology and framework” and “Policy methodology and framework”. The first deliverable was “International practice and experience”.

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¹ SAP# 100349, described in the RFP 700000439, dated 25th November 2013,

² Project no. GF/EGY/12/001

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1 Introduction

This report describes the key elements of a strategy plus a 10-year roadmap for an industrial energy efficiency (IEE) policy framework in Egypt and an approach to developing these. The strategy and the 10-year roadmap themselves will be developed by Egyptian consultants based on the input provided in this report, and with interaction with stakeholders. The international team will support the Egyptian consultants in formulating these policy recommendations for Egypt.

Furthermore, selected Egyptian government representatives will visit Denmark to receive training in various aspects of policy implementation, in particular voluntary agreements.

This report thus seeks to answer the following:

- What is the *function and content* of an IEE strategy and a roadmap?
- What *approach* is best applied in the process of developing an IEE strategy and a roadmap?

2 Function and content of a strategy and a roadmap

Reasons for intervention In an ideal world industrial companies would by themselves invest in energy efficiency based on sound economic analyses. All externalities (e.g. environmental impact) would be incorporated in the end-user price, and all decision-makers would have easy access to all relevant information. In this world there would be no reason for public intervention in industrial decision-making.

However, in the real world there are many reasons for public intervention in industrial decision-making. “Market failures” can be externalities, but also imperfect information or imperfect competition.

In Egypt and elsewhere, industrial management do not use a lot of time to find optimal EE solutions. Many aspect of manufacturing is important and EE tends not to be on the top of the agenda. “Bounded rationality” is a term used to describe the rational behaviour of e.g. management¹. This include recognising that gathering and processing information has a cost. Instead of a full search for solutions, a simplified approach is often used (and this can in general be very efficient). Rules and traditions based on former experience are used when searching for solutions.

The reasons for intervention in Egypt should be understood and openly formulated. What problems are to be addressed, what causes the problems, and how and to what extent can different policy instruments remedy these problems?

At the same time is must be understood that “market failures” has a sister in form of “regulation failure”. Regulation failure can be a case where the regulation leads to an expensive solution. This could be the case if e.g. a minimum efficiency standard for motors were developed with a certain number of hours of use (e.g. over 2,000 hours per year). In this case, the standard may lead to a too expensive solution for motors only used a few hours per year.

Other regulation failures may be high administrative costs. This can be cost borne by the regulated companies in an energy efficiency obligation scheme, the implementing body, or the Government. Such cost also includes the cost for evaluating and developing the activity.

¹ Formulated bu Herbert A. Simon.

Finally, regulation failure may be related to the impact of the intervention. In some cases a good and clear idea exists behind the design of an intervention, but in real life impact turns out to be very small. This was the case with a Danish policy for energy labelling of buildings. It turned out that buildings without an energy label had the same energy efficiency as buildings with a label. The owners of buildings without an energy label appears to manage to find the relevant information by other means.

ESCOs

Countries with a limited history of energy efficiency services may not have a presence of energy service companies (so-called ESCOs) solely dedicated to energy services. However, this is no hindrance to energy efficiency. Typically, equipment suppliers and the like can deliver energy services relating to the equipment category in question and can relatively easy expand their expertise to include other energy efficiency aspects if there is an interest in the market. It could never-the-less be relevant to include considerations on how to help expand the supply range of energy services or accumulate information relevant to energy service providers when designing IEE policies. A systematic and deliberate monitoring and evaluation of newly introduced policies can provide useful data and insights. Creating a forum for initial exchange of experience among energy service providers can also stimulate the supply.

Vision, strategy,
roadmap

A vision and a development goal define the scope of the work to be done. A strategy sets the path for how to achieve these. It identifies the principles that will guide the priorities and decisions to be made. A roadmap with a portfolio of policy instruments makes the transition operational. The differences between a vision, a strategy, and a roadmap are briefly explained below.

It is important to consider the financial aspects already at the strategy formulation stage. The availability of financing and the potential sources of financing influence the possible level of ambition and which policy designs will be best suited to realise the ambition. A limited budget for the intervention is typically a sign of a low ambition. It is important to formulate the level of ambition from the start.

