A brief on Saudi Arabia's Energy Efficiency Program (SEEP)

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The importance of energy efficiency for the Kingdom's economic and social development

The Kingdom has witnessed unprecedented economic and industrial development in the last decades, which has led to an increase in the Kingdom's domestic energy consumption. Based on the local energy consumption trends, forecasts indicate an increase in domestic energy consumption with a growth rate which could reach 4 per cent to 5 per cent annually until 2030. Although this growth in demand is partially attributed to the industrial growth and growing economic prosperity in the Kingdom, a rather significant portion of it results from the inefficient use of energy; deeming this accelerated growth unsustainable. Whereas the vast majority of countries have managed to lower the energy intensity of their economies, the Kingdom's energy intensity increased significantly over the last two decades. Hence, it is a strategic imperative for the Kingdom that energy efficiency becomes a major topic for all decisions related to an increase in demand for fuel and feedstock.

The Kingdom's demand-side energy efficiency journey

The first National Energy Efficiency Program (NEEP) was launched in 2003 as a three-year term temporary programme to improve the management and the efficiency of electricity generation and consumption in the Kingdom. This programme was ended in 2006.

To build on the experience gained from the previous programme and to sustain and unify energy efficiency efforts under one permanent roof, in 2007 the Ministry of Petroleum and Mineral Resources, supported by other government entities in the Kingdom, recommended the creation of a permanent national entity. As a result of this recommendation, the Saudi Energy Efficiency Center (SEEC) was established in 2010 by a Council of Ministers' decree. Since then, SEEC has been responsible for the demand-side energy efficiency effort in the Kingdom, with the mission to improve domestic energy consumption efficiency, and coordinate all related activities between governmental and non-governmental stakeholders. SEEC is temporarily under the King Abdulaziz City for Science & Technology (KACST) with a Board of Directors composed of more than 20 entities from ministries, government entities, and companies. The key objectives of SEEC are to:

- Develop a national energy efficiency programme;
- Propose energy efficiency policies and regulations, and monitor their implementation;
- Promote awareness;
- Participate, as needed, in the implementation of pilot projects.

In 2012, SEEC launched the Saudi Energy Efficiency Program (SEEP – called hereafter 'the Program') with the objectives of improving the Kingdom's energy efficiency by designing and implementing initiatives and their enablers.

A sub-committee was established by SEEC's Board, chaired by the Ministry of Petroleum and Mineral Resources and composed of members from all related government entities, to establish the Program. The sub-committee focused the Program's scope of work on three main sectors (buildings, transportation, and industry) representing more than 90 per cent of the Kingdom's energy consumption, and five enablers (regulations, Energy Services Companies, funding, governance, and awareness). The sub-committee also ensured that the Program followed a set of guiding principles:

- The Program is limited to energy demand-side management only;
- The Program does not include price reforms;
- The Program designs energy efficiency initiatives based on the effects on the end-users (to ensure reasonable payback periods);
- The Program designs the initiatives in consensus with the stakeholders, including the private sector if necessary.

Since its inception, the Program has been a consensus-based inter-governmental effort involving all government, semi-government, and private stakeholders through weekly working sessions, workshops, and detailed technical research and studies. In addition, partnerships and collaboration were established with foreign government entities and experts to benefit from their experience (for example best practice exchange, data sharing).

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Approximately 120+ professionals from 20+ entities have been mobilized to work directly on the Program while hundreds of government employees have been working on implementing

the energy efficiency initiatives. The Program is organized in specialized work-streams by sectors and enablers; the technical teams have used the same fact-based bottom-up approach to define the strategy, the initiatives, the enablers, and their implementation plan. The approach has been as follows:

Step 1 – Energy demand analysis consisting of:

- Data collection and analysis of energy demand by end-use sectors in the Kingdom;
- Identification of key energy consumption drivers for each sector;
- Prioritization of sectors and drivers.

Step 2 – Establishment of technical teams and mobilization of stakeholders consisting of:

- Identification of government, semi-government, and private sector stakeholders for each sector;
- Creation of technical team for each sector with stakeholders' representatives and technical experts;
- Liaison with international organizations and experts, and establishment of partnerships.

Step 3 – Design and planning of initiatives and enablers consisting of:

- Benchmarking of energy efficiency initiatives globally and assessment of applicability in the Kingdom;
- Proposal of energy efficiency initiatives to the sub-committee (monthly meetings);
- Selection of energy efficiency initiatives by the sub-committee;
- Design and implementation plan detailing for selected energy efficiency initiatives.

Step 4 – Implementation of energy efficiency initiatives and enablers consisting of:

- Ensuring that enablers are in place: (i) budget and manpower for government entities, (ii) private sector infrastructure (e.g. testing labs, ESCOs), (iii) regulations & standards;
- Handing over of energy efficiency initiatives to the relevant entities for implementation;
- Monitoring of implementation and evaluation of impact on energy consumption / efficiency.

The energy efficiency initiatives are implemented by the various entities in accordance with their jurisdiction and mandate. The Program may provide temporary support to launch and monitor the implementation of the initiatives until the entities have been enabled through allocation of new resources.

The Program is being monitored by the Review & Coordination Team (RCT) to ensure adherence to the initiatives' objectives and their timeline commitments. In addition, the RCT coordinates and identifies interdependencies amongst the Program's teams and the various government entities implementing the energy efficiency initiatives.

