Final Report

Saadat Ali

Development Consultant

[Saadat9@outlook.com](mailto:Saadat9@outlook.com)

s

December 2015

Outcome Evaluation

Enhanced Policies and Strategies for Sustainable Use OF NATURAL Resources and Environment

Preface

*This outcome evaluation of Country Programme Outcome II “Enhanced Policies and Strategies for Sustainable Use of Natural Resources and Environment” sets out findings, recommendations and lessons learnt for UNDP.*

*The report has been prepared in compliance with the Terms of Reference for Outcome Evaluation. The conclusions and recommendations set out in the report are solely those of the evaluator and are not binding on UNDP.*

*The author would like to thank all stakeholders who assisted in the outcome evaluation of Country Programme Outcome II, UNDP KSA, Ministry of Water and Electricity, Saudi Energy Efficiency Centre, and Royal Commission for Yanbu.*

Executive Summary

Introduction

The Kingdom of Saudi Arabia (KSA) UNDP Country Programme relating to outcome II: Enhanced Policies and Strategies for Sustainable Use of Natural Resources and the Environment is being implemented since 2012 as per the Country Programme Document (CPD).

The UNDP Country Programme Outcome II addresses two main areas i.e. Energy and Water Resources Conservation for sustainable use of Natural Resources and the environment in KSA.

The outcome II will result in stronger policy incentives for shifting to less energy intensive growth at national and local levels and launch of national water policies and enhanced conservation measures.

The outputs and initiatives that have contributed to the CPD outcome II are mainly contained within the following two projects:

* National Energy and Efficiency Programme (NEEP) Phase II
* Capacity development for sustainable development and management of water resources in the Kingdom of Saudi Arabia.

There was a limited technical assistance programme of ‘Evaluation of Sustainability in Madinat Yanbu Al-Sinaiyah (MAYS)’ that also contributed towards the outcome.

The UNDP has implemented three projects in partnership with Ministry of Water and Electricity, Saudi Energy Efficiency Centre and the Royal Commission of Yanbu.

Findings

The cultivation of wheat and fodder crops as well as increase in tariff for commercial and industrial users would gradually decrease use of non-renewable ground water in KSA. The assessment of outputs of capacity development for sustainable development and management of water resources in the Kingdom of Saudi Arabia towards outcome II is **Moderately Satisfactory**.

The energy efficiency in household appliances, transport and industrial is being achieved whereas decree is yet to be issued for Energy Efficiency Law and Energy Conservation Strategy, the overall assessment of outputs of National Energy Efficiency Programme II towards outcome II is **Satisfactory**.

The energy efficiency and water efficiency measures adopted by RCY will facilitate the overall realization of outcome II and they acknowledge that they received exposure to the world through UNDP and greatly benefited from the input provided, the assessment of outputs of sustainability in Madinat Yanbu Al-Sinaiyah (MAYS towards outcome II is ‘**Highly Satisfactory’**.

The outputs were highly relevant in meeting the objectives of enhanced policies and strategies for use of natural resource management and the environment to the successful implementation of energy efficiency of household appliances, transport and industrial sectors as well as capacity development of MOWE and approval of National Water Strategy which will lead to sustainable use of water resources and reduce the water consumption of industrial and agriculture sectors and its relevance is rated as **Relevant.**

The finalisation of Energy Efficiency Law and Energy Conservation Strategy and their subsequent approval by the Government of KSA, as well as implementation of National Water Strategy, enforcement of KSA Water Regulation and Policy Coordination and operationalization of IWIS will take time but nevertheless progress towards its achievement is considerable and so its sustainability is rated as **Moderately likely**.

Recommendations

Saudia Arabia has started conserving water in agriculture sector and there is an increase in tariff for commercial and industrial water users. However, there is a need to identify new sources of water, maximizing treated wastewater reuse, maximizing water conservation, minimizing water loss in the water supply transmission and distribution network pipelines, expansion of solar powered desalination plants with appropriate environmental management, and maximizing rain water harvesting.

The corrective action for capacity development for sustainable development and management of water resources in the kingdom of Saudi Arabia project are as follows:

* Support to timely completion of IWIS,
* Conduct awareness seminars for all data providers to IWIS, Establishment of necessary protocols to check the reliability and accuracy of data provided by different stakeholders to IWIS and Check reliability and accuracy of data entered into IWIS,
* Importance of timely establishment of National Water Regulatory Authority,
* Conduct field testing of Ground Water Hydrological Modules,
* Placement of all intended and additional international experts,
* Involvement of Ministry of Agriculture in the implementation of the project,
* To conduct annual review of the project, and
* To extend the project duration by two years.

The National Energy and Efficiency Programme (NEEP) Phase II project’s duration be extended by one year and terminal evaluation of the project should be conducted.

## The corrective actions for future UNDP projects are to support establishment of Kingdom of Saudi Arabia - Environmental Information Management System for strengthening institutional mechanisms for Integrated Environmental Management; support to Climate Change’s Adaptaion and Mitigation projects in water and wastewater management, integrated water management planning and reduction in desertification.

The outcome evaluation has discovered that most of the key outputs of outcome II are in place. The Energy Efficiency Law and National Energy Conservation will be approved by end of 2016 while the National Water Strategy and KSA Water Regulation and Policy Coordination have been approved.

The overall progress of outcome Indicators is positive and it is anticipated they shall be achieved within their extended timelines.

Table of Contents

[1 Introduction 8](#_Toc438728185)

[1.1 Introduction 8](#_Toc438728186)

[1.2 Objective of the Outcome Evaluation 8](#_Toc438728187)

[1.3 Scope of the outcome evaluation 8](#_Toc438728188)

[1.4 Methodology of the Outcome Evaluation 8](#_Toc438728189)

[1.4.1 Desk Review of Project Documentation 8](#_Toc438728190)

[1.4.2 Planning for consultative meetings with the stakeholders 9](#_Toc438728191)

[1.4.3 Interviews with Key Stakeholders 9](#_Toc438728192)

[1.4.4 Data Compilation and Analysis 9](#_Toc438728193)

[1.4.5 Application of findings 9](#_Toc438728194)

[1.4.6 Dissemination of Evaluation Report 10](#_Toc438728195)

[1.5 Limitation of Evaluation 10](#_Toc438728196)

[1.6 Structure of the Outcome Evaluation Report 10](#_Toc438728197)

[2 The Development Context of Outcome II 11](#_Toc438728198)

[2.1 Background of Outcome II 11](#_Toc438728199)

[2.2 Development Context of Outcome II 12](#_Toc438728200)

[2.3 Problems to be addressed by the Outcome II 12](#_Toc438728201)

[2.4 The main outputs and initiatives expected to have contributed to the Outcome II 13](#_Toc438728202)

[2.5 Key Partners and stakeholders and their contribution 13](#_Toc438728203)

[3 Findings and Conclusions 15](#_Toc438728204)

[3.1 Introduction 15](#_Toc438728205)

[3.2 Status of the outcome 15](#_Toc438728206)

[3.2.1 Capacity development for sustainable development and management of water resources in the Kingdom of Saudi Arabia 16](#_Toc438728207)

[3.2.2 Sustainability in Madinat Yanbu Al-Sinaiyah (MAYS) 22](#_Toc438728208)

[3.3 Factors affecting the outcome 23](#_Toc438728209)

[3.4 UNDP contributions to outcome through outputs 25](#_Toc438728210)

[3.5 UNDP Partnership Strategy 28](#_Toc438728211)

[3.6 Relevance 29](#_Toc438728212)

[3.7 Impact 30](#_Toc438728213)

[3.8 Effectiveness and Efficiency 31](#_Toc438728214)

[3.9 Sustainability 31](#_Toc438728215)

[3.10 South-South Cooperation 32](#_Toc438728216)

[3.11 UNDP Exit Strategy 33](#_Toc438728217)

[4 Recommendations 34](#_Toc438728218)

[4.1 General recommendations 34](#_Toc438728219)

[4.2 Corrective Actions for ongoing projects 34](#_Toc438728220)

[4.3 Corrective Actions for Future UNDP Projects 35](#_Toc438728221)

[5 Lessons Learnt 37](#_Toc438728222)

[A: Terms of Reference 38](#_Toc438728223)

[B: List of documents Reviewed 40](#_Toc438728224)

[C: List of Persons Interviewed 41](#_Toc438728225)

[E: Results framework for the projects implemented Under Outcome II: Enhance Polices and Strategies for Sustainable Use of Natural Resources and the Environment 42](#_Toc438728226)

List of Tables

[Table 2.1: Details of projects contributing to the Outcome II 13](#_Toc438728243)

[Table 3.1: Consumption and Sources of Water in KSA for the period 2007-2014 17](#_Toc438728244)

[Table 3.2: Wheat Production in Saudi Arabia 20](#_Toc438728245)

[Table 3.3: A brief on BRESL Project 32](#_Toc438728246)

List of Figures

[Figure 3.1: Average water consumption in KSA from 2007 to 2012 in BCM 17](#_Toc438728261)

[Figure 3.2: Water Consumers in KSA from 2007 to 2012 in BCM 18](#_Toc438728262)

[Figure 3.3: Water sources in KSA from 2007 to 2012 in BCM 18](#_Toc438728263)

[Figure 3.4: Water Sources in KSA from 2007 to 2012 in BCM 19](#_Toc438728264)

[Figure 3.5: Irrigation water requirements for 1 ha of land for different types of crops in KSA 19](#_Toc438728265)

Abbreviations

|  |  |
| --- | --- |
| **BCM** | Billion Cubic Meter |
| **BTU**  **NDP** | British Thermal Units  National Development Plan |
| **KSA** | Kingdom of Saudi Arabia |
| **EE** | Energy Efficient |
| **EEIS** | Energy Efficiency Information System |
| **GEF** | Global Environment Facility |
| **GHG** | Greenhouse Gases |
| **MDG** | Millennium Development Goal |
| **MOWE** | Ministry of Water & Electricity |
| **UNDP** | United Nations Development Programme |
| **HDI** | Human Development Index |
| **NDP** | National Development Plan |
| **KACST** | King Abdul Aziz City for Science and Technology |
| **NEEP II** | National Energy and Efficiency Programme II |
| **MYAS** | Madinat Yanbu AL Sinaiyah |
| **ToT** | Training of Trainers |
| **GDP** | Gross Domestic Product |
| **LEED** | Leadership in Energy and environmental Design |
| **IWIS** | Integrated Water Information System |
| **RCY** | Royal Commission of Yanbu |
| **CPD** | Country Programme Document |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **GDP** | Gross Domestic Product |
| **Ha** | Hectare |
| **NGO** | Non-Governmental Organisation |

# Introduction

## Introduction

The Kingdom of Saudi Arabia (KSA) Country Programme relating to outcome II: Enhanced Policies and Strategies for Sustainable Use of Natural Resources and the Environment is being implemented since 2012.

In accordance with the Evaluation plan of the UNDP County Office, an outcome evaluation was scheduled to be conducted at the end of 2015 to evaluate progress made towards the outcome II. In this context, UNDP Saudi Arabia is seeking to evaluate the contribution of its projects to the achievement of the outcome.

## Objective of the Outcome Evaluation

The objective of the outcome evaluation is to assess the outputs of UNDP Country Programme outcome II: “Enhanced Policies and Strategies for Sustainable Use of Natural Resources and the Environment”, including an assessment of sustainability of achievements, relevance and impact, efficiency and effectiveness, UNDP exit strategies, South-South cooperation and innovation.

The evaluation of this outcome was strategically placed at this particular time in order to promote needed adjustments, identify lessons learnt and draw up a sustainability plan for the continuing projects and feed lessons learnt and recommendations into future cycles.

## Scope of the outcome evaluation

The outcome evaluation includes four standard categories of analysis i.e. an assessment of progress towards the outcome, an assessment of the factors affecting the outcome, an assessment of key UNDP contributions to outcome through outputs and an assessment of the partnership strategy used.

The findings and conclusions of the evaluation report will reflect the scope presented in the Terms of Reference. A copy of the Terms of Reference has been provided in Annexure A.

## Methodology of the Outcome Evaluation

The outcome evaluation was undertaken through a combination of desk study of three project documents that have contributed to the outcome along with conducting meetings with the stakeholders.

The Results Framework of outputs has formed the basis for the outcome evaluation. Therefore, an assessment of all three project activities, baseline and output indicators as well as expected outputs were carried out towards Outcome II. The recommendations provided are based on the findings from this evaluation.

### Desk Review of Project Documentation

A desk review of project documentation was undertaken including:

* Country Programme Document for Saudi Arabia (2012-2016)
* Project documents.
* Project’s progress reports.