	Vision	Strategy	Roadmap
Time horizon	Long-term	Long-term	Short-medium term
What questions does it answer?	<p>Where do we want to be in the long term (vision and development goals)?</p> <p>Accept that intervention for IEE is relevant.</p>	<p>What principles should guide us on the path to the future (compass)?</p> <p>How is the journey to be financed overall?</p>	<p>What are the possible pathways?</p> <p>Which pathway do we chose?</p> <p>What is to be done, how, by whom, when?</p> <p>How is progress and achievements measured and monitored?</p>
Target audience / users	Policy makers	Policy makers	Policy-planners and implementers
What characterises quality?	<p>Clear ambition, not too detailed;</p> <p>Can include quantitative development goals, e.g. reduction targets;</p> <p>Agreed with stakeholders.</p>	<p>Clear ownership;</p> <p>Clear and balanced understanding of the reason for intervention;</p> <p>Plan for financing;</p> <p>Agreed with key actors and political levels;</p> <p>Clear relation/link to other development strategies.</p>	<p>Status quo and targets for the next period.</p> <p>Specific and clear indicators;</p> <p>Clear role distribution;</p> <p>Follow-up in the form of monitoring and evaluation outlined;</p> <p>Agreed with key actors and political levels;</p>
Type	Political statement / document	Political statement / document	Political document and guide for implementers / policy makers

Table 1: Differences between a vision, a strategy, and a roadmap.

A concrete example of guiding principles contained in a strategy can be found in the Danish energy strategy 2050 – see text box 1.

Text box 1: Example of guiding principles – Case Denmark

The long-term strategy for the Danish energy policy (Danish Government, 2011) has as vision a transition to a fossil fuel free society by 2050 and suggests four areas of focused effort – energy efficiency, electrification, renewable energy, and RD&D. The guiding principles are:

- Cost-efficiency – Obtaining best possible security of supply and reduction in fossil fuels for the money spent (value-for-money). Large scale use of technologies that require substantial support are not pursued. Instead RD&D is used to reduce the need for support;
- No strain on government funds – This means that the financing sources have been identified and that the financing will be provided via end-users of energy;
- Retention of the competitiveness of the Danish businesses – This requires among other that the businesses know the long-term framework conditions that they will be operating under and that the energy costs do not increase significantly as a consequence of the strategy; and
- Exploitation of the opportunities that a globalised world and an increasingly closer EU cooperation provide including participation in an international energy market.

Furthermore, the transition may not undermine the natural and environmental resources. The necessary initiatives are divided into three categories, namely initiatives with immediate impact on the Danish energy system, initiatives that prepare the transition to independence of fossil fuels, and initiatives aimed at development and improvement of energy technologies.

Following a think-tank meeting in 2014 the consulted Egyptian industrial stakeholders have agreed on the following vision for the Egyptian IEE strategy:

“The Egyptian industry achieves the utmost energy efficiency levels economically viable for the Egyptian society.”

The formulation is relevant and clear. One suggestion could be to add sentences like: *“Public intervention is needed to reach this goal. It is important that such intervention is compatible with the world of industry. E.g. in the design of public interventions it is important to seek synergies with other areas of industrial importance, e.g. increased productivity, modernisation, and strengthening of staff competences.”*

Paving the way

Any political strategy or policy is subject to political compromises. Frequently an ambitious target is first possible after a series of less radical targets. An example of such gradual introduction of more ambitious targets are the EU energy targets (see text box 2). Most recently, a political compromise of an *indic-*

ative 27% energy savings target for the EU as a whole was agreed by the European Council. To compensate for the fact that the target isn't binding it was agreed the target will be reviewed in 2020 having in mind a 30% target.

Text box 2: Example of softer targets leading to harder targets – Case EU

The EU has set itself a goal of reducing greenhouse gas emissions by 80-95% below 1990 levels by 2050¹. The 'EU Climate and Energy Package' is a set of binding legislation which aims to ensure the EU meets its climate and energy targets for 2020. These targets were known as the "20-20-20" targets and are:

- A 20% reduction in EU greenhouse gas emissions from 1990 levels;
- Raising the share of EU energy consumption produced from renewable resources to 20%;
- A 20% improvement in the EU's energy efficiency.