Developments in the buildings sector

The Program has focused its initial efforts on increasing the minimum energy performance standards (MEPS) for air conditioners (ACs), lighting products, various other home appliances (such as washing machines and driers), and on enforcing thermal insulation in new buildings. In addition, efforts have been initiated with the National Committee of the Saudi Building Code to enhance and revise measures and enforcement mechanisms related to energy efficiency in new buildings. Existing public buildings will be retrofitted to increase their energy efficiency, whereas households in residential buildings will be incentivized through financial schemes to replace existing inefficient products with efficient ones.

Developments in the industrial sector

The Program has been focused on the petrochemical, cement, and steel industries, representing roughly 80 per cent of industrial energy consumption.

Existing plants (in those sectors) are to be given aspirational energy intensity

ACs example: Cooling of buildings roughly accounts for half of the electricity consumed in the Kingdom. Yet at the outset of the Program, the MEPS for ACs were low and inadequately enforced. The Saudi Standards Metrology & Quality Organization (SASO) and the Program worked with ASHRAE, AHRI, and the AC industry (manufacturers, importers, and distributors) to increase MEPS in line with international best practices. Subsequently, all stakeholders, such as the Ministry of Commerce & Industry (MoCI) and Saudi Customs, jointly revamped the AC product control mechanism to enforce a high level of compliance with the new MEPS. Local and international testing laboratories were also engaged to ensure the readiness of the testing/inspection/certification (TIC) infrastructure in the Kingdom. Split AC MEPS were raised on 7 September 2013 to 9.5 Energy Efficiency Rating (from 7.5) with an additional increase to 11.5 EER in 2015, yielding a 30–35 per cent electricity saving for cooling compared to the business-as-usual scenario. To date, around 50 AC suppliers have declared more than 800,000 non-compliant AC units to be re-exported, dismantled for spare parts, or revamped to meet new MEPS.

(EI) levels based on international benchmark average performance, to be achieved within a specific timeframe. A consensus is being built with the industry players to ensure that these levels are not jeopardizing their competitiveness. In addition, the Program is putting in place tools to support the industry in achieving these levels.

New plants will have to be designed and built to meet international energy efficient standards in order to obtain the various licences and permits required to operate in the Kingdom.

MEPS for electrical motors have been increased and the Program will follow suit with other common industrial equipment (such as boilers).

Developments in the land transportation sector

Land transportation accounts for over 90 per cent of the energy consumption of the transportation sector in the Kingdom. The Program has focused most of its initial efforts on light duty vehicles (LDVs) with two goals in mind: enhance the fuel economy of incoming vehicles and reduce the fuel consumption of on-the-road vehicles.

As for new incoming LDVs, a label reporting the fuel economy of the vehicle will be mandatory starting in August 2014. In addition, automotive manufacturers are to comply with the Kingdom's new fleet average fuel economy standard for incoming LDVs, starting in the second half of 2015 or early 2016.

For the on-the-road fleet of LDVs, the Program is assessing the opportunity to incentivize owners to replace their old inefficient vehicles with new efficient ones. In addition, the Program is collaborating with multiple government agencies to establish temporary mass transport solutions until the planned public transportation projects are completed.

Heavy duty vehicles (HDVs) have not been overlooked, since they account for a significant share of the energy consumption. Multiple HDV initiatives are currently under analysis including: anti-idling regulations, aerodynamic additives, and retirement programmes for old vehicles.

Both LDVs and HDVs are to be subject to rolling resistance and wet grip requirements for tyres starting November 2015 and November 2016 respectively.

Enablers

The Program has been collaborating with the various government entities involved in urban planning decisions to ensure that energy efficiency requirements are included in their guidelines.

The Program has placed special attention on product control mechanisms and enforcement (Testing, Inspection, and Certification) to ensure a high level of compliance with the new regulations and standards.

The development of awareness campaigns by the Program has been synchronized with changes to the regulations and standards, in order to provide the general public with the rationale for those changes. For example, an unprecedented AC awareness campaign is set to be launched before the summer in full collaboration with the AC industry, which will be contributing financially with its Corporate Social Responsibility (CSR) programmes.

The Program has worked with the Ministry of Finance to establish a mechanism with quantitative criteria for selecting initiatives with financial incentives. Those potential energy efficiency initiatives would be focused on incentivizing households to accelerate the retirement of their inefficient assets (such as AC, lighting products, and cars).

The Program has been devising strategies to support the development of Energy Services Companies in the Kingdom. These include the establishment of an accreditation system, a measurement and verification protocol, and standard energy services performance contracts. In addition, the ambitious government buildings retrofitting lead-by-example initiative will create strong demand for their services.

'COOLING OF BUILDINGS ROUGHLY ACCOUNTS FOR HALF OF THE ELECTRICITY CONSUMED IN THE KINGDOM.'

The government intends to have a Saudi Energy Efficiency Law and it has been working with an international law firm and the legal representatives from the stakeholder government entities to draft it.

Lessons learnt by the Program through the challenges faced

A number of important lessons were learned during the development of the Program:

1. *Technical expertise and approach:* The team should use a fact-based systematic methodological approach in the design and implementation of the Program to avoid conflicts of opinions and give confidence to the stakeholders that decisions are rational and unbiased.
2. *Stakeholder engagement:* The team should engage with the government and private sector stakeholders from the inception of the Program to ensure practical initiative design and buy-in for smooth implementation.
3. *Leadership commitment:* The team should have the continuous support

of the highest level of the government, to alleviate the hurdles which are bound to present themselves for the Program, as the interest of the Kingdom might conflict with the status quo.

4. *Coordinated enforcement:* Enforcement of the regulations and standards ought to be optimized by developing a unified enforcement approach and coordinating the various government entities' enforcement efforts, in order to ensure high levels of compliance.