Saudi Energy Efficiency Center

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Presentation Outline

• Background
  – Necessity and potential for EE
  – EE Journey in KSA

• Establishment of SEEC
  – SEEC Setup
  – Mission & Objectives
  – Sample of activities

• Saudi Energy Efficiency Program; SEEP
  – Start, Scope and Setup
  – Working principles
  – Samples of achievements
- EI showing an increasing trend since 1985
- EI in KSA has shown an overall growth ~ 50%
- EI ~ twice the world average in 2010
Electricity consumption per capita is three times the world average.
Energy Efficiency in Buildings

Insulation in Saudi residential buildings

- Insulated
- Not insulated

A/C energy efficiency rating

- Minimum current EER standard
- Market average EER

Lighting electricity consumption (kWh/m2 p.a.)

- Saudi Arabia: 16.4 kWh/m2 p.a.
Energy Intensity in the Transportation Sector

Gasoline & diesel for road transport use were 92% of total transport fuel consumption in 2010.

Source: Saudi Aramco
KSA Energy Efficiency journey started almost a decade ago, and lead to the creation of SEEC and the start of the EEP.

- **2003**: Launch of a national effort (NEEP) to enhance demand-side energy efficiency (focused on electricity) in collaboration with public and state-owned enterprises.

- **2007 - 10**: Initiative by the Ministry of Petroleum to transfer the National Energy Efficiency Program to a permanent entity: the Saudi Energy Efficiency Center, established in October 2010 by the Council of Minister.

- **2012**: Inter-agency effort to launch the Energy Efficiency Program (EEP).
Established by the council of ministers decision 363 dated (24/11/1431; 31 October 2010) that mandated the transfer of NEEP to a Permanent National Center for Energy Efficiency named: Saudi Energy Efficiency Center.

– Temporary within KACST’s and report directory to KACST’s president.
– SEEC is Supervised by a committee composed of representatives from related stakeholders.
SEEC’s Management Committee

- Chairman; KACST’s President

Ministries:
- Petroleum & Minerals
- Water and Electricity
- Municipality and Rural Affairs
- Commerce and Industry
- Transportation
- Culture and Information
- Housing
- Finance

Other governmental entities:
- Presidency of Meteorology and Environment
- King Abdullah City for Atomic and Renewable Energy
- Saudi Standards, Metrology and Quality Organization
- Electricity & Co-Generation Regularity Authority
- Saline Water Conversion Corporation
- Designated National Authority

Companies and Private Sector:
- Saudi Aramco
- Saudi Electricity Company
- SABIC
- Two representatives from the private sector
SEEC’s Mission

Support preserving the national energy resources to enhance the national development and economy through the rationalization of energy consumption and improving energy efficiency in order to achieve the lowest possible levels of energy intensity.
SEEC’s main activities include:
✓ Development of National Energy Efficiency Program.
✓ Support the integration of the stakeholders’ efforts to improve EE and coordination amongst them.
✓ Promote EE awareness at both public and institutional levels.
✓ Support building capacity in EE.
✓ Participate, as needed, in the implementation of EE pilot projects.
Energy Flow in KSA

- Saudi Aramco
  - Industrial: 51%
  - Transportation: 21%
  - Other: 5%
  - 8%

- Utilities: 6%
- Residential: 53%
- Governmental: 12%
- Commercial: 11%

- Industrial Energy Use: 15%
- Non-Industrial Energy Use: 8%
SEEP’s Objectives and Scope

- Improve Kingdom’s energy efficiency (EE)
- Set EE goals by sub-sectors to be revisited regularly
- Design the EE initiatives and their enablers
- Involve key stakeholders: Government, businesses, and public

SEEP Objectives

- Focus on demand side only for 3 sectors: Buildings, transport, and industry
- 3 sectors covered represent ~ 90% of the Kingdom’s internal energy consumption

SEEP Scope
SEEP Developments’ Principles

Developing phase:
✓ Technical developing teams composed from all related organizations and lead by the most relevant.
✓ Secure consensus and agreement of all stakeholders (including private sector).
✓ SEEP has to enable all related organizations to achieve the EE goals.