Part of this package was also nationally binding targets for non-emission-trading-system emission reduction and renewable energy. Later (2012) indicative national targets for energy efficiency were agreed in relation to the 'EU Energy Efficiency Directive' (2012/27/EU). This directive sets binding targets for savings achieved via introduction of national energy efficiency obligation schemes (or policy instruments with similar impact) but also binding measures (e.g. obligation for large enterprises to carry out an energy audit at least every four years, with a first energy audit at the latest by 5 December 2015; easy and free-of-charge access for consumers to data on real-time and historical energy consumption; and 3% of buildings owned and occupied by the central governments must be renovated each year starting from 1 January 2014).

On 23 October 2014, the EU leaders agreed on a 2030 greenhouse gas reduction target of at least 40% compared to 1990 together with the other main building blocks of the 2030 policy framework for climate and energy. The 2030 agreement also sets a binding EU target of at least 27% for renewable energy in 2030 and an indicative 27% energy savings target. The energy savings target will be reviewed in 2020 having in mind a 30% target. Later, the 2030 targets will be translated into national targets and interventions.

What does actually happen?

Progress and achievements should be monitored continuously and data on key indicators collected so that corrective measures can be taken in due time if necessary, as also suggested by the Regional Centre for Renewable Energy and Energy Efficiency (RECREEE). At regular intervals progress and costs must be evaluated in more detail to provide information for reformulation of the policy portfolio e.g. for the next roadmap.

¹ http://ec.europa.eu/clima/policies/2030/index_en.htm

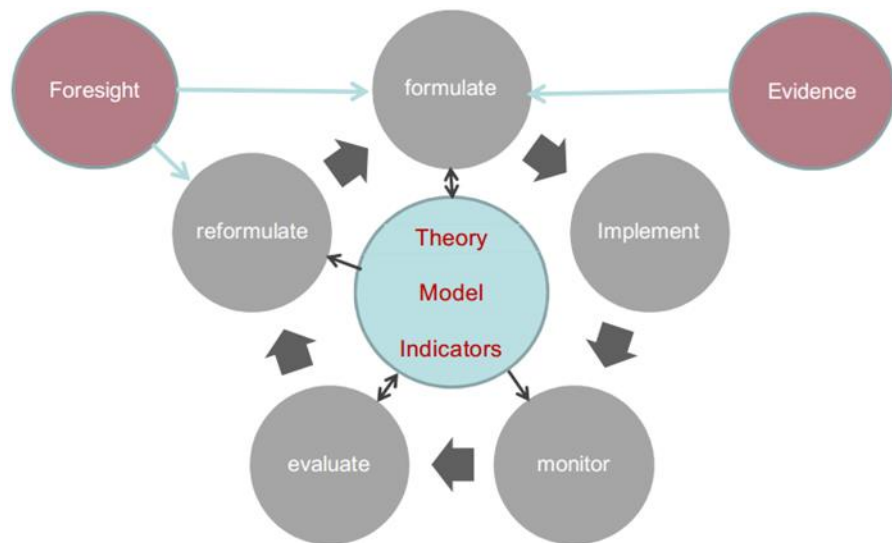


Figure 2: Policy cycle. (RECREEE, 2009)

Success

A successful strategy is characterised by the following:

- It sets a clear and **unambiguous** frame, specifying the vision (aspirations) for the future, the development goal, and guiding “themes” [find better wording] for the operationalization of the strategy.
- It is **politically agreed**, preferably beyond the nearest election period – This will give the necessary stability for the private investment and market development).
- It is widely **accepted among key stakeholders** – This is critical to the actual implementation of the subsequent policies. It will also provide a common platform for development of specific policies that can draw on the insights of key stakeholders.
- The “**owner(s)**” of the strategy is **clearly identified** as are their responsibilities (accountability).

A successful policy portfolio is characterised by the following:

- It addresses all key areas that need change in order to achieve significant impact.
- It contains a range of policies that supplement one another thus increasing the combined impact.
- It is backed by a lasting and robust financing mechanism.
- Perhaps most important in the strategy development is the work process itself. Complex and diffuse matters are to be discussed, and it is uncertain exactly what the future might bring. Furthermore, there are different perceptions of these matters but a common path forward has to be identified and agreed upon. A well-structured approach using stakeholder consultation can be of great value in this process.