The complete list of documents reviewed during the outcome evaluation have been provided as Annexure-B.

### Planning for consultative meetings with the stakeholders

The evaluation questions were prepared for meeting with the stakeholders to seek their views on outputs of three projects.

The evaluation questions were formulated in such a way that they address the primary evaluation criteria that is being used in the outcome evaluation as well as to seek their view about the progress of three projects.

An Evaluation Inception Report was prepared which contained an Evaluation Matrix and Results Framework of planned inputs, activities and outputs of three projects being implemented under Outcome II.

### Interviews with Key Stakeholders

A briefing was held with UNDP Riyadh on 10th November 2015 at the start of meetings with the stakeholders. The consultative meetings with the stakeholders were held from 10th to 16th November 2015 in Riyadh, Saudi Arabia.

The stakeholders included staff and experts of UNDP KSA, Ministry of Water and Electricity, Saudi Energy Efficiency Centre and Royal Commission of Yanbu.

During these meetings, questions relating to the Evaluation Matrix were inquired from the stakeholders as well the progress on all the three project activities. The list of stakeholders interviewed during the outcome evaluation has been provided in Annexure C.

### Data Compilation and Analysis

The information obtained through desk review of the project documents and consultative meetings held with the stakeholders was compiled and tabulated. A comparison of information obtained with pre-project scenario, cause–effect linkages and sustainability aspects of the projects was prepared. The nature of the data was qualitative as well as quantitative.

### Application of findings

The analysis of qualitative data was carried out on the basis of content analysis. The analysis were used along with personal judgment of the Evaluator on the basis of similar projects elsewhere.

The quantitative data was analyzed on the bases of graphs and charts of different types. The assessments of lessons learnt were predicted on the basis of all the project outputs and their expected results by drawing the link between outputs of three projects and outcome II. The recommendation has been made in accordance with the UNDP Outcome Level Evaluation handbook.

The rating has been assigned to the outcome, outputs, sustainability and relevance of the outcome. The rating of outcome and outputs has been carried out using the 6 point Progress towards Results Rating Scale: HS (Highly Satisfactory), S (Satisfactory), MS (Moderately Satisfactory), MU (Moderately Unsatisfactory, U (Unsatisfactory), HU (Highly Unsatisfactory).

The rating for sustainability is Likely (negligible risks to sustainability), Moderately Likely (moderate risks), Moderately Unlikely (significant risks, and Unlikely (severe risks). The relevance rating Relevant and Non Relevant.

### Dissemination of Evaluation Report

The findings and conclusion of the outcome evaluation was presented by the Evaluator on 16th November 2015 at UNDP Riyadh.

## Limitation of Evaluation

There is limited information on the three projects implemented under the country programme outcome II. The UNDP Country Programme Document, Project Documents of all the three projects and progress reports contained only limited information. Furthermore, the progress reports were not of the required quality to provide a clear overview of the progress achieved.

## Structure of the Outcome Evaluation Report

This outcome evaluation has been conducted in accordance with UNDP’s ‘Outcome Level Evaluation - A companion guide to the handbook on planning monitoring and evaluating for development results for Programme Units and Evaluators’, December 2011.

The report has been structured into five chapters; following the Executive Summary, the first chapter describes introduction, second chapter covers the development context of the outcome II, third chapter provides findings of the evaluation and conclusions, fourth chapter describes recommendations and fifth chapter describes lessons learnt. A number of annexures have been provided to present additional information.

# The Development Context of Outcome II

## Background of Outcome II

The 9th National Development Plan of KSA covering period from 2010-14 has the overall theme of sustaining development with a record $385 billion targeted at six goals: improving standards of living, regional development, economic diversification, knowledge based economy and competitiveness and human resources, including youth and women.

As noted in ‘UN Country Analysis and Common Strategic Framework’, Saudi Arabia has achieved promising progress in recent years with rise in Human Development Index (HDI) to 0.752 in 2010, placing in ‘high’ human development category. As noted in 2010 Human Development Report (HDR), KSA stands as the 5th top mover in HDI improvements and 3rd top mover for no-income HDI.

As noted in 2009, National ‘Millennium Development Goal’ (MDG) Report, ten of eleven targets have been or would be reached by 2015. As noted by UNDP’s MDG Breakthrough strategy for the Arab Region, where breakthrough to MDG achievement are already made as in KSA, a key focus is on the need for sustainability of development results.

Developed with UNDP support, the 9th NDP aims to reinforce KSAs progress and support its sustainability. As noted therein, KSA relies on the oil sector for 80% of public revenues, 45% of GDP, and 90% of export earnings.

Industrialization and urbanization are leading to rising ecological footprints with policy solutions to resource scarcity a clear priority in the UNDP for energy conservation, renewable energy and water conservation as groundwater scarcity sets in pollution impacts and climate risks to human development emerge.

A series of reviews were undertaken of the previous Country Programme 2007-11 including a country analysis linked to UN Common Country Strategic Framework 2011-15 is a consultative process of identifying development challenges and areas of agency comparative advantage.

A history report of UNDP-KSA Cooperation 1970-2010 was also produced by UNDP showing long-term partnerships that sharpened national priorities, strong alignment with national priorities and recognition of UNPD’s added value in accessing global best practices.

A global UNDP evaluation on capacity development for policy and planning was undertaken with a Saudi Arabia case study finding that UNDP played a crucial role in refocusing policies from GDP to human development orientation.

An ‘Outcome Evaluation on Development Policy’ found UNDP’s positive role in shifting focus towards sustainable results and recommended future focus on social, environmental and economic pillars of sustainable development. Increased emphasis was advised for results based management and connecting partners to global partnership.

An Outcome Evaluation on Environment found key outputs including energy conservation regulations and policies, Government capacities for analyzing emission trends and climate risks, groundwater policies and action plans for biodiversity conservation. It recommended a cohesive vision of cooperation and focus to support Government of KSA’s efforts in this area.

## Development Context of Outcome II

The UNDP Country Programme Document 2012-2016 addressed two main areas under outcome II which are energy efficiency and management of water resources as follows:

* A priority in the 9th NDP is development of new capacities for energy conservation and renewable energy system in public and private sectors.
* Partnerships with Government and industry for design of new policies and regulations that catalyze new clean technologies, and with university and industry centers of excellence for research and development on renewable energy and energy conservation.
* Support will be provided to build capacities to engage in new global partnerships and mechanism such as the Clean Development Mechanism as a means of attracting investments into new clean technologies.
* Cooperation will include programming in the areas of water resources conservation in KSA, with particular emphasis on innovative technologies.
* Support will include analysis on water resources and elaboration of adaption strategies. Global partnerships with best practices.

## Problems to be addressed by the Outcome II

The problems that the Outcome II has to address are as follow:

* There are limited energy conservation and renewable energy policies at national or local level and modest use of market mechanism,
* Limited laws and regulations enabling and establishing equipment standards and labels for energy efficient household appliances in KSA,
* According to the World Data Atlas, Saudi Arabia ranks 12th in energy intensity (ratio of energy consumption to national gross domestic product in case of a country's energy consumption) in the World[[1]](#footnote-1).
* Saudi Arabia’s energy intensity was 11,861 BTU per year during 2000 and during 2011 it was 14,798 BTU per year 2005 U.S. Dollars. This statistic represents an increase of 25% of energy intensity during eleven years.
* The use of non-renewable ground water by agriculture sector is increasing in the water scarce Saudi Arabia. The ground water resources continue to be heavily minded as they represent 57% of non-renewable supply to satisfy mainly the need of irrigated agriculture, by far the largest water user (Over 85%). Combined, sea water desalination and wastewater reuse represent less than 5% of the total supply while the rest (38%) is provided by mostly renewable ground water and, marginally, by surface water resources[[2]](#footnote-2).
* National water strategy action plan is yet to be launched.
* The information on water demand and supply is scattered, incomplete and is ministry, project or area-specific and not easily accessible.
* The MOWE capacity has to be enhanced to enable them to address major issues of water sector and solve the present and future projects of vulnerability of water supply to Saudi Arabia.
* One of the main reasons for higher energy and water consumption are the lower tarrifs of water and electricity in Saudi Arabia.

## The main outputs and initiatives expected to have contributed to the Outcome II

The outcome II of Country Programme Document relating to Enhanced Policies and Strategies for Sustainable Use of Natural Resources and the Environment is being implemented since 2012.

The main outputs and activities that have contributed to the outcome are contained within the following projects:

Table 2.1: Details of projects contributing to the Outcome II

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name of the Project** | **Project Start Date** | **Project End Date** | **Project Cost in US$** | **Status of the project** |
| National Energy and Efficiency Programme (NEEP) Phase II | Jan 2012 | Dec 2015 | 10,968,956 | Near Completion |
| Capacity development for sustainable development and management of water resources in the Kingdom of Saudi Arabia. | 2013 | 2016 | 6,636,558 | Ongoing |
| Sustainability in Madinat Yanbu Al-Sinaiyah (MAYS) | 1 June 2014 | 31 May 2015 | 52, 500 | Completed |
| Capacity building in Sustainable Waste Management (AMANA) |  |  |  | Dormant |

The capacity building in Sustainable Waste Management (AMANA) was dropped and as such was not considered in the outcome evaluation.

## Key Partners and stakeholders and their contribution

The UNDP contribution is as follows:

* UNDP policy advice on design of energy conservation and renewable policies.
* UNDP capacity development for energy conservation and renewable energy institutions including CDM.
* UNDP advice on ground water policies and capacity development.

The key partners of Outcome II are as follows:

* Government energy conservation and renewable energy policies.
* Ministry of Petroleum CDM Policies
* Ministry of Economy and Planning Renewable Energy Strategy
* Presidency of Environment National Commission Climate Report
* Ministry of Water and Electricity issues Water Strategy
* National Wildlife Commission issues Biodivercity Plan

The other contributing partners for Outcome II are as follows:

* University Centre of Excellence and KACST on energy conservation and renewable energy to provide expertise and consultative support.
* Private sector participation in dialogues; proactive role in implementation of GIZ, UNEP, FAO and World Bank expertise support.
* Global partnerships to share expertise and resources among countries

The expected beneficiaries of the outcome II are households, commercial, industrial sectors, public and private sector Organisation, official of different various ministries of Government of KSA, academia and general public of KSA.

# Findings and Conclusions

## Introduction

The findings and conclusions of the outcome evaluation have been presented in this chapter in accordance with the terms of reference.

The findings and conclusions are based on the four categories of analysis i.e. an assessment of progress towards the outcome, an assessment of the factors affecting the outcome, an assessment of key UNDP contributions to outcome through outputs, and an assessment of the partnership strategy used including an assessment of sustainability of achievements, relevance and impact, efficiency and effectiveness, South-South Cooperation and UNDP exit strategy.

## Status of the outcome

The status of the outcome II, its achievement up to date or progress has been assessed and measured against the outcome indicators provided in the Country Programme Document (2012-2016)’ and revised during 2010.

The outputs and initiatives that have contributed to the outcome II are contained within the following three projects:

* National Energy and Efficiency Programme Phase II (NEEP II)
* Capacity development for sustainable development and management of water resources in the Kingdom of Saudi Arabia.
* Evaluation of Sustainability in Madinat Yanbu Al-Sinaiyah (MAYS)

The original outcome indicators of outcome II of ‘Country Programme Document (2012-2016)’ were based on “a percentage of area under conservation, per capita water availability and energy intensity of growth per unit Gross Domestic Product (GDP)”. However, these indicators were too general and without any baseline value, so it was difficult to gauge their achievements.

The outcome indicators were revised by UNDP in consultation with Government of KSA. The revised outcome indicators are more specific and measureable to gauge the status of the outcome i.e., progressive reduction per capita consumption in municipal water supply from 238 lcd to 200 lcd by 2016, decree to establish Saudi Energy Efficiency Centre, use of non-renewable sources as part of managed drawdown not to exceed 5 BCM by 2030 etc.

The revised outcome indicators have been compared with the baseline and their status was checked. The Evaluator did consider these outcome indicators as SMART (Specific, Measurable, Achievable Relevant and Time-bound).

The sustainable use of natural resources and environment outcome concept is in line with the national sector development priorities and plans that has been developed in collaboration with Government of KSA by the UNDP. Furthermore, the outcome is also in line with the future climate change projects under adaptation and mitigation measures.

The present status of the outcome or progress made so far towards their achievements has been described in the following sections.