Implementation phase:
✓ Have an updating mechanism.
✓ Preserve the mandates of each governmental organization and ensure their accountability.
✓ SEEC will coordinate, monitor and support.
SEEP has mobilized approximately 70+ engineers/specialist from 20+ organizations
The Saudi EE Program framework is organized around 3 sectors and 5 enablers:

**Sectors**
- Buildings
- Transport
- Industry

**Enablers to implement initiatives**
- Regulations (specific to initiatives)
- ESCO’s (Energy Service Companies)
- Funding
- Governance
- Awareness

**EE savings**

6 EE sub-sectors with EE savings goals

**Initiatives to achieve the EE savings goals**

New buildings | Existing buildings | New fleet | Existing fleet | New plants | Existing plants
---|---|---|---|---|---
Initiatives | Initiatives | Initiatives | Initiatives | Initiatives | Initiatives

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The center is a part of the Saudi Energy Efficiency Center.
Guiding principles for designing SEEP

1. Purely focused on demand-side management

2. Program design should not include price reform

3. Initiatives to be designed based on end-user impact (e.g. payback period)

4. Consensus driven Energy Efficiency initiatives e.g. baseline and savings goals by consensus
Buildings: EE effort focused on A/C, insulation, white goods, lighting and the Saudi Building Code

Air conditioners
- Very low efficiency standards
- Lack of enforcement mechanism

Insulation
- No efficiency standards
- No enforcement mechanism

Lighting
- No efficiency standards
- No enforcement mechanism

Saudi Building Code EE section (601)
- Complex
- Long
- Outdated
- Not enforced
Validated buildings baseline

- Buildings consumed ~80% of the total electricity consumption
- A/C consumed ~70% of building electricity consumption (equal to ~50% of total electricity consumption)

Finalized high impact EE initiatives

- Standard / regulation updated, and EER\(^{(1)}\) MEPS\(^{(2)}\) ramp-up plan is issued
- Mandate insulation for new buildings

Validated high impact EE initiatives on insulation & SBC\(^{(3)}\) 601

- Signed memorandums of understanding between SEEC and five entities to ensure application of EE guidelines
- Engaged ASHRAE to develop insulation standard and regulation, and initiated product control process development

# Transportation EE for new and on-the-road LDVs and HDVs

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<tr>
<th>Light-Duty Vehicles</th>
<th>Heavy-Duty Vehicles</th>
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<tr>
<td>On-the-road</td>
<td>On-the-road</td>
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<td>New</td>
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- Lack of transportation alternatives (buses, passenger trains, freight railways, etc.)
- Lack of penalization / incentivisation system
- Lack of standards & labeling
- Significantly large old on-the-road fleet
Transportation: Samples of Initiatives

Validated baseline and developed global benchmarks

- Developed analysis for new incoming LDVs and on-the-road LDVs fleet
- Developed comprehensive understanding of LDVs/HDVs initiatives implemented globally

Mandated Fuel Economy reporting for LDVs

- SASO requested mandatory FE reporting on Model Certificate of Conformity from GSO (expected for 2015 model year)

Developed Fuel Economy labeling for LDVs

- Finalized the development of the LDVs fuel economy label

Defined rolling-resistance standard for tires

- Drafted preliminary proposal
- Organized workshop with tire manufacturers to share proposed standard and receive input
Industry: EE for Cement, Steel, Petrochemical sub-sectors and industrial equipment

- No energy efficiency targets for existing plants
- No energy efficiency requirements for new plants approval process
- No established baseline for production output and energy consumption

Industrial equipment

- No energy efficiency standards (MEPS)
- No labeling
- No mapping of imports and local manufacturers
Industry: Samples of Initiatives

- Energy efficiency targets for new and existing plants
  - Defined and validated for cement
  - Currently being finalized for steel and petrochemical

- Plant visits and mapping completed
- Baseline, production and consumption data collected (under validation)

- Enforcement mechanism for new plants completed

- Benchmarking of international policies and standards completed
- Baseline process started with customs and main industrial players
The other five technical teams have shown similar progress.

Engagement of all stakeholders was ensured through face-to-face meetings, technical workshops…

Best practices and international experiences have been an important element for SEEP’s development.
Conclusions

• Energy intensity of the Kingdom has grown significantly over the last 25 years.

• SEEC has been tasked to reduce Saudi Arabia’s energy consumption and improve its energy efficiency capitalizing on its strongest asset “the integrated inter-agency cooperation”.

• SEEC is developing EEP, a necessary and ambitious program where all stakeholders partake in the making and delivery.
THANK YOU