- Interventions should be balanced and well-argued. The interventions (policy instruments) should have a positive cost/benefit balance. With a negative cost/benefit balance the costs would be a burden for industry (or the state) leading to reduced competitiveness.

Timeline

A sketch of the timeline for strategy, roadmaps, policy portfolio, and evaluations (E) leading up to achieving the agreed development goal is presented in Figure 3. The first IEE roadmap is intended to cover a period of 10 years. It is however not sufficient to evaluate the achievements after the 10 year period. It is important to identify intermediary targets and milestones and to communicate progress achievement in relation to these at regular intervals to the immediately involved parties, other key stakeholders, and the general public.

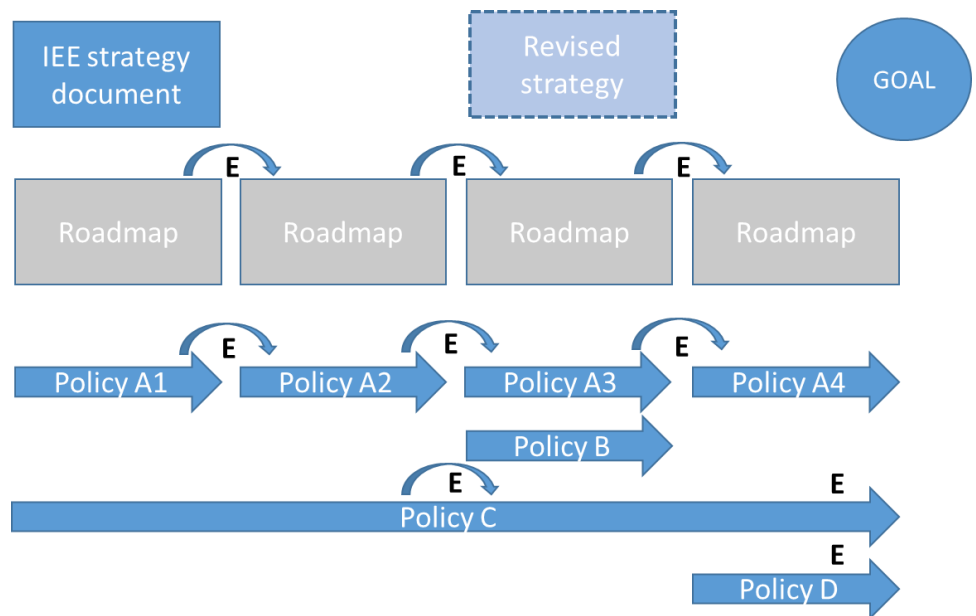


Figure 3: Sketch of the timeline for strategy, roadmaps, policy portfolio, and evaluations (E).

Document outlines

The format of the strategy document and the roadmap document chosen by policymakers varies but some core elements should always be included. Table 2 and Table 3 present our suggestion for the outline for the Egyptian IEE strategy and roadmap.

Chapter	Comments
Vision and goals	<i>Define how the strategy envisages to move policy resolutions into implemented actions while clearly defining priorities and goals and the rationale behind them</i>
Status quo	<i>This section will present information that is relevant to the strategy in a more concise and focused form.</i>
Targets	<i>Define a set of measurable targets for the goals defined in the first section of the Strategy</i>
Implementing instruments	<i>Select the general types of policy instruments to be activated. This should be a high level description. Division of work, tasks to existing and new organisations.</i>
Strategic implementation outline	<i>Present in a higher level of details the approach of how to achieve the vision and goals. Set the framework for the Road map</i>
Performance monitoring and future review	<i>Define monitoring and review methodology for strategy implementation</i>

Table 2: Outline of IEE Strategy paper. Based on UNIDO's terms of reference for the project.

Chapter	Comments
Vision, goals, and strategy	<i>Summary of the strategic framework</i>
Key policy instruments: <ul style="list-style-type: none"> • Responsible organisations • Design features • Financing • Timing 	<i>A limited number of main instruments is described one-by-one.</i>
Portfolio review	<i>How is the balance across target groups? How is the synergy or overlapping across instruments?</i>
Monitoring and evaluation	<i>Define timing and responsible organisation of monitoring and evaluation. Internal/external evaluations. Impact evaluation as well as improvement of processes.</i>

Table 3: Outline of IEE Roadmap paper.

New Zealand	
Objective	Enhanced business growth and competitiveness from energy intensity improvements
Targets	By 2016: An improvement in the commercial and industrial sector energy intensity level (GJ/1,000 NZD) By 2025: 9.5 PJ/year of the energy utilised will be based on woody biomass or geothermal.
Responsibility	Lead: Ministry of Economic Development, and the Energy Efficiency and Conservation Authority Support: Department of Building and Housing, Ministry of Agriculture and Forestry, and Ministry of Science and Innovation
Rationale	Optimising energy performance can reduce production costs and thus increase productivity. Marketing edge through environmentally conscious products EE potentials exist Limited economy and capability restrains EE in small and medium sized companies which leads to them considering energy costs as a fixed cost. Larger companies can help raise the bar and better access to information can enable smart energy decisions, credible information and analyse can reduce risk and uncertainty. Greater partnering with energy service companies can add value to companies that do not have energy as their core business.
Policy	Encourage businesses to factor in operational costs as well as capital costs when investing in assets – the longer term energy savings may be worth a slightly higher upfront cost. Build management capability, including in small and medium enterprises, to identify and exploit opportunities to ensure energy intensity good practice is reflected in mainstream business planning. Encourage major firms proficient in energy efficiency practices to champion good practice across the wider business community. Prioritise energy research and development funding to develop renewable energy and demand side management technologies that improve energy security, and efficient and affordable energy use. Build recognition of the value that can be added through the expertise of energy consultancies and service companies. Overseas, such companies have been credited with expanding funds available to finance energy efficiency projects. Improve the capability and capacity of energy auditors/assessors and their professional bodies. Assist industry to recognise and exploit opportunities for utilisation of geothermal and bioenergy sources.

Table 4: Case New Zealand – Example of presentation of a strategy and associated policies (New Zealand Ministry of Economic Development, 2011).

Strategy ownership

The RECREEE reviewed the Egyptian national regulations and incentives for renewable energy and energy efficiency in 2009. With regard to the institutional capacity, RECREEE concluded among other that there “*is a need for an institu-*

tion, or perhaps several, to gather and maintain evidence and to carry out analytical work that feeds into the formulation of policy and later guides the monitoring and evaluation and reformulation of policy. Foresight studies are a part of the evidence that should be considered in policy formulation and these should take into account the evolution of global trends and policies in energy and the environment, but also of trends beyond these disciplinary frontiers.” (RECREEE, 2009)

The Egyptian consultants working on the current IEE strategy and 10-year roadmap arrived at a similar conclusion in spring 2014 in their ‘Baseline report’, after a thorough assessment of the IEE experiences in Egypt and earlier reports and policy documents. One of the conclusions was that so far there has been a lack of continuity in the “policy value chain” and a lack of clear ownership of IEE. While there have been assessments of the existing situation only few suggestions for strategies exist and hardly any monitoring initiatives. Monitoring the situation is important feedback to policy-makers.

Clear assignment of ownership should therefore be given special attention in the IEE strategy work.



Figure 4: Policy value chain, as presented in the 'Baseline report'. (Logic Energy and Envirionics, 2014)

3 Approach

3.1 Stakeholder involvement

Experience shows that the chances of arriving at a strategy and a roadmap that is politically agreed upon and rolled out increases significantly if the key stakeholders are actively involved in the development process. Involvement can be a first step enlisting commitment to certain activities.

Involvement does not imply hands-on involvement in preparing data, analyses, and reports. Stakeholder involvement can be limited to a consultation – often repeated – of representatives of the different interests at stake when formulating ambitions, identifying options and synergies, and weighing pros and cons of various policy alternatives. Involving multiple stakeholders already in the early phases can help avoid overlooking important and critical facts and interests.

The consultations are typically based on input e.g. in the form of discussion papers presented by energy planners and analysts.

We therefore recommend involving key stakeholders hands-on in the identification of a sound IEE strategy and a strong policy portfolio for Egypt.

Form for stakeholder involvement

In the case of the Egyptian IEE, the consultation of stakeholders could take place during the foreseen think-tank / stakeholder meetings.

The moderator should be selected to guide the development process. It could for example be the Energy Efficiency Unit, local consultants, or experts in moderating stakeholder discussions.

Acknowledge that the stakeholders have different motives and that the interests of each industrial company interest do not necessarily align with long-term societal interests. When motives and interests are openly acknowledged it becomes easier to jointly define a long-term vision that holds some value-added for all parties concerned and that can form a common ground for the work ahead.

3.2 Analysis method

Development of an IEE strategy addresses complex issues – both technically and politically. Therefore a work method that allows a systematic approach

that can present the complexities in a manageable manner conducive to understanding the inter-linkages is required. Multi-criteria assessment and scenario analyses are two such tools. A strength of both is that it does not require in-depth technical expertise of all participants.

Multi-criteria assessment

A method that is frequently used when formulating strategies and associated policies is multi-criteria assessment. The method provides valuable structure to the strategy and portfolio development since it is well suited for systematic assessment of different options and conducting policy mix exercises – irrespective of whether it is used in a stakeholder consultation or by energy regulators/planners alone.

There is a plethora of literature on multi-criteria assessment. One example is (Belton, et al., 2001). An approach widely used in the EU during the 1990's for EE policy and program design is presented in the following.

Key to multi-criteria assessment is to remember that it is the discussions during the assessment process that provide the greatest value. The discussions are intended to reveal underlying understandings of the challenges that are to be addressed, how the policies are expected to work, and the point of view of the involved stakeholders.

Steps

The steps of the multi-criteria assessment are as follows:

1. Discuss what changes the policies are intended to cause.
2. List relevant policies liberally.
3. Formulate **criteria** for assessing the relevance of each policy.
4. Assign **weights** to each criterion according to their importance.
5. Develop a **rating scale** for each criterion.
6. Rate each policy against the criteria.
7. Calculate the score and rank the policies accordingly.
8. Discuss the outcome critically.

The first step is to discuss which policies are most appropriate to address the “needs” for change identified in the gap assessment¹. The listing of relevant policies (step 2) should not be too critical. The subsequent assessment will clearly reveal those policies of only modest relevance.

¹ More information on gap assessment can be found in the first report – ‘International practice and experience analysed for application in Egypt’.

Each of the relevant policies are assessed using a weighted criteria matrix as shown in Table 5. Criteria against which the policies are judged are formulated and each criteria is assigned a certain weight to illustrate that not all criteria are equally important (step 3 and 4). Examples of criteria include costs, size of potential/likely impact, acceptance, the need for strong governance, the need for financial support, etc. A time criteria could also be added if relevant – for example how soon could a policy be implemented or how soon could a significant impact be expected. This criteria is important in a situation where Egypt is experiencing constraints on supply.

Then a rating scale for each criteria is established (step 5). This allows you to quantify very simply both complex quantitative characteristics but also qualitative characteristics so they become comparable.

The weights and the rating system must be determined prior to completing the score for each policy. In step 7 the total score for each policy is calculated and the policies ranked in order of relevance. Finally in step 8, the results are discussed. The results are not just taken at face value. There might be a good reason for including one or more of the lower scoring policies. And perhaps the discussions reveal that it is necessary to adjust some of the criteria, rates, or weights and carry out the exercise again.

Criteria	A	B	Z	Total score
Weight	5	1		
Rating scale	1 = High program costs per kWh saved 3 = Medium program costs per kWh saved 5 = Low program costs per kWh saved	...		
Policy 1	Rate = 3 => 3*5 = 15 points			
Policy 2				
...				

Table 5: Example of multi-criteria assessment table.

Policy portfolio compilation is a complex matter and is more easily handled using the described weighted criteria approach. The core of this approach is less about the math, but more about openly and jointly pinpointing what are the criteria against which options are assessed: Using this approach can help you see what you might have missed. It is the mutual insights gained through the discussions with stakeholders of different positions towards energy efficiency and different professional expertise that lead can lead to a stronger and more efficient policy portfolio.

If key stakeholders are involved in the assessment, then the work process can be organised as shown in Table 6.

Step	Examples	Work process
1	Discuss the changes that the policies are intended to bring about	Less exposure of industry to price increases
2	List potential policies liberally	(Rather list more than less)
3	Formulate criteria (step 3)	Cost to society; Acceptance; ...
4	Assign weights to each criterion (which key factors matter most)	Weight 1-3-5
5	Establish a rating scale for each criterion (step 5)	1=High cost 2=Medium cost 3=Low cost
6	Rate each policy against the criteria (Step 6)	Rate = 2
7	Multiply the scored rates by the weights and calculate total score for each option	Weight = 3 Rate = 2 Score = 3*2 = 6
8	Discuss the results	-

Table 6: Suggestion for how to organise the work process for policy assessment.

A great variety

A large variety of the level of detail and ways to present the results of multi-criteria assessments exist – spanning from “smileys” to complicated mathematical calculations. If the aim is to engage multiple stakeholders and seek consensus on a minimum of policies then experience shows that more detail and complexity is not necessarily better, on the contrary.

An example of a very simple version of a multi-criteria analysis is the one found in the report ‘International practice and experience analysed for application in Egypt’. The analysis results have since then been adjusted based on comments from the Egyptian consultants (see Table 7 below). The qualities of the different types of policy instruments, when considered as individual stand-alone instruments, were estimated. The starting point of the assessment was the challenges facing Egypt. No weights were applied and only a very simple rating scale (1-2-3). Without weights all the challenges are assigned the same importance – this would not be the case in reality. Please note that it is also assumed that the assessed policies are ideally designed and perfectly implemented although this might not be the case in reality.

Aspects and challenges		Tailored info – audits	Tailored info - EMS	General info	EEO	V/A	Taxes	Subsidies	Labelling	MEPS	TP
Energy resource strain	Potential energy efficiency improvement impact	3	3	1	3	2	2	2	1	2	1
	<i>Likely to achieve significant impact – also under the current energy price regime</i>	1	1	1	3	1	2	2	1	2	2
Economic and financial aspects	Potential result of total economy test	3	3	3	3	2	3	1	1	3	2
	Reduce the current and expected strain on companies due to energy price increases	3	3	1	2	2	1	3	1	1	1
	Low need for state financing	3	3	3	2	3	3	1	2	2	1
Urgency	Speedy approval and start-up policy instrument	3	3	3	1	1	1	2	2	1	1
	Speedy IEE target achievement (i.e. strong market driver)	1	2	1	3	2	2	2	1	2	2
Acceptance	Likely socio-political acceptance	3	2	3	1	1	1	3	3	1	1
Other	Ability to overcome lack of data for policy making and company decision making	3	3	3	1	2	1	1	2	1	1
	Ability to overcome lack of awareness and know-how	3	3	3	2	2	1	1	2	1	1
	Does not rely on strong regulatory capacity for policy enforcement	2	1	3	1	2	1	2	1	1	2
	<i>Ability to reach both large and small industries</i>	2	1	3	2	1	3	2	3	3	2
	Ability to overcome lack of persistency in EE efforts (stop-go)	2	3	1	3	3	3	1	2	2	2
TOTAL		32	31	29	27	24	24	23	22	22	19

Table 7: Qualitative rating of the relevance of different types of policy instruments as first generation policy in Egypt (draft). Scale: 1 to 3 (best). MEPS – Minimal energy performance standards; EEO – Energy efficiency obligation; VA – Voluntary agreements; TP – Technology procurement..

Scenario analysis

Scenario analysis is a useful tool for identifying future policy measures and actions which are required to transform an energy system and the energy demand in a sustainable direction. Scenario analysis can give an overview of the different possible actions to reach a set goal while also analysing the effect of policy instruments. Instead of only focusing on a single policy instrument, scenario analyses can provide an insight into the correlation between different policy instruments and offer a holistic approach to understanding the possible development paths to reach an agreed goal.

In general, working with projections and scenario analyses helps to frame thinking about the long-term. It is a tool to deal with uncertainty and to look at a range of possibilities, and can be used for strengthening the internal and external communication by creating a common point of reference. While the calculations behind the modelled scenarios can range from very complex to simpler versions, the aim is to simplify comparison. This will enable all stakeholders to understand the correlations and consequences of different policy portfolios.