### Capacity development for sustainable development and management of water resources in the Kingdom of Saudi Arabia

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | **Outcome II Indicator** | **Baseline** | **Targeted Outcome Indicator** | **Present status of outcome indicator in 2015** |
| 1.1 | National Water Strategy |  | Approved National Water Strategy | National Water Strategy has been approved. |

The National Water Strategy has been prepared and duly approved by Government of KSA.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Outcome II Indicator** | **Baseline** | **Targeted Outcome Indicator** | **Present status of outcome indicator in 2015** |
| 1.2 | Progressively reduction per capita consumption in municipal water supply | 238 lcd - 2010 | 200 lcd by 2016 | 258 lcd during 2015 |

The baseline per capita consumption in municipal water supply in KSA was 238 lcd (Liter per capita per day) during 2010 and presently it is 258 lcd, an increase of 8.4% from the baseline.

The population of Saudi Arabia in January 2015 was 29.6 m and during 2010 it was 27.2 m[[3]](#footnote-3). This displays an increase of 8.8% of population during the last 5 years that offsets the increase in municipal water supply consumption in KSA.

MOWE is planning to raise tariff for commercial and industrial consumers from 1 January 2016. The residential houses are excluded from the increase. MOWE plans to apply the new tariff and improve sanitation services in all regions of the Kingdom as a means to reduce the high rate of water consumption and rationalize its use. The revision in pricing will depend on the amount of water consumed per month.

The new tariff will be Saudi Rial (SR) 9 per cubic meter in case users benefit from both water and sanitation services and SR 6 per cubic meter in case consumers use only the water service. The cost will depend on the water consumption volume and the number of meters[[4]](#footnote-4). The proposed increase in tariff will lead to an impact on limiting the high water consumption by commercial and industrial sectors and preserving water resources.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Outcome Indicator** | **Baseline** | **Targeted Outcome Indicator** | **Present status of outcome indicator in 2015** |
| 1.3 | Use of Non-Renewable Sources as a part of managed drawdown not to exceed 5 BCM by 2030 | 17.446 BCM - 2010 | 5.0 BCM by 2030 | 20.884 BCM - 2012 |

The five year data by the MOWE on consumption of water and sources of water in KSA from 2007 to 2012 in BCM has been provided in Table 3.1.

Table 3.1: Consumption and Sources of Water in KSA for the period 2007-2014

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Consumption of water in KSA from 2007 to 2012 in BCM** | | | | | | |
| **Year** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** |
| Domestic | 1.977 | 2.006 | 2.123 | 2.283 | 2.423 | 2.527 |
| Industrial | 0.683 | 0.698 | 0.714 | 0.753 | 0.800 | 0.843 |
| Agricultural | 15.420 | 15.083 | 14.747 | 14.410 | 15.970 | 17.514 |
| **Total** | **18.080** | **17.787** | **17.584** | **17.446** | **19.193** | **20.884** |
| **Sources of Water in KSA from 2007 to 2012 in BCM** | | | | | | |
| **Year** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** |
| Renewable ground water | 3.752 | 3.774 | 3.694 | 3.629 | 3.690 | 3.695 |
| Nonrenewable ground water | 13.121 | 12.800 | 12.560 | 12.340 | 13.802 | 15.450 |
| Desalination | 1.067 | 1.063 | 1.145 | 1.258 | 1.476 | 1.545 |
| Treated water form wastewater treatment plants | 0.140 | 0.150 | 0.185 | 0.219 | 0.225 | 0.194 |
| **Total** | **18.080** | **17.787** | **17.584** | **17.446** | **19.193** | **20.884** |

The analysis of average data of five years of water consumption in KSA displays that 84 % of water is consumed by the agriculture sector, 12% by domestic and 4% by industrial consumers.

Figure 3.1: Average water consumption in KSA from 2007 to 2012 in BCM

The domestic water consumption has increased by 28% and industrial by 23% during five year period. The agricultural water consumption initially decreased during first three years. However, during the last two years the consumption again increased up to 14%.

Figure 3.2: Water Consumers in KSA from 2007 to 2012 in BCM

The analysis of average data of five years of water sources in KSA shows that 72 % of source is non-renewable ground water, 20% is renewable ground water, 7% is desalination water and 1% is the treated water from wastewater treatment plants.

Figure 3.3: Water sources in KSA from 2007 to 2012 in BCM

The renewable ground water source has been gradually decreasing, except for 2008 whereas during 2012, it decreased by 2% from the level in 2007.

The share of non-renewable ground water was decreasing up to 2010 but started increasing from 2011 onwards. During 2012, share of non-renewable ground water was 18% higher than the level in 2007, which is against sustainable use of water. This is indeed an alarming situation as 72% source of water is non-renewable ground water, which has negligible recharge of the aquifer.

The share of desalination water is gradually increasing, which is presently 45% higher than the 2007 level. This is indeed a positive indicator. Furthermore, Saudi Arabia is trying to install desalination plants that shall be powered by solar energy, thus making the whole process of desalination sustainable.

The share of use of treated water from wastewater treatment plants is also increasing but with fluctuation. The highest share of treated water was 61% during 2011 and lowest was 7% during 2008. The increase in share of treated water from wastewater treatment plants is a positive development. The treated water from wastewater treatment plants is mainly used for horticulture purposes.

Figure 3.4: Water Sources in KSA from 2007 to 2012 in BCM

The demand for agricultural water depends on the extent of agriculture, type of crops and type of irrigation practices. Most of the cultivated land is being used for wheat, fodder crops, fruits, dates and vegetable production.

Water demands are significantly different among various crops and types of irrigation. The one hectare (ha) of land for wheat production requires approximately 13,713 m3 of water, while one ha of dates producing land requires approximately 9, 100 m3 of water.

The Figure 3.5 demonstrates that water demands per ha of irrigated land can vary in the range of 9100–39,000 m3/ha. The water demands per ha of irrigated land can be further changed depending on the type of irrigation. Most of the irrigation water is supplied by non-renewable ground water sources.

**Figure 3.5: Irrigation water requirements for 1 ha of land for different types of crops in KSA**

***Source:*** *Modified after FAO, 1998; SSYB, 2008*

KSA has been undergoing a strategic move for the past seven years to conserve water. The cultivation of wheat has been banned as they consumes high water during harvesting. Now, the MOWE is planning to ban cultivation of fodder consuming highest water during harvesting.

The projected production of wheat for 2015 shows a reduction of 79% from 2007/2008 which will result in reduction in use of non-renewable ground water by the agriculture sector.

Table 3.2: Wheat Production in Saudi Arabia

|  |  |  |
| --- | --- | --- |
| **Marketing Year** | **Wheat Area Planted in HA** | **Wheat Production (MT)** |
| 2007-2008 | 450,330 | 2,350,000 |
| 2008/2009 | 326,161 | 1,720,000 |
| 2009/2010 | 195,884 | 950,000 |
| 2010/2011 | 219,505 | 1,349,000 |
| 2011/2012 | 192,818 | 1,184,000 |
| 2012/2013 | 117,000 | 700,000 |
| 2013/2014 | 100,000 | 600,000 |
| 2014/2015 (projection) | 83,000 | 500,000 |

***Source:***[*http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Grain%20and%20Feed%20Annual\_Riyadh\_*](http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Grain%20and%20Feed%20Annual_Riyadh_) *Saudi% 20 Arabia\_5-14-2015.pdf*

The cultivation of wheat and fodder crops as well as increase in tariff for commercial and industrial users would gradually decrease use of non-renewable ground water in KSA. The assessment of outputs of capacity development for sustainable development and management of water resources in the Kingdom of Saudi Arabia towards outcome II is **Moderately Satisfactory**.

**3.2.2 National Energy Efficiency Programme II**

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Outcome II Indicator** | **Baseline** | **Present status of outcome indicator in 2015** |
| 2.1 | Decree to establish SEEC |  | Decree to establish SEEC issued. |
| 2.2 | Develop an Energy Efficiency Plan covering Policies, regulations and initiatives |  | SEEC has developed an Energy Efficiency Plan covering policies, regulations and initiatives. The energy efficiency law and energy conservation strategy will be approved by December 2016. |
| 2.3 | Monitor the implementation of the plan |  | SEEC is monitoring implementation of the plan. |
| 2.4 | Promote EE awareness |  | SEEC has promoted EE awareness. |
| 2.5 | Support building capacity |  | NEEP II supported SEEC and partner’s building capacity. |
| 2.6 | Promote the EE industry |  | SEEC has promoted the EE of steel, cement and petro-chemical industry. |

Saudi Arabia has experienced rapid economic growth over recent years. The energy intensity has shown an overall growth for 50% since 1985 and it is estimated that the energy consumption will rise by 2028 to nearly 8 million BOE (barrel of oil equivalent) compared to 3.4 million BOE in 2008.

Saudi Energy Efficiency Centre’s (SEEC) is implementing NEEP II Project. The project has mainly worked on three sectors which are household appliances, transport and industry as these sectors together represent more than 90% of the local energy consumption in Saudi Arabia.

Household appliances: The household appliances sector consumes 23% of the total primary energy consumption, 70% of it is consumed by cooling.

SEEC has prepared new standards for air conditioners which prohibit importing and selling of in-efficient air conditioners. Furthermore, SEEC promoted use of thermal insulation in new buildings and implementing standard specifications for heating, ventilation and Air conditioner (HVAC) systems. They are working on development of Energy Efficiency Standards for household lighting.

SEEC updated the standard specification of energy efficiency in refrigerators, freezers, and washing machines which were approved by the board of directors of Saudi Standards Organization (SASO).

Auditing and updating the Saudi building Code 601 for Energy Rationalization requirements. The part of Buildings sector has already finalized Studying and enhancing the current mechanism of thermal isolation that suggested by the Ministry of Water and Electricity and work on creating a sustainable mechanism to apply thermal isolation in residual sectors and creating a technical regulation for thermal isolation values in the Kingdom of Saudi Arabia.

Transport Sector: The transport sector represents 23% of the total local consumption. SEEC has developed new fuel economy standards for light duty vehicles to meet the international standards.

In land transportation sector, SEEC approved of adding fuel economy standard on customs labels of imported cars on coordination with Standardization Organization of GCC countries. SEEC organized workshops with specialized international agencies to check the proposed fuel economy standard. Similarly, workshops were organized with cars manufacturers to exchange the proposed Saudi fuel economy standard and to agree on an executive plan.

SEEC finalized of fuel economy standard after being circulated and taking the feedback from international manufacturers (36 international factories) and 2 manufacturers’ gatherings which represent 90% of Saudi Market.

Industrial Sector: The major consumption of the primary energy goes to the industrial sector by almost 42 %. SEEC has focused on three largest industrial sectors i.e., Cement, Steel and Petro-chemical as they consume 80 % energy of this sector.

SEEC collected 130 production lines data in the kingdom in cement, iron, and petrochemical sectors to determine their energy efficiency levels. The energy efficiency levels that intended to be achieved by all targeted sectors were finalized. SEEC established a working mechanism that included an annual collection of factories information and create a database for it. Rules and conditions of a new factory that includes energy efficiency regulations were finalized.

The energy efficiency in household appliances, transport and industrial is being achieved whereas decree is yet to be issued for Energy Efficiency Law and Energy Conservation Strategy, the overall assessment of outputs of National Energy Efficiency Programme II towards outcome II is **Satisfactory**.

### Sustainability in Madinat Yanbu Al-Sinaiyah (MAYS)

The objective of sustainability in Madinat Yanbu Al-Sinaiyah (MAYS) project was to conduct an evaluation of their status of sustainability.

Yanbu Industrial City is one of the largest continuing development projects in the world spread over an area of 420 square kilometres of land housing 190 industries with a population of 185,000.

The UNDP Consultant conducted the evaluation and submitted his report to Royal Commission of Yanbu (RCY). The evaluation report made a number of recommendations to RCY for sustainable development. The majority of the Consultant’s recommendations have been agreed by RCY and consequently implemented as follows:

* RCY should adopt ISO 37120 for sustainable development of community’s indicators for city services and quality of life**:** RCY is going ahead to adopt ISO 37120 for sustainable development of community’s indicators for city services and quality of life.
* The standardized indicators will enable them to assess their performance and measure progress over time and also to draw comparative lessons from other cities locally and globally. The indicators will also guide on policy, planning and management across multiple sectors and stakeholders.
* RCY should adopt the Global Protocol and use Global Protocol for Community Scale Emission**:** RCY is going to adopt the international carbon accounting standard of global protocol and use i.e., Global Protocol for Community Scale Emission – 2nd draft for climate change specific measurement standards to become the first City in KSA and only the second in the Middle East to use a developing carbon footprint measurement and reporting standards for Greenhouses gas (GHG) corporate protocol ISO14064.

Now, with the use of Global Protocol for Community Scale Emission, there is consistency in reporting of energy and carbon data.

* The Consultant commended RCY’s environmental regulations that have undergone continuous improvement by adopting international best practice as appropriate. The Consultant has commented that RCY has a comprehensive mechanism of monitoring of air quality and water quality compliance. The hazardous materials management is comprehensive and is an excellent industrial waste management guidance. There is a status of compliance of environment. The Environmental Impact Assessment (EIA) of every project is mandatory and is one of the major requirements for setting up an industry at Yanbu Industrial Estate.

Once an industrial project is completed at Yanbu Industrial Estate and its operational phase is going to commence, then a follow up visit/special inspections of RCY takes place to ensure that all mitigation measures of EIA have been implemented. If there is any need for additional environmental mitigation measures, than conditions are imposed. The environmental compliance monitoring, third part validation and environmental audits are carried out as per the requirement of the EIA.

The Consultant recommended additional measures on RCY’s 2015 draft environmental regulations, which will result in further improvement of environment at Yanbu.

* RCY should revise the master plan of Yanbu**:** RCY is generally in agreement with most of the proposed revisions in the master plan of Yanbu by the Consultant and progress is taking place for their incorporation.

The master plan shows vision and commitment to a sustainable future. Importantly, it also recognises the many environmental challenges that lie ahead. The revision of master plan of Yanbu is being carried out in accordance with the Consultant’s report. A number of recommendations on zoning, clustering of industry and other recommendations will be implemented soon.

* RCY should follow DPSIR format for Sustainability Report: The sustainability report of RCY does not follow any standard format although it has adopted international best practices in specific areas. The RCY is now following the format of DPSIR (Driving forces, Pressures, State of the Environment, Impacts and Response (Approach used by EEA and OECD) for sustainability report.

RCY should seek international recognition through engagement with international media and NGOs**:** RCY in the 21st Century is still in a class by itself in terms of combining both industrialization and sustainability in a well-balanced formula of success. RCY makes outstanding contributions to the environment, consistent with UNEP’s policy and objectives. Therefore, in order to maximise its chances of winning, it will need to develop quality promotional material and engagement with international media and NGOs.

The RCY has recently received following international awards:

* 2014 – The Royal Commission wins the highly prestigious environmental prize.
* 2014 - Kingdom’s International Award for Environmental Management.
* 2013 – The Royal Commission wins the elite international award “ UN LivCom Awards” for liveable communities in collaboration with UNEP

RCY has developed its own energy efficiency and water efficiency policy and their motto is “To be a Global Centre of Excellence for Sustainability Concepts and Applications”.

The energy efficiency and water efficiency measures adopted by RCY will facilitate the overall realization of outcome II and they acknowledge that they received exposure to the world through UNDP and greatly benefited from the input provided, the assessment of outputs of sustainability in Madinat Yanbu Al-Sinaiyah (MAYS towards outcome II is ‘**Highly Satisfactory’**.

## Factors affecting the outcome

A number of factors have affected the outcome positively and negatively. The positive factors that have facilitated the outcome are as follows:

* Government of Saudi Arabia facilitated the outcome: The support of Government of Saudi Arabia has facilitated preparation of laws and strategies for the outcome i.e.,
* Energy Efficiency Law,
* Energy Conservation Strategy,
* National Water Strategy,
* KSA Water Regulation and Policy Coordination etc.

Although, Energy Efficiency Law and Energy Conservation Strategy is yet to be approved by the Government of KSA. But, nevertheless, there is general consensus and unanimity about importance of energy efficiency and management of water resources in KSA by various ministries, academia, public and private sector organizations, which resulted in formulation of laws, strategies, standards and labels within comparatively short time.

Normally, the formulation and subsequent implementation of Government laws and strategies takes a longer time because considerable time is lost to develop consensus of all the stakeholders.

* Adaptation of Laws and Regulation in KSA are Strong: There is strong compliance of adaptation of Government laws and regulations by the general public, commercial organizations and industry in Saudi Arabia and they are quick to adopt the changes. The standards and labels for household appliances, transport and industry are being implemented satisfactorily.

The negative factors that may hamper or delay the realization of the outcome are as follows:

* National Coordination Mechanism is key to success in the development of water sector in KSA**:** As stated earlier, 84 % of water is consumed by agricultural sector which is in the domain of Ministry of Agriculture. The Ministry of Agriculture support to the project particularly IWIS is important.

By catalysing a sector-wide initiative, and with the involvement of other UN agencies such as FAO working closely with the Ministry of Agriculture, UNDP could help in bringing together the two partners to collaboratively address the potentially conflicting demands of rationalising water use and the expanding needs of irrigated agriculture. Similarly, the GIZ and the World Bank are also involved in the water sector. Therefore, there is a need for national coordination mechanism for development of water sector in KSA.

* Socio-economic and political factors may adversely affect the outcome**:** MOWE is planning to raise tariff of water supply for commercial and industrial consumers from 1st January 2016. However, the residential houses are excluded from this increase.

There was a need to increase the tariff of water supply to residential houses also but it was not done, which will inter alia further increase the water consumption of residential houses. Therefore, there is a risk that outcome indicator of progressive reduction per capita consumption in municipal water supply to 200 per capita per liter per day by end of 2016 may not be achieved.

* Reliability of data provided by public and private sector organization is key to success for any Management Information System: The reliability of data provided by various organizations is key to success of any Management Information System.
* The IWIS will be receiving data from 10 monitoring networks, 30 MOWE offices, 2,000 well fields, 100 desalination plants, 40,000 farmers, 100 industrial plants, 100 thermo-energy plants, 100 urban water utilities, 10 mining operations, 1 water offtaker and 10 ministries and government agencies. There is a need that at least 2-3 % of data should be annually checked for reliability. The reliability of the data can be checked by calibration of data acquisition equipment and compliance of required data acquisition protocol.
* Expedite engagement of remaining experts of capacity development for sustainable development and management of water resources in the KSA Project**:** The overall implementation of capacity development for sustainable development and management of water resources in the KSA project will be delayed.

The project’s initial focus was on preparation of National Water Strategy, KSA Water Regulatory Mechanism and Coordination, IWIS and Ground Water Monitoring, which took considerable time.

There are 10 outputs of capacity development for sustainable development and management of water resources in the KSA project. However, there was a need to first prepare policies, regulations and strategies (National Water Strategy, KSA Water Regulatory Mechanism and Coordination, IWIS and Ground Water Monitoring mechanism) which should be agreed by the MOWE and all the stakeholders. There is an input of 7 international experts having 139 man month input but presently only three international experts with 74 man month input are working.

The approach adopted by the project is reasonable but nevertheless now it is time to move forward with the placement of remaining inputs of international experts as well as with the additional requirement of international experts which are required to complete the outcome. There is a need for additional input from a Water Economist and Hydro-geologist having knowledge of ‘Rock Shell’ so as to complete the task of ‘Ground water delineation’ monitoring.

* Establishment of Water Regulation Authority: The establishment of Water Regulatory Authority is a political decision to be made by MOWE. The timely establishment of Water Regulatory Authority for implementation of KSA Water Regulation and Policy Coordination is critical for achievement of the outcome.

## UNDP contributions to outcome through outputs

The completion of sustainability in Madinat Yanbu Al-Sinaiyah, near completion of National Energy Efficiency Programme Phase II, and approval of National Water Stratergy and KSA Water Regulation Mechanism and Policy Coordination of capacity development for sustainable development and management of water resources in the KSA are the most visible UNDP outputs towards the outcome.

A Results Framework describing progress achieved of all the three projects has been provided describing activities, expected output, baseline, output level indicators/targets and progress achieved up to date in Annexure E.

The key outputs produced by UNDP that contributed to the outcome are as follows:

National Energy Efficiency Programme Phase II

Output 1: Energy Conservation Law, Stratregy and Action Plans: Energy Conservation Law has been approved by SEEC Board and Energy Conservation Strategy is in progress which would be finalized by end 2016.

Once the law and strategy is operational, it would be possible to achieve the 4% annual energy intensity saving target by 2019.

The enforcement of Energy Efficiency Action Plans for household appliances, transport and industrial sectors which accounts for about 90% of energy consumption will facilitate to achieve up to 30% of energy saving, comparing it with business as usual scenario by 2030.

Output 2: Capacity Development for Energy Managers and Leaders: The training of SEEC staff (60 Staff + 150 participants trained during six courses and four workshops during 2015) has resulted in better implementation and monitoring of NEEP II project and its outputs.

The capacity development of energy manager and leaders of SEEC has resulted that now they can plan and implement their energy efficiency plans and activeties themsevles.

Output 3: Energy Efficiency Information Systems (EEIS): The blueprint of EEIS was prepared, after comparative review of similar systems around the world. The EEIS is operational and is being used by partners i.e., public and private sector organizations, academia, retailers and manufacturers.

The use of EEIS has shown the trust of retailers and buyers on energy efficient products, having energy efficiency standards and labels. SEEC has established an efficient process of acquiring labels that takes 2-3 weeks by the manufactures and 1-2 days in approval of the label from SEEC.

Output 4: Awareness Raising for Public and Industry: SEEC conducted Knowledge Attitude and Practice (KAP) study for assessing awareness on energy conservation through a survey adopting methodology across different categories of consumers. The objective was to collect baseline data reflecting awareness level of energy conservation, including attitude and practices across different categories of energy using consumers at Riyadh, Damam, Jeddah, Buryaidha, and Abha.

Based on the results of KAP study, SEEC reviewed more than 300 international awareness campaigns which resulted in design of best methods to conduct the National Campaign for Energy Efficiency in KSA.

A three-year plan covering 2014 to 2016 has been developed by SEEC for the National Campaign for Energy Efficiency, which created awareness and promoted use of energy efficient products and technologies for all sectors.

The awareness raising campaign were aimed to reach all society’s members in KSA focusing on households (Father, Mother and children) and other young people from male and female. The awareness raising campaigns created the issue of energy efficiency of household appliances as a public issue that relates to society of this generation and next generation to raise their interest.

The messages of awareness campaigns were focused about energy efficiency of household appliances. These campaigns targeted consumer in residential sector and focused on family and particularly on women and children.

Capacity Development for sustainable development and management of water resources in the kingdom of Saudi Arabia

Output 1: Resource Assessment, Monitoring and protection**:** The comprehensive evaluation for ‘National Water Resource Use’ has contributed towards preparation of National Water Resources Monitoring & Evaluation Program & Delineation of Protection Zones.

Output 2: Development of National Integrated Water Resources Management (IWRM) Plan: National Integrated Water Resources Management (IWRM) Plan will assist in long term sustainable development and management. Moreover, the ‘National Committee for Spatial Data Infrastructure’ (NCSDI) adopted IWIS as their flagship project (as part of the KSA e-government Initiative).

Output 3: Water Resources Data Management – Integrated Water Information System:The Integrated water Information System (IWIS) Plan has been designed and approved by MOWE which will, upon its operation, become a focal point of water resources information and tool for future planning of water sector in KSA.

IWIS will act as a gateway to information on the Kingdom’s water issues. The IWIS comprises of a wide range of data and information collected by government institutions, private organizations and individuals. IWIS has been designed to serve three core activities of the water business: water planning, water management and water regulation for which an independent body to be created.

IWIS is a multi-year project involving several water resources and information technology specialists. The project is being organized under four areas i.e., Data Models, Data Migration, Applications Development and the Government Secure Network.

Output 5: Institutional Restructuring of MOWE & Public-Private Partnership Enhancement:The institutional restructuring of MOWE and establishment of National Water Regularity Authority is yet to take place. However, when it is established and operational, a considerable positive change will take place towards the realisation of the output.

Output 6: Water Quality Monitoring Protection & Enforcement: The progress of achieving the output of Water Quality Monitoring Protection & Enforcement is continuing.

Output 8: Develop Comprehensive strategic program to achieve Millennium Development Goals (MDG):MDG already achieved by KSA and now the key focus is on achievements of sustainability of development results.

Output 9: Specific Strategic Projects: The specific detailed hydrological investigations & training of MOWE staff in groundwater and Modeling has been conducted.

Output 10: Water Conservation & Efficient Supply Management: The efforts of Government of Saudi Arabia to stop growing of wheat and fodder crops will reduce pressure on withdrawal of water from non-renewable ground water resources and achievement of the outcome.

Evaluation of the Status of Sustainability in Madinat Yanbu AL Sinaiyah (MYAS)

The Consultant submitted desk review report as planned. Agreement on areas of improvement and steps towards implementation were discussed with the expert. He also identified the areas for improvement and made suggestions on how to apply the best practices in environment awards.

Based on the progress made by the outputs of the three projects, it is reasonable to conclude that the outputs achieved remained focused on the core issues for ultimate realization of the outcome II.

The outputs of three projects towards the outcome have been identified as follows:

* UNDP has developed a positive relationship with the Government of KSA as a key partner in both policy making and developing a legal framework particularly in areas of energy efficiency and management of water resources.
* Strengthening capacities of national institutions and project partners.
* Facilitating dialogue and debate on sustainable use of natural resources and the environment through awareness raising programmes particularly in energy efficiency.
* Supporting targeted technical studies.

Based on the above, it is concluded that the UNDP appears to be the preferred partner of the sustainable development in KSA as well as potential future development in climate change adaption and mitigation.

The quality of all the outputs delivered so far is up to the mark and does meet its requirement. There is unanimous agreement between the UNDP and all stakeholders especially in the formulation of laws, policies and national strategies on energy efficiency and management of water resources.

There are delays in the implementation of two out of three projects as follows:

* National Energy Efficiency Programme Phase II is expected to be completed by end of 2016 instead of end of 2015.
* Capacity Development for sustainable development and management of water resources in the KSA is expected to be completed by end 2018 instead of end 2016.
* Evaluation of the Status of Sustainability in Madinat Yanbu AL Sinaiyah (MYAS) was compeleted within the agreed upon time frame.

Although most of the outputs of National Energy Efficiency Programme Phase II have been completed and SEEC is able to implement the project but one of its main outputs i.e., enactment of energy efficiency law and approval of National Enegry Strategy, is pending. The law and strategy must be approved within the duration of the NEEP II project. Therefore, there is a need to extend its duration by one year i.e., 31st December 2016.

The implementation of outputs of capacity development for sustainable development and management of water resources in the KSA will take at least two years. Therefore, there is a need to extend its duration by two years i.e., upto 31 December 2018.

The quality of technical support provided by UNDP to MOWE, SEEC, and RCY is the key factor which facilitated the quality production of all the outputs achieved up to date towards outcome II.

The monitoring and evaluation of indicators are appropriate and there is a link between outputs to the outcome. There is no need for any further revision of outcome indicators.

## UNDP Partnership Strategy

Partnership within the context of National Country Cooperation Programme is demand driven and as such UNDP partners with the relevant entity.

UNDP is actively involved in achieving outputs of the outcome. UNDP commitment could not be deterred with the delays in implementation of the outputs, particularly the enactment of laws, policies and strategies for energy efficiency and management of water resources in KSA.

The partnership with SEEC and RCY was excellent, whereas it was mixed with MOWE. The MOWE took time in gaining knowledge from capacity development and management of water resources in KSA project. This approach, while helping MOWE in gaining a better understanding of knowledge due to capacity building activities, yet also caused delays in the implementation of their project.

UNDP has considerable experience in implementation of sustainable development projects and now there is a need to take lead in the climate change adaptation and mitigation projects.

The project documents of all the three projects as well as country partnership programme outcome II were comparatively very brief which contain minimum operational modalities. However, the UNDP team, while implementing the three projects, were able to sort the specific operational modalities.

## Relevance

The outputs were highly relevant in meeting the objectives of enhanced policies and strategies for use of natural resource management and the environment to the successful implementation of energy efficiency of household appliances, transport and industrial sectors as well as capacity development of MOWE and approval of National Water Strategy which will lead to sustainable use of water resources and reduce the water consumption of industrial and agriculture sectors and its relevance is rated as **Relevant.**

The outcome of Country Programme Document Outcome II is consistent with the KSA plans like 9th and 10th National Developments Plan of KSA. The project focus is on better utilization of energy efficient technology and products, so as to reduce energy consumption by household, transport and industrial sectors.

The project focus is on reduction of drawdown of non-renewable ground water resources of KSA, so as to reduce water consumption by industrial and agriculture sectors.

The outputs design was highly satisfactory as a convincing approach to address the in-efficient use of energy and excessive water consumption was adopted.

SEEC has conducted Knowledge Attitude and Practice (KAP) study and surveys in five regions and 24 cities at the beginning of developing the plan of National Campaign for Energy Efficiency to obtain a general idea of the energy rationalization levels among citizens and residents.

The surveys target male and female Saudi citizens from 18 to 60 years old, and they were conducted using three methods: interviews, focus groups discussion and questionnaires. Once the awareness campaigns were conducted than they conducted studies to gauge their impact on individuals.

The surveys were conducted on families in general whereas the focus of all the surveys conducted were on women. SEEC engaged female teams to participate in the awareness campaigns to provide more focus on women. Moreover, SEEC conducted a number of campaigns especially for women universities, exhibitions, etc.  In addition, most of the campaigns’ messages targeted women as they play a major role in changing the consumption behavior of the next generations, and since they are usually responsible for selecting household appliances and are main users.

A number of women have attended the training courses of building capacity in energy efficiency field such as Energy Conservation in Building Sector, Certified Energy Manager (CEM) and Saudi Energy Efficiency Forum and Exhibition.

## Impact

The potential impact of the outcome II will be known when all the outputs are completed and implemented.

There are three outcome indicators for management of water resources in the KSA out of which only one indicator has been achieved i.e., approval of National Water Strategy and KSA Water Regulation and Policy Coordination has been developed. The work is continuing on ground water modelling and on establishment of Integrated Water information System.

The present status of progressively reduction per capita consumption of municipal water supply has increased instead of decreasing i.e., 258 lpcd against 200 lpcd.

The MOWE has already excluded residential houses from the projected increase in tariff. Similarly, the share of non-renewable ground water source is increasing instead of deceasing. As stated earlier, 84 % of water in Saudi Arabia is consumed by agriculture sector. The Government of Saudi Arabia has already banned cultivation of wheat and is planning to ban fodder crop for three years.

There is steady increase in quantity of drinking water from desalination plants. The share of desalination water is gradually increasing as well as use of treated water from wastewater treatment plants.

The banning of two main water consuming crops will definitely have a positive impact on the water resources management and it is likely that MOWE will be able to manage drawdown of non-renewable ground water to not exceed 5 BCM by 2030.

Although the Energy Efficiency Plan covering policies, regulations and initiatives has been developed but issuance of decree of Energy Efficiency Law and approval of Energy Conservation is pending. The overall implementation of all the remaining indicators i.e., monitoring implementation of the Energy Efficiency plan, promotion of Energy efficiency awareness, capacity building of SEEC staff is going on smoothly. The energy efficiency standards and labelling for household appliance, transport and industrial sectors are in place and being implemented.

It is anticipated that laws and strategies in energy efficiency and management of water resources are at an advance stage, which will be mostly achieved during the extended duration of the two projects. The overall long term impact of the outcome on energy efficiency and management of water resources in KSA is positive.

The outcome II has promoted, encouraged and supported outputs in generating mitigation co-benefits in energy efficiency. The Saudi Energy Efficiency Centre has been strengthened and now they are able to plan and execute their future plans themselves and they are continuously expanding their focus. Presently, SEEC focuses on three main sectors, namely industry, household appliances and transportation that collectively account for over 90% of the energy demand in Saudi Arabia.

There is a likely possibility that the annual energy intensity saving by 4% will be achieved by 2019, provided Energy Efficiency Law is decreed and Energy Conservation Strategy is approved.

The demand for energy efficient household appliances will increase with the passage of time due to new technological advancements.

There will be a significant amount of other indirect CO2 emission reductions due to use of energy efficiency in household appliances, transport and industry. KSA has a population of 29 million and the use of electrical appliances is increasing day by day. The availability of energy efficient appliances and their subsequent use by the large consumers based within KSA will have a modest global effect.

SEEC has worked with SASO on harmonizing energy performance test procedures for targeted household appliances products. The development of a more rational testing regime by SASO as well as private sector laboratories is facilitating the identification of energy-using products, which will be useful to both policy makers and consumers.

## Effectiveness and Efficiency

The activities of all the three projects were effective in achieving most of their expected outputs, particularly for NEEP II and MAYS, whereas MOWE’s capacity development for sustainable development and management of water resources in the KSA project will take time.

The outcome II succeeded in establishing Energy Efficiency action plans for household appliances, transport and industry sectors.

The overall coordination of UNDP with SEEC and MOWE were effective as most of the outputs were achieved. However, there was a need for the active participation of Ministry of Agriculture in the capacity development for sustainable development and management of water resources in the KSA project, as they are one of the important stakeholders in the water sector.

The outcome is in line with KSA’s regional cooperation with the GCC countries. The regional cooperation is evident in the conferences, seminars being hosted by KSA on different development issues.

The energy efficiency component of the outcome has increased awareness of energy efficient appliances and technologies in KSA to the stakeholders, manufacturers/importers of targeted products and to the general public.

The approach adopted by SEEC was excellent as they chose the Energy Efficiency awareness raising by selecting the best example out of 100 programmes. They conducted KAP study before the launch of their awareness raising campaigns and conducted to gauge their impact on the beneficiaries.

## Sustainability

The finalisation of Energy Efficiency Law and Energy Conservation Strategy and their subsequent approval by the Government of KSA, as well as implementation of National Water Strategy, enforcement of KSA Water Regulation and Policy Coordination and operationalization of IWIS will take time but nevertheless progress towards its achievement is considerable and so its sustainability is rated as **Moderately likely**.

The issuance of decree of Energy Efficiency Law and Energy Conservation Strategy in KSA would entail three major aspects i.e., control on import of inefficient energy appliances, support to manufacturing/importer of energy efficient household appliances, mass awareness on purchase and use of energy efficient appliances.

The outcome has created awareness of energy efficient household appliances, products and technology amongst household appliances, transport and industry sectors. The development of standards and actions plans for energy efficiency for fuel will lead the transport sector towards becoming more energy efficient.

The sustainability of the project is already based on the market-oriented strategy adopted i.e., less consumption of electricity, because energy efficient household appliances will be used by residential, commercial and industrial sectors, only if they see direct and tangible benefits.

The establishment of effective energy efficiency standards and labeling regime for lighting, household appliances and transport sector will lead to a more sustainable energy future. Furthermore, energy efficiency standards and labels have been introduced through a formalized process of consultation with all the stakeholders and leading to a government regulation.

The government agencies i.e., SEEC, SASO, Ministry of Commerce and Trade are playing a significant role in the implementation and enforcement of energy efficiency action plans for standards and labels. The NEEP II created awareness about energy efficient household appliances and now retailers, importers and manufacturers can check online the label which shows the general public commitments towards energy efficiency.

A number of campaigns, using electronic and print media, seminars and exhibitions have been used to create awareness raising about the general public, academia and Government official about energy efficiency in household appliances, transport and industry.

## South-South Cooperation

Saudi Arabia is coordinating and supporting in energy efficiency and management of water resources with Gulf Cooperation Council (GCC) countries that have facilitated, encouraged and established South-South transfer of technical know-how and technology.

There is a potential to be tapped for regional and international cooperation in addressing interconnected issues and common problems in the field of energy and management of water resources. The MOWE and SEEC should explore, the possibility of capitalising and replicating at regional and international levels key results so far achieved by them in the area of energy efficiency and management of water resources.

There is a need for disseminating best practices and lessons learnt at the regional and international levels, while having a chance to benefit from technical exchanges, capacity building, training opportunities and international exposure for their own staff.

There is a need for development of a regional forum and network with GCC/South East Asia - for dialogue and action on Energy Efficiency as well as Energy Standards and Labelling Regime, to increase the capacity and political will to develop, implement and finance Energy Efficiency as well as Energy Standards and Labelling Regime programs. Ultimately, the outcome will lower energy intensity within countries in the region.

A case study of BRESL Project which was implemented in Bangladesh, China, Indonesia, Pakistan, Thailand and Vietnam has been provided in Table 3.3.

Table 3.3: A brief on BRESL Project

|  |  |
| --- | --- |
| **Title** | **Description** |
| Project Title | Barrier Removal to the Cost effective Development and Implementation of Energy Efficiency Standards and Labelling (BRESL) |
| BRSEL is funded by GEF with the total amount of USD$ 7.8 Million. The project duration is 5 years. The participating countries include Bangladesh, China, Indonesia, Pakistan, Thailand and Vietnam. The products covered by BRSEL are Refrigerators; Room air conditioners; Electric motors; Ballasts for FLs; Electric fans; Compact fluorescent lamps; Rice cookers.  The main Services of Regional Energy Efficiency Standards and Labeling Network are as follows:   * Information Sharing: Information; Policy, project and program; products, tool-package. * Harmonization Initiatives: Sharing of experiences and enhancing cooperation; facilitate regional harmonization. * Information Sharing: Information; Policy, project and program; products, tool-package. * Technical Assistance: Provision of technical support materials; Sharing of experts; Assistance to countries in developing the EES&L programs. | |

## UNDP Exit Strategy

There is no documented UNDP exit strategy for Outcome II of National Country Programme.

