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IMPLEMENTATION COMPLETION AND RESULTS REPORT
(TF-91191)

ON A

GRANT

IN THE AMOUNT OF
(US$6.0 MILLION)

TO THE

REPUBLIC OF SOUTH AFRICA

FOR THE

RENEWABLE ENERGY MARKET TRANSFORMATION PROJECT

MARCH 27, 2014

Energy Practice 1
Sustainable Development Department
Country Department AFCS1
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective 2013)

Currency Unit = ZAR
1.00ZAR = US$0.10
US$1.00 = 9.87ZAR

FISCAL YEAR
2013–2014

ABBREVIATIONS AND ACRONYMS

BEE	Black Economic Empowerment
CEF Group	Central Energy Fund Group
CO_2	carbon dioxide
CSP	Concentrating Solar Power
CSWH	Commercial Solar Water Heating
DANIDA	Danish International Development Agency
DBSA	Development Bank of Southern Africa
DFI	Development Finance Institution
	DME Department of Minerals and Energy (part of which was later renamed DoE)
DoE	Department of Energy
DSM	demand-side management
DTI	Department of Trade and Industry
ESMAP	Energy Sector Management Assisted Program
FMU	Financial Management Unit
G5	Group of Five
GEF	Global Environment Facility
GEO	Global Environmental Objective
GHG	greenhouse gas
GWh	gigawatt-hour
HP	high pressure
ICR	Implementation Completion and Results Report
IDC	Industrial Development Corporation
IEG	Independent Evaluation Group
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IRR	internal rate of return
ISMO	independent system and market operator
ISR	Implementation Status Report
ISU	Implementation Support Unit
kg	kilogram
kWh	kilowatt-hour
LP SWH	Low-pressure Solar Water Heating
MG	Matching Grants

MTR	Mid-Term Review
MW	megawatt
M&E	Monitoring and Evaluation
NERSA	National Energy Regulator of South Africa
NSWHF	National Solar Water Heating Framework
NT	National Treasury
PAD	Project Appraisal Document
PDO	Project Development Objective
PG	Performance Grants
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PSC	Project Steering Committee
RE	renewable energy
REFIT	Renewable Energy Feed-In Tariff
RE IPP	renewable energy independent power producer
REIPPPP	Renewable Energy Independent Power Producer Procurement Program
REMT	Renewable Energy Market Transformation
REPG	renewable energy power generation
REWP	Renewable Energy White Paper
SABS	South African Bureau of Standards
SASTELA	Southern African Solar Thermal and Electricity Association
SWH	Solