A holistic approach to Energy Efficiency Improvement; Initiatives and Emerging Challenges

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Agenda

Part-1 by Waneya Al Ktebi
• Energy Policy
• Holistic Approach
• Existing Assets
• Future Assets
• Knowledge-based Development
• Motivation and Reward

Part-2 by Saqib Sajjad
• Emerging Challenges
GASCO ENERGY POLICY

GASCO recognizes its strategic role in the hydrocarbon value chain and is committed to use energy resources responsibly and continually improve energy efficiency in its operations. GASCO aims to achieve the above by adopting the following principles:

- Review the energy strategy regularly to sustain continual energy performance improvement.
- Pursue energy efficiency improvement and emission reduction initiatives.
- Ensure compliance with the ADNOC Code of Practices and other applicable legal requirements.
- Implement and sustain Energy Management System in existing and new facilities.
- Ensure the availability of information and necessary resources to achieve the energy objectives and targets.
- Pursue purchase of energy efficient & sustainable products and services.
- Ensure energy efficiency improvement throughout the projects lifecycle.
- Promote application of viable Best Available Techniques (BAT) in new and existing facilities.
- Benchmark energy performance within ADNOC group of companies and other similar industries.
- Promote the use of renewable energy and application of Green Building.
- Enhance awareness on energy conservation & efficiency and foster a culture of knowledge sharing.

Abdul Aziz A. Al Ameri
Chief Executive Officer

May 2018

تعزيز جاسكو للطاقة

تدعو شركة جاسكو إلى الاستثمار في منتجات الطاقة المستدامة وتتبناها باستقلالها المشتركة من أجل تحقيق التحسين المستمر في استخدام الطاقة وتحسين المستقلة لكفاءة استخدامها.

تعزز جاسكو لتحقيق هذه الأهداف من خلال ما يلي:

- إجراء استراتيجيات الطاقة بنظام من أجل مواصلة التحسين المستمر في استخدام الطاقة وتحسين كفاءتها.
- أخذ مبادرات تحسين كفاءة الطاقة وتخفيض الأبعاد.
- ضمان الامتثال للقواعد واللوائح المؤهلة من أجل توفير النقل والخدمات والعملاء الآخرين.
- تطوير وتنفيذ نظام إدارة الاطاقة بالمرافق القائمة والجديدة.
- ضمان توفير التعليمات والتدريبات اللازمة لتحسين كفاءة الطاقة.
- اعتماد المنتجات والخدمات المتطورة والطاقات المستدامة في استخدام الطاقة.
- جمع مساعدة استخدام الطاقة طوال فترة حياة المشروع.
- تعزيز تطبيق أفضل التكنولوجيا القائمة والجديدة في المرافق القائمة والجديدة.
- ممارسة ا adolescente استخدام الطاقة مع شرائح مجموعة أو أكثر وخلايا من الأسواق المختلفة.
- تطوير استخدام الطاقة المتجددة وتطبيق مصادر الطاقة الأخرى.
- تعزيز الوعي بالمخاطر على الطاقة وتشجيع كفاءة تبادل المخاطر.

Abdul Aziz A. Al Ameri
Chief Executive Officer

May 2018

لة شركة جاسكو للطاقة (جاسكو) عام 1978

وهي شركة تابعة للشركة السعودية للغاز والبترول

Abu Dhabi Gas Industries Limited (GASCO) was incorporated in 1978

as the operating company in Abu Dhabi responsible for processing associate and non-associate gas from oil production.
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Energy Strategy
Emission Reduction
Initiatives
Energy Management System
Existing and New Facilities
Energy Objectives and Targets
Projects Lifecycle
Best Available Techniques
Energy Performance Benchmarking
Renewable Energy
Green Buildings
Awareness
Knowledge Sharing
Holistic Approach

Motivation and Reward

Existing Assets

Knowledge Base Development

Energy Policy

Future Assets
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**Existing Assets**
- Energy Management System (ISO-50001)
- All GASCO Plants ISO-50001 Certified since December 2012
- Yearly EnMS Sustainability Plan
- Comprehensive Energy Audits and Studies
- Advanced Process Controls (APC) and Real Time Optimizers (RTO)
- Energy Performance Monitoring and Reporting

**Future Assets**
- Energy Efficiency in Projects Lifecycle
- GASCO Project Energy Optimization Framework (PEO)
- Energy Review Workshops and Energy Reports
- Centralized Power Generation and Drives Electrification
- Energy Performance Benchmarking
- Green Buildings (LEED and Estidama Certification)
- Contractors Energy Performance
Initiatives

- Energy Competencies Framework
- EnMS and Energy Conservation Awareness & Training
- Certified Energy Courses (ISO, LEED, CEM)
- GASCO Energy Award since 2008
- More than 15,000 Billion BTU Cumulative Energy Savings
Emerging Challenges

How much can we improve further? And how soon?

- Energy Performance Pathway
- Mature Energy Pathway

Superior Energy Performance

Energy Performance Pathway

Mature Energy Pathway

Timeline

Energy Performance Improvement

Quick Improvement

Sluggish Improvement

Maturity

- Energy Data, Monitoring and Measurement
- Significant Energy Uses
- Energy Supply
- Management of Energy Projects
- System Sustainability
- Energy Performance Improvement
- Innovation for Energy Performance
Emerging Challenges

Normalization and Dynamic Baseline

- **Dynamic Baseline** is a useful tool for energy performance monitoring by normalizing the baseline to the prevailing set of conditions of variables.

- Regression analysis based on **Statistical Models** and **Thermodynamic Models** (or combination) are required to normalize baseline using the variables affecting energy performance.

- Complex Systems with Multi-variables.
Emerging Challenges

Data Management and Analysis

- Extensive data with complex monitoring and reporting needs
  - Standardization
  - Unified Report
  - Dashboard
- Spreadsheet based monitoring becomes inefficient and impractical
- Energy Optimization
  - No distinctive boundary from spreadsheet based open-loop system to Real-Time Optimizer
- Analysis requirements (Analytical tool)
  - Software solutions / applications
  - Integration
Emerging Challenges

CAPITAL

- Low hanging fruits have become nonexistent
- Further improvement is CAPEX intensive
- Cost optimization measures and budget constraints
- “Nice-to-have” versus “Return on Investment (ROI)”
- Policy driven initiatives?
- Changes in Fuel and Power Tariffs
- Electricity Price - Solar PV
  - Firm Evaluation
  - Prioritization
  - Pilot or proof-of-concept
  - Policy driven initiatives

\[\text{Solar PV Bids (2013-2016)}\]

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{Country} & \text{2013} & \text{2014} & \text{Jan-2015} & \text{2015} & \text{2016} & \text{2016} & \text{2016} \\
\hline
\text{USA} & 8.50 & 7.10 & 5.84 & 5.71 & 4.90 & 4.85 & 4.50 \\
\text{UAE} & 3.70 & 3.60 & 2.99 & 2.91 & 2.42 \\
\text{Mexico} & 3.70 & 3.60 & 2.99 & 2.91 & 2.42 \\
\end{array}
\]

Electricity Price, cents / kWh

- $583 billion upstream oil & gas investment in 2015
- 25% less than 2014
- mainly a result of cost reductions triggered by lower oil prices
- Further 24% drop expected in 2016

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Thank you