The overall performance in implementation of outputs toward outcome is highly satisfactorily. Now, SEEC is able to design, plan and execute their future interventions in energy efficiency. They are already implementing a number of initiatives with other development partners, academia, public and private sectors organizations and hence it does not need any additional support from UNDP.

There is a need to support MOWE in the implementation of capacity development for sustainable development and management of water resources in the KSA and beyond. Although, there is increase in capacity development of MOWE and now they are able to tackle most of water sector problems, but nevertheless they will still need UNDP support in the forseable future.

The future involvement of UNDP KSA should be in line with adaptation and mitigation measures proposed by Saudi Arabia in the Intended Nationally Determined Contribution document to UNFCCC during November 2015. There is a need to consider interventions in water and wastewater management, integrated water management planning, and reduction in desertification.

# Recommendations

## General recommendations

Saudia Arabia has started conserving water in agriculture sector and there is an increase in tariff for commercial and industrial water users. These measures will indeed facilitate sustainable use of water resources in KSA. Therefore, there is a need to identify options which must be explored as follows:

* + Identifyg new sources of water;
  + Maximizing treated wastewater reuse,
  + Maximizing water conservation;
  + Minimizing water loss in the water supply transmission and distribution network pipelines
  + Expansion of solar powered desalination plants with appropriate environmental management
  + Maximizing rain water harvesting.

## Corrective Actions for ongoing projects

Capacity Development for sustainable development and management of water resources in the kingdom of Saudi Arabia

* All stakeholders should extend support for timely completion of Integrated Water Information System (IWIS) which is a key to the success of the outcome.
* There is a need to conduct awareness seminars for all data providers to IWIS. The IWIS must establish necessary protocols to check the reliability and accuracy of data provided by different stakeholders. There is a need that every year at least 2-3 % of data entered into IWIS should be cross checked for reliability and accuracy including checking of calibration of equipment used and its compliance of required data acquisition protocol.
* UNDP should emphasis the importance of timely establishment of National Water Regulatory Authority to MOWE which is an important milestone for implementation of KSA Water Regulatory Mechanism and Coordination.
* The field tests of Ground Water Hydrological Modules should be carried out to confirm that they are duly calibrated and provide required sensitivity analysis for the ground water aquifer monitoring.
* UNDP should update the schedule for placement of all intended international experts. UNDP should consider engagement of additional international experts particularly a Water Economist and Hydro-geologist having knowledge of ‘Rock Shell’ so as to complete the task of ‘Ground water delineation’ monitoring.
* Proactively involve Ministry of Agriculture in the implementation of the project for better coordination as they are the major water user.
* UNDP should conduct an annual review of the project at the time of submission of Annual Work Plan by MOWE. During this annual review, overall progress of the project’s outputs towards outcome should be discussed, necessary changes should be made, if any, and the work plan should be approved.
* To extend the duration of the project by two years so as to achive the outcome.

National Energy and Efficiency Programme (NEEP) Phase II

* Extend the project duration by one year so as to ensure that the Energy Efficiency Law and Energy Conservation Strategy is approved within its duration.
* Conduct Terminal Evaluation of NEEP II Project to assesses achievement of the Project’s objective, outcomes and outputs, and presents ratings for the targeted objective and outcomes.

## Corrective Actions for Future UNDP Projects

Support Establishment of KSA EIMS

UNDP should support establishment of Kingdom of Saudi Arabia - Environmental Information Management System in Kingdom of Saudi Arabia (KSA EIMS) for strengthening institutional mechanisms for Integrated Environmental Management since considerable data such as EEIS, IWIS, RCY, ARAMCO, academia, public and private sector organizations etc. is available.

The objective of KSA EIMS should be to collect and compile scattered data on sustainability and environment, leading towards complete, largely automatic, fully integrated ‘state of the art’ solutions for sustainable environmental management, planning assessment, compliance, monitoring, control and impact assessment and produce annual state of the environment report of KSA.

The objective of an Environmental Information Management System is to provide an inventory (directory) of environmental information resources, employ a web interface for search and retrieval of descriptive information (Meta data) and statistics and enable staff and nodal agencies to develop the inventory using web based data forms.

KSA EIMS would provide models and other analytical tools to transform data into information that is suitable for human interpretation. It would also serve as an archive for reports and studies conducted in the past.

Partner agencies and NKSA-EIMS staff would also access the system using the web interface, standard data input forms would enable partner agencies to submit data throughout the day from any location. Furthermore, the NKSA-EIMS staff would have administrative control to maintain and expand the overall system. The Environmental Management Information System (EMIS) Cells will be established at all the nodal agencies.

The Presidency of Metrology and Environment (PME) should act as a focal agency and manage KSA-EIMS central library. Each partnering/nodal agency will build and maintain agency specific databases and corresponding metadata. Each partnering/nodal agency will also designate a focal person, responsible for coordinating data management efforts with the central agency.

The KSA-EIMS is expected to contribute to promotion of sustainable development through enhancing the quality, efficiency and accountability of decision and policy making in the context of sustainable development by providing timely and accurate environmental information.

The KSA-EIMS will facilitate national state of environment reporting, provide tools for monitoring and control of environmental impacts, preparation and assessment of regulations, and development and assessment of market instruments and promote inter-ministerial coordination.

Please refer to website: <http://www.slideserve.com/jaden/environmental-information-system-for-uzbekistan> for additional information on EIMS Uzbekistan

Support Climate Change’s Adaptaion and Mitigation Projects in KSA

* The future involvement of UNDP KSA should be in line with adaptation and mitigation measures proposed by Saudi Arabia in the Intended Nationally Determined Contribution document submitted to UNFCCC during November 2015.

There is a need to consider interventions in water and wastewater management, integrated water management planning and reduction in desertification.

# Lessons Learnt

Due considerations should be given for selection of National Contributing Partners: The Ministry of Agriculture, main consumer of 84% of water was not actively involved in the implementation of capacity development for sustainable development and management of water resources in KSA project.

Whereas, in case of NEEP II project all the stakeholders i.e., SEEC, SASO, Ministry of Commerce and Trade, Ministry of Petroleum and CDM Policies, Ministry of Economic and Planning, Renewable Energy played significant role as being implementing partners to the project.

There is a need that in any project or programme involving preparation of laws, regulations, and strategies for development of sector like water must involve all major stakeholders.

Improve quality of Annual Progress Reports by the implementing Partners

The overall monitoring and evaluation of all the three projects is satisfactory. However, the annual progress reporting is ‘Satisfactory’ by SEEC and ‘Poor’ by MOWE.

There is a need to improve quality of Annual Progress Reports by the implementing Partners by jointly preparing a format of the Annual Progress Report containing Project’s snapshots, Introduction, Situation Analysis, Project Performance and Results, Contribution toward Country Programme Outcome; Achievement of Project Results/Outputs; Lessons Learnt, and the Way Ahead/Key Priorities for Next Year Annexures on Annual Work Plan Based reporting matrix and Annual Project Quality Assurance Assessment

The Annual Progress Report should be discussed in a seminar so that overall progress achieved is fully discussed and documented.

Coordination among different sectors

The success of the outcome is dependent upon robust coordination between various ministries, public and private sector Organizations, academia and other stakeholders. The outputs of NEEP II project were achieved mostly in time, mainly due to better coordination between all the stakeholders whereas in case of capacity development for sustainable development and management of water resources in KSA project it was only satisfactory.

Data collection and analysis

The reliability of data provided by different stakeholders must be ensured for reliability and accuracy so that the management information system does provide accurate information to the potential users.

Enforcement of policies and implementation of strategies across different sectors

The enforcement of policies and implementation of strategies went smoothly in case of use of energy efficient household appliances, energy efficiency measures in transport and industrial sector as awareness raising was robust and to the fact that general public, consumers and industrialist see a tangible economic benefit in the long term.

A: Terms of Reference

**1. Introduction**

In accordance with the Evaluation plan of the UNDP Country Office in Saudi Arabia, an outcome evaluation is scheduled to be conducted at the end of Q3 2015 to evaluate progress made towards the following Country Programme outcome – Outcome II: “Enhanced Policies and Strategies for Sustainable Use of Natural Resources and the Environment”. In this context, UNDP Saudi Arabia is seeking to evaluate the contribution of its projects to the achievement of the above mentioned outcome.

**2. Brief description of the Outcome**

The 9th National Development Plan (NDP 2010-14) for Saudi Arabia has the overall theme of sustaining development with a record allocated budget of $385 billion, a 67% increase from the 8th NDP, targeted at six goals: improving standards of living, regional development, economic diversification, knowledge-based economy and competitiveness, and human resources including youth and women. Although the 10th NDP has yet to be released, sustainability in its three pillars (social, environmental and economic) remains the leading concern.

Kingdom of Saudi Arabia (KSA) has made great progress in recent years with rise in HDI to 0.836 in 2013 placing it in the Very High Human Development category.  As noted in 2009 National MDG Report, ten of eleven targets have been or would be reached by 2015. About 1.63% of Saudi families live under $2/day (2005) largely in remote rural communities. As a G20 member and largest economy in the region, KSA is a global partner in development.

As noted by UNDP’s MDG Strategy for the Arab Region, where breakthroughs to MDG achievement have already been made as in KSA, a key focus is on the need for sustainability of development results. Developed with UNDP support, the 9th NDP aims to reinforce KSAs progress and support its sustainability. As noted therein, KSA relies on the oil sector for 90% of public revenues, 45% of GDP, and 90% of export earnings, while also facing high unemployment of 14.4% (2005).

KSA seeks to diversify the economy beyond oil exports and create future employment opportunities, including development of a knowledge-based economy and geographic diversification of growth and increased share of private sector-generated GDP alongside greater effectiveness of local administration. KSA also invests in a new generation of universities to support future employment needs. Industrialization and urbanization are leading to rising ecological footprints with policy solutions to resource scarcity. This has been identified as a clear priority in the NDP for energy conservation, renewable energy, and water conservation as groundwater scarcity sets in and pollution impacts and climate risks to human development emerge.

An Outcome Evaluation on Development Policy found UNDP’s positive role in shifting focus towards sustainability of results and recommended future focus on social, environment and economic pillars of sustainable development. Increased emphasis was advised for results-based management and connecting partners to global partnerships.

NDP’s cooperation focuses on capacities to design and implement energy efficiency policies, South-South Cooperation’s on the matter, capacity development of Nationals to carry on with sustainable development in terms of Water Conservation, Waste Management and clean energy. This includes use of global partnerships to share best practices.

**3. Main outputs and initiatives expected to have contributed to the outcome**

The main outputs and initiatives that have contributed to the outcome are contained within the following projects outlined in the below:

* Award 80559, National Energy and Efficiency Programme (NEEP) Phase II.
* Award 59437, Ministry of Water and Electricity (MOWE) Capacity Building.
* Award 90136, Sustainability in Madinat Yanbu Al-Sinaiyah (MAYS).

**4. Outcome Evaluation Objectives:**

The objective of the outcome evaluation is to assess how the outputs under the above mentioned projects have contributed to the change in the outcome: “**Enhanced Policies and Strategies for Sustainable Use of Natural Resources and the Environment**”, including an assessment of sustainability of achievements, relevance and impact, efficiency and effectiveness, UNDP exit strategies, South-South Cooperation and innovation. In addition, the evaluation will seek to answer the following question: Has UNDP’s technical and advisory support provided to partners through relevant projects assisted in fulfilling the Government’s vision and mandates; sustained their functions and activities and thereby contributed to Saudi determination of its economic and social policies and strategies to the maximum possible extent?

The evaluation of this outcome was strategically placed at this particular time in order to promote needed adjustments, identify lessons learned and draw up a sustainability plan for the continuing projects, and feed lessons learned and recommendations into future cycles.

**5. Scope of Outcome Evaluation:**

The outcome evaluation will include four standard categories of analysis (i.e. an assessment of progress towards the outcome, an assessment of the factors affecting the outcome, an assessment of key UNDP contributions to outcome, and an assessment of the partnership strategy used). The scope of the evaluation will be determined by the following questions:

*Outcome status:* What was the origin of the outcome and its constituent interventions? How were the past experience, findings and recommendations of previous evaluations, and dialogue with stakeholders used in design of outputs? What was the adequacy level of background work carried out? Has the outcome been achieved and, if not, is there any progress made towards its achievement? What is the balance effort needed and the suitability of pursuing the achievement of the outcome? What innovative approaches were tried and capacities developed through UNDP assistance?