Projections of energy consumption and production are an integrated part of developing an energy action plan. It gives an overview of the expected development, and highlight different opportunities, threats and points of action. Usually projections include factors that can be influenced and external factors that cannot be influenced.

Scenario types

Scenarios can best be described as stories about how the future might unfold. They are not predictions but plausible accounts of the situation may develop. Scenarios can be divided up into three types: Predictive scenarios, explorative scenarios and anticipative scenarios. Predictive scenarios show the predicted future, and aim at illustrating what future seems most likely given the continuation of current trends. Explorative scenarios show several plausible futures and can be used to discuss which futures are possible and how to prepare for sets of equally plausible futures. Anticipative scenarios are used to show the desirable future and how to get there.

Developing robust scenarios often require a good deal of resources, especially when it comes to explorative scenarios.

When developing projections you usually first establish a baseline where the development of chosen factors is projected to the chosen target year, following the principle of business-as-usual. Projection factors for the baseline statistics can be found in international and national statistics or action plans. The projection values are based on a number of assumptions such as expected fuel prices and economic growth, which it is relevant to be aware of as they might change during the action plan period. Local conditions and development factors might differ from the national average.

After developing a baseline it is possible to make projections towards a set target, e.g. x% lower energy intensity compared to the baseline, or to analyse the impact of different policies and policy mixes.

4 Policy design

The appropriate choice of policy design depends on various factors including the local context, available financing, the experience and capacity among key stakeholders (regulator, ESCO, end-users), and what other policy instruments are under considerations. Some of these topics were addressed in (Ea Energy Analyses and Aura, 2014). The report also discussed possible variations of typical IEE policy instruments. One point worth re-iterating is that a gradual increase in complexity over time is preferable when little experience and/or capacity exist to build on. Building small success stories can pave the way for large scale roll-out and later also greater degree of complexity.

A starting point

A good starting point for policy design can be a more detailed description of the EE problem/challenge to be addressed by a policy instrument as well as how the policy is expected to influence the situation can be a useful tools for gaining a clearer understanding of the crucial elements of a given policy. Such a “theory” will reveal the assumptions made. It will also provide a good basis for the following monitoring and evaluation of the effects and how the policy actually works and provide information for improving the theory and fine-tuning the policy instruments. For more on this topic see e.g. (Rogers, et al., 2000).

Non-energy benefits

Another useful exercise when designing policies can be to consider the EE seen from the end-user perspective and as a means to achieving something else such as higher productivity. If a policy can contribute to better business for the target group, i.e. the industrial companies, then the EE policy is more likely to get a positive response among the target group.

Again the differences between sizes and types of industries should be reflected in the design choices. An energy audit policy should for example take into account that in-depth audits might not be well suited for smaller industries while large industries may benefit more from energy management. And industrial branches with many similar companies might benefit from a concept specially designed to meet the interests and concerns of that particular branch.

A report recently published by the IEA on the multiple benefits of energy efficiency may serve as inspiration regarding the possible leverages for EE – see (IEA, 2014).

4.1 Recommendations for Egypt

Our recommendation regarding policy design are as follows:

- A sound understanding of the problem that the policy is intended to alleviate is key to a successful policy design.
- Carefully consider the need for policy complexity and chose the simplest construction.
- Energy management systems and energy audits can provide valuable formation for the design of future policies and target setting. Therefore the possibilities for data compilation should be considered when designing the policies for energy management systems and energy audits.
- Avoid setting performance targets measured in energy consumption per produced industrial product. Instead such indicators should only be used for benchmarking and reflection on possible reasons for differences in benchmark values. The benchmarking could for example be with other companies operating in the same branch (external benchmarking) or between different production sites of the same company or a specific production site over time (internal benchmarking).
- Get started! IEE instruments need to be adjusted and developed. It is important to get started. Even if part of the vision, strategy or roadmap is not in place, it can be productive to start learning.

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Abbreviations

EE – Energy efficiency

IEE – Industrial energy efficiency

RCREEE – Regional Center for Renewable Energy and Energy Efficiency