*Underlying factors:* What are the underlying factors beyond UNDP’s control that influenced the outcome? What were the key assumptions made, internal and external factors? What are the substantive design issues from the key implementation and/or management capacities to issues including the timeliness of outputs, the degree of stakeholder and partner involvement in the completion of the outputs, and how processes were managed/carried out?

*UNDP contribution:* What is the relevance of the outcome and the constituent components specifically for UNDP assistance? Can UNDP funded constituent outputs and other interventions—including the outputs, programmes, projects and soft and hard assistance—be credibly linked to achievement of the outcome? *Partnership strategy*: Was UNDP’s partnership strategy appropriate and effective? What were the partnerships formed? How did partnerships arise? What was the role of UNDP? How did the partnership contribute to the achievement of the outcome? How did they function and sustain? What was the level of the participation of stakeholders? Who were the key beneficiaries and their major perceptions?

B: List of documents Reviewed

* Capacity Development for Sustainable Development and Management of Water Resources in the Kingdom of Saudi Arabia, Project Document, January 2012
* Capacity Development for Sustainable Public Service Management, May 2013
* Evaluation of the State of Sustainability in Madinat Yanbu AL Sinaiyah (MYAS), May 2014
* Draft Country Programme Document Saudi Arabia (2012-2016), July 2011
* National Energy Efficiency Programme Phase II, December 2011
* NEEP II Project Progress Report, 1 January to 31 December 2012
* NEEP II Project Progress Report, 1 January to 31 December 2014
* NEEP II Project Progress Report, 1 January to 31 December 2013
* Capacity Development For Sustainable Development And Management Of Water Resources In The Kingdom Of Saudi Arabia, Project Progress Report 1 January to 31 December 2014
* Evaluation of the Status of Sustainability in Madinat Yanbu Al Sinaiyah (MYAS), Kingdom of Saudi Arabia, January 2015
* Brief Report on the Ninth Development Plan (2010-2014), Ministry of Economy and Planning, Kingdom of Saudi Arabia
* <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Saudi%20Arabia/1/KSA-INDCs%20English.pdf>
* http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Grain%20and%20Feed%20Annual\_Riyadh\_Saudi%20Arabia\_5-14-2015.pdf

C: List of Persons Interviewed

* Dr. Mohammed I. Al-Saud, Deputy Minister for Water Affairs, Ministry of Water and Electricity, Riyadh
* Gustavo E. Diaz (Water Resources Planning & Management Expert)
* Dr. Ayman Abdul Rahman, Water Resource Engineering, Consultant, MOWE, Riyadh
* Dr. Ayaz Hasan Al-Hasan, Advisor/Senior Water Specialist, MOWE, Riyadh
* Engr. Mane M. A. Abudrahem, Water Engineering, Department of Water Research and Studies, MOWE, Riyadh
* Dr. Naif M. Alabbadi, Director General, Saudi Energy Efficiency Centre, Riyadh
* Eng. Abdullah A. Albawardi, Project Manager, NEEP II, Saudi Energy Efficiency Center, Riyadh
* Mr. Khalid A. Al-Hajery, Director, Environmental Control Department, Royal Commission for Jubail and Yanbu
* Ms. Mayssam Tamim, Assistant Resident Representative, UNDP, Riyadh
* Mr. Asim Salah, Programme Associate, UNDP, Riyadh

E: Results framework for the projects implemented Under Outcome II: Enhance Polices and Strategies for Sustainable Use of Natural Resources and the Environment

| **Activities** | **Expected Outputs** | **Baseline** | **Output level Indicators/Targets** | **Progress Achieved** |
| --- | --- | --- | --- | --- |
| **National Energy Efficiency Programme Phase II** | | | | |
| **Outcome 1: Energy Conservation Law, Stratregy and Action Plans** | | | | |
| Provide expert support to review and completion of the Energy Conservation Law and National Energy Strategy.  Provide support to development of implementing regulations and policies with partners. | Energy Conservation Law; National Energy Efficiency Strategy | Law drafted | National Energy Strategy submitted to SEEC board | UNDP expert provided support to SEEC to review and completion of the Energy Conservation Law and National Energy Strategy.  The draft of Energy Conservation Law has been approved by SEEC Board.  A comprehensive National Conservation Strategy is being prepared which will contain all aspects of energy conservation.  The Energy Conservation Law and National Energy Strategy will be finalized by end 2016. |
| Assessment of challenges and opportunities for efficiency gain in the buildings and transportation sectors. | Energy Efficiency Action Plans Key Sectors | Labels for 3 appliance exist. | Standards improved by 30% and draft action plan ready for building and transport sectors | Those Air conditioners’ which did not comply with new Specification (SASO 2663/2012) become illegal.  The Energy Efficiency Action Plans for buildings, transport and industrial sectors has been prepared and approved. Furthermore, SEEC concentrated on high energy consuming industries i.e., Steel, Cement and Petro-chemical.  Regarding energy efficiency labels for transportation sector, fuel economy label was enforced on light vehicles of 2015, model.  A memorandum of understanding regarding the new fuel policy has been signed with 78 companies.  Transportation team has developed tires rolling resistance and wet grip standard for light duty vehicles which will be enforced by November 2015.  The energy efficiency team has finalized the draft for energy efficiency standards for residential lighting and its impact on the light market. The standards for residential lighting has been approved from SASO and will be enforced in the first quarter of 2016.  UNDP has facilitated assessment of challenges and opportunities for efficiency gain in the buildings and transportation sectors.  SEEC anticipate that by enforcement of Energy Efficiency Action Plans for building, transport and industrial sectors they will be able to save up to 30% of energy consumption comparing it with business as usual scenario. |
| **Outcome 2: Capacity Development for Energy Managers and Leaders** | | | | |
| Analysis of training levels and needs for new SEEC staff members and energy managers in partner institutions. | Capacity needs assessment of training needs in SEEC and stakeholders. | No assessment done | Detailed plan for training needs in each sector prepared. | The detailed plan for training levels and needs assessment SEEC staff has been prepared and 60 staff was trained.  The capacity need assessment of training needs of stakeholders will be carried during 2016. |
| Design of series of ToT sessions, inculding design of curriculium for specific sectors and identification of selected individuals from partner institutions for both men and women.  Conduct series of ToT sessions across the country for specific sectors and selected individuals from partner institutions to serve in futire as training leaders in KSA targeting both men and women | Training of trainers in energy efficiency | No national trainers | 20 national trainers avaialable within partner institutions. | Six courses were conducted with 150 participants and four workshops were held which were participated by 80 staff during 2015.  The design of series of ToT sessions, inculding design of curriculium for specific sectors and identification of selected individuals from partner institutions for both men and women were carried out as planned.  Series of ToT sessions has been planned across the country for specific sectors and selected individuals from partner institutions to serve in future as training leaders in KSA targeting both men and women.  20 national trainers of partner institutions will be trained during early 2016. |
| Conduct series of training sessions across the country for specific sectors directly by project experts. | Direct training for energy managers | No trained energy managers | 20 national trainers avaialable within partner institutions | This output had been changed to “Establishing Project Management Office” [PMO].  The enterprise excellency team has completed an organizational project management assessment by gathering project data, interviewing team leaders, and analyzing collected data during 2014.  In addition, the team also engineered the PMO solution; therefore, PMO project was ready as planned.  The direct training of energy managers was conducted as planned. |
| **Outcome 3: Energy Efficiency Information Systems (EEIS)** | | | | |
| Analysis of comparative models and lessons learned in EEIS systems around the world and feasibility for the Saudi context. Design of blueprint for EEIS system for Saudi Arabia. | Comparative review of EEIS systems around the world | Initial information of systems and database exist | Blueprint for EEIS prepared | The industrial team has completed benchmarking for processes of petrochemicals, cement, steel factories, and compared them to international energy efficiency levels to reduce the gap and reach the average energy intensity in 2019 as per revised target.  The transportation team has completed their planned benchmarking of transportation sector.  There is a need to prepare energy use index in kw/m3  The building team has yet to carry out their work. The main issue is whether to go ahead with the building code or not?  The blueprint for EEIS has been prepared on the basis of comparative review of EEIS systems around the world. |
| Establishment of EEIS including technologies and institutional protocols for sustainability of tis operations | Establishment of EEIS for Saudi Arabia | No EEIS but some hardware and info available | System operational and used by partners | All the required hardware and software tools were acquired.  SEEC has completed the work on Saudi Label and Standard website (www.sls.gov.sa) which is a database for energy efficiency labeling program in the Kingdom of Saudi Arabia. The consumer can check whether the label is genuine or fake.  The database contains all the energy efficiency data related to air-conditioners in local market and all other devices carrying energy efficiency labels.  Saudi Label and Standard website is regularly updated by SASO which is responsible for maintaining and updating such data  EEIS system is operational and used by partners i.e., retailers and manufacturers.  The establishment of EEIS for Saudi Arabia is operational and people have trust on the labels. The process of acquiring labels is simplified which takes 2-3 weeks by the manufactures and 1-2 days at SASO and SEEC to approve the label. |
| **Outcome 4 : Awareness Raising for Public and Industry** | | | | |
| Conduct surveys and polling for level of awareness among different stakeholders in five different cities across the country | Baseline Surveys and polling | No survey done | Survey done for cities | Twelve focus groups were held and brief presentation was prepared to show their results  All schools curriculum in Saudi Arabia have been surveyed and a report was prepared to add awareness subjects about the importance energy efficiency.  More than 300 international awareness campaigns were reviewed and analyzed to determine the best methods to conduct the National Campaign for Energy Efficiency.  A three-year plan covering 2014 to 2016 was developed for the National Campaign for Energy Efficiency.  Baseline survey were conducted for 5 cities i.e., Riyadh, Damam, Jeddah, Buryaidha, and Abha.  Fuel Economy compliance to energy efficiency was conducted to determine Eco Drive.  Energy Efficient Household appliance campaigns were conducted.  Various campaigns for education sectors i.e., from school to university levels were conducted.  A campaign has been planned during November/December 2015 for “Your role for Energy Efficiency” for people to enhance e their understanding.  The campaigns are planned with SASO, MOC etc. to enhance their awareness. |
| Design of national campaign for energy conservation on TV, short films, public billboards, print media. Implement a number of campaigns addressing the residential sector. | National campaign for energy conservation | Campaigns targeting families and student done in 3 cities | Awareness campaigns plan for all sectors and for a period of 5 years drafted and approved | The website and social networks accounts for the National Campaign for Energy Efficiency has been launched.  News about energy efficiency activities was disseminated. Press conferences were held about energy consumption in Saudi Arabia.  An agreement was signed with MBC TV station to prepare and show report about energy consumption in KSA.  A video about energy efficiency initiatives in Saudi Arabia was produced.  Design of national campaign for energy conservation on TV, short films, public billboards, and print media were conducted.  The national campaigns addressing the residential sector were conducted.  The awareness campaigns plan for all sectors and for a period of 5 years has been drafted and approved.  SEEC conducted surveys in five regions at the beginning of developing the plan of National Campaign for Energy Efficiency to obtain a general idea of the energy rationalization levels among citizens and residents. SEEC intends to conduct surveys before any campaign in 24 cities to know the level of awareness, and other surveys after the campaigns to understand their impact on individuals.    The surveys targeted male and female Saudi citizens from 18 to 60 years old and the focus in general was on families particularly on women.  The survey was conducted using three methods: interviews, focus groups and questionnaires. A special focus was on  SEEC hired female teams to participate in the awareness campaigns to provide more focus on women.  Moreover, SEEC conducted a number of campaigns especially for women who were placed in women’s universities, women exhibitions, etc.  In addition, most of the campaigns’ messages targeted women as they play a major role in changing the consumption behavior of the next generations, and since they are usually responsible for selecting household appliances.  A number of women have attended the training courses of building capacity in energy efficiency field such as Energy Conservation in Building Sector, Certified Energy Manager (CEM) and Saudi Energy Efficiency Forum and Exhibition. |
| **Capacity Development for sustainable development and management of water resources in the kingdom of Saudi Arabia** | | | | |
| **Outcome 1: Resource Assessment, Monitoring and protection** | | | | |
| Evaluate and update water resource estimates and provide optimal plan for water allocation plan for the kingdom.  To estimate agricultural water demand of kingdom through remote sensing & GIS techniques.  To estimate water withdrawals for potable water supply and withdrawals for industries and agriculture.  Capacity building (organizing seminars, workshop and training courses on water resources assessment) | Comprehensive evaluation for National Water resource use. | A detailed water resource studies for a number of aquifers were carried out and evaluated | Periodical comprehensive assessment of National Water resource use for municipal industrial and agricultural sub sectors. | Agriculture water resource assessment has been carried out.  The estimation of agricultural water demand of kingdom through remote sensing & GIS techniques has been carried out which is available city wise.  A contract is being signed with King Abdullah to estimate water withdrawals for potable water supply and withdrawals for industries and agriculture.  A limited number of capacity building activities (organizing seminars, workshop and training courses on water resources assessment) were carried out.  Periodical comprehensive assessment of National Water resource use for municipal industrial and agricultural sub sectors was carried out.  A comprehensive evaluation for National Water resource use has been done. |
| Prepare detailed work plan regarding monitoring, parameters (water level, salanity etc.), and for periodic monitoring and sampling.  Review of existing monitoring and sampling program and conduct additional monitoring surveys.  To forcast potential water supply shortages and determne mitigation measures to maintain existing ground water supplies.  Organise seminars, workships and training courses on water resources monitoring. | National water resources  Monitoring & Evaluation Program & Delineation of protection zones | Data was collected for a large numbers of wells during the detailed water resources studies and entered into Ministry data base | Develop National Water Resource Monitoring, progress and develop well field proction znes. | The mitigation measures to maintain existing ground water supplies are being applied.  Establish Guidelines for Groundwater Modeling |
| **Outcome 2: Development of National Integrated Water Resources Management (IWRM) Plan** | | | | |
| Prepare National IWRM Plan to integrate strategies and programs for surface groundwater desalinated wastewater reuse and formulate measures to efficient use of water resources.  Prepare plans for stakeholders’ consultations and implantation of IRWM by them.  Organize seminar, workshops and training courses for MOWE staff and stakeholders to implement IRWM | Develop National Integrated Water Resources Management (IWRM) Plan for long term sustainable development and management. | National Strategy of the year 2009 recommends National IRWM as so important component for long term plan | Plans to implement IRWM to the Saudi regions were developed after the consultation of all stakeholders. Also plans evaluation Mechanism. | National IWRM Plan has been prepared to integrate strategies and programs for surface, groundwater, desalinated, wastewater reuse and formulated measures to efficient use of water resources.  The plans for IWRM evaluation mechanism are being prepared.  National Integrated Water Resources Management (IWRM) Plan has been prepared for long term sustainable development and management and its implementation is going on. |
| **Outcome 3: Water Resources Data Management – Integrated Water Information System)** | | | | |
| Upgrade WRIC design with new hardware and software for large data acquisition and processing from monitoring network and MOWE directorates.  Integration of decision support system (DSS) with data baseand develop protocols for detailed analysis, mapping and reporting.  Expand GIS operations to support policy analysis, load ground water and hydrogilogical models for further planning.  Organise seminars, workshops and trainings courses on data loading, interfacing and reporting about water resources management planning. | Upgrade water resources information center. | water resources information center exists but needs to be up grade | Water resources information center will become a focal point of water resources information and tool for future planning of water sector. | IWIS plan design has been prepared and accepted by the MOWE. The mechanism of its implementation is being worked out.  The integration of decision support system (DSS) with data base and protocols developed for detailed analysis, mapping and reporting is being worked out.  The GIS operations are being expanded to support policy analysis, load ground water and hydroglogical models for further planning.  The water resources information center will become a focal point of water resources information and tool for future planning of water sector.  The upgraded water resources information center will be operational within 2 years when IWIS is operational.  The mechanism of its implementation is being worked out. Activities started during March 2015 and presently 25% of work completed. The IWIS will be operational within two years.  Two seminars were conducted on data loading, interfacing and reporting about water resources management planning. “Integrated Water Resources Information System” (IWIS) is the gateway to information on the Kingdom’s water issues. It comprises a wide range of data and information collected by government institutions, private organizations and individuals. IWIS is designed to serve three core activities of the water business: water planning (MoWE), water management (MoWE) and water regulation (independent body to be created).  The IWIS is comprised of data models, data migration, application development and the Government’s secured network. Presently, the progress has been achieved in data models and data mitgration. |
| **Outcome 4: Human Resource Development and Capacity Building in Water Resource planning Management** | | | | |
| Prepare annual training programs organize field visits to relevant national and international institutes to learn practices for water resource management.  Organize training courses on preparation of tender document and application of regulatory system and supervision of studies.  Training MOWE staff on advanced modeling and on-job trainings, on-line workshops and study visits | Prepare Annual plans & strategies for Human Resources Development. | there is no long term program for human resources development | MOWE staff will conduct technical studies related with water resources monitoring and management. |  |
| **Outcome 5: Institutional Restructuring of MOWE & Public-Private Partnership Enhancement** | | | | |
| To supervise institutional Restructuring program executions of MOWE.  Formulate action plan for establishment of water services regulation & licenses authority (WSRLA), Develop regulatory and licensing system and to prepare work plans for tanning of MOWE staff.  To supervise Public Private Partnership (PPP) activities and to prepare Terms of Reference (TORs) for PPP projects.  Organize seminars, workshops and training courses on public private partnership concept and strategy. | Prepare Action Plan to supervise institutional restructuring of MOWE & to prepare implementation plan for public private partnership (PPP). | The plan for institutional restructuring of MOWE has been finalized | Successful implementation of WSRLA Plan and follow up of MOWE PPP projects. | Action plan for establishment of water services regulation & licenses authority (WSRLA) is being in progress. |
| **Outcome 6: Water Quality Monitoring Protection & Enforcement** | | | | |
| Establish and undated standards guidelines and regulations for wastewater treatment and reuse in agricultural, industries and recreational purposes.  Develop action plan for institutional restructure and establishment of regulatory organization for wastewater treatment & reuse.  Delineate and monitor groundwater resources protection zones.  Organize seminar, workshops and training courses on wastewater treatment and reuse. | Development plans and strategies for water quality monitoring & regulatory systems. | Executive bylaws for wastewater treatment and reuse are developed, preliminary protection zone for groundwater are determined. | Development of regulations for wastewater treatment & reuse. | The updated standards guidelines and regulations for wastewater treatment and reuse in agricultural, industries and recreational purposes are being prepared.  Action plan for institutional restructure and establishment of regulatory organization for wastewater treatment & reuse ARE ongoing.  There are 5 modules in shell area and 8 modules in coastal areas for delineation and monitoring of groundwater resources protection zones. However, these modules cannot conduct sensitivity analyses of protected zones due to their problems with calibration and calibration. |
| **Outcome 7: Climate Change Effects on Sustainability of Water Resources** | | | | |
| Evaluation of regional and local climate results to assess and predict climatic changes effects on water resources  Develop plan to mitigate Natural Disaster related to water resources.  Organize seminars, workshops and training courses on climate change predication and integration of natural disasters. | Detailed synthesis of vulnerability of water resources due to climate change & development of systems to predict natural disasters. | Detailed future climate change impact study have been organized in 2005 using climate model. | Adoptation of climate change impact mitigations in National Sustainable Water Resources Management Plan. |  |
| **Outcome 8: Develop Comprehensive strategic program to achieve Millennium Development Goals (MDG)** | | | | |
| Develop comprehensive strategic action plan to achieve MDGs related to water resources.  Develop strategic plan for MIDGs related to water filed up to 2015 and to prepare annual reports on programs to achievement of such MDG.  Organize seminar, workshops and training courses on MDG related to water resources. | Develop in strategic plan to achieve millennium development goal related to water resources. | National MDG report was published in 2009. | MOWE staff will be able to achieve MDG related to water resources. |  |
| **Outcome 9: Specific Strategic Projects** | | | | |
| Carry out operational efficiency analysis of existing dams and identify new dam units  Carry out limited studies of local aquifers to evaluate aquifer potential and safe yield.  Organize seminars, workshops and trainings courses on advanced hydrogeological modeling techniques.  Review and supervise groundwater flow modeling project of MOWE.  Carry out studies to update the model of contaminated and effective groundwater pumping area in the kingdom.  Organize seminars, workshops and training courses on advanced groundwater modeling techniques to MOWE staff. | To conduct specific detailed hydrological investigations & training of MOWE staff in groundwater and Modeling. | detailed water resources studies for several effects within the K.S.A were conducted | MOWE staff will be able to carry out detailed water resources studies and groundwater modeling. | The operational efficiency analysis of existing dams was carried out.  The specific detailed hydrological investigations & training of MOWE staff in groundwater and Modeling was conducted. |
| **Outcome 10: Water Conservation & Efficient Supply Management** | | | | |
| Develop comprehensive plan for water management and use of advanced network transmission, as well as development of wastewater collection, treatment and reuse.  Determine state of the art hardware and software are used in water transmission and distribution facilities.  Organize seminar, workshops and training courses on water transmission and distribution techniques.  Develop operation plan for enforcement of National Water Conservation Strategy.  Organize seminar, workshops and training courses on advance conservation Techniques. | Develop action plan for water conservation and management. | MOWE has completed four phases of water rationalization campaign | Develop and implement water management and conservation plan to achieve the target of unaccounted for water (UTF) to 5 % by the year 2026. | There is a decree to stop growing of wheat and fodder crops which is the single action that will reduce pressure on withdrawal of water from non-renewable ground water resources. |
| **Evaluation of the Status of Sustainability in Madinat Yanbu AL Sinaiyah (MYAS)** | | | | |
|  | | | | |
| Prepare a desk review (report) on international experience in the field of environmental sustainability  Collect, share and maintain knowhow, expertise and best practices and guidelines in environmental sustainability for industrial cities globally.  Assess the situation in MYAS and prepare initial report | Desk Review (report) and assessment of the current Sustainability Situation |  | Clarity on current situation and agreement on global standards | The desk review (report) on international experience in the field of environmental sustainability was conducted.  The consultant collected, shared and maintained knowhow, expertise and best practices and guidelines in environmental sustainability for industrial cities globally.  The consultant assessed the situation in MYAS and prepared initial report.  There is a clarity on current situation and agreement on global standards by the RCY.  The desk Review (report) and assessment of the current sustainability situation was carried out. |
| Based on output 1 draft an initial report on suggested areas for improvement best practice awards.  Collect and compile steps needed to apply for environmental sustainability best practice awards.  Prepare a presentation to the RCY, relating the desk review findings, gap analysis and recommendations.  Consolidate feedback, and prepare a full report to be sent Royal Commission at Yanbu via UNDP | Identification of areas for improvement and make suggestions on how to apply for best practices in environment awards. |  | Agreement on areas of improvement and steps towards implementation discussed. | Based on output 1 an initial report on suggested areas for improvement best practice awards was submitted to RCY.  The consultant collected and compiled steps needed to apply for environmental sustainability best practice awards.  The consultant prepared a presentation to the RCY, relating the desk review findings, gap analysis and recommendations.  The consultant consolidated feedback, and prepared a full report which was sent Royal Commission at Yanbu via UNDP.  The areas of improvement and steps towards implementation on sustainability of Yanbu were agreed by RCY.  The consultant identified areas for improvement and made suggestions on how to apply for best practices in environment awards in MAYs. RC has its own environmental laws which are strictly followed.  The Royal Commission operate 6 Air quality stations and 4 Meteorological stations and all these stations are connected to the main EPCD computer for online monitoring.  The collected data are compared with the RC ambient standards to ensure that the ambient air within the acceptable range at all the times within standards. RCY has special Regulations on Waste Management. There are 4 Integrated Waste Management Facilities inside MYAS. Hazardous Material Storage & Transport is strictly monitored by RC in the form of a unique electronic tracking system for all trucks and road tankers.  Advanced and latest air dispersion models are used by the Royal Commission to determine the impact of existing and/or new industries on ambient air of Yanbu Industrial City.  A communitywide environmental education scheme to increase public awareness, knowledge, and appreciation for environmental protection by means of special awareness program aimed at younger generations. |

1. *http://knoema.com/atlas/ranks/Energy-intensity?baseRegion=SA* [↑](#footnote-ref-1)
2. *Capacity Development for Sustainable Development and Management of Water Resources in the KSA, Project Document, UNDP 2012* [↑](#footnote-ref-2)
3. <http://www.countrymeters.info/en/Saudi_Arabia> [↑](#footnote-ref-3)
4. http://www.arabnews.com/news/532571 [↑](#footnote-ref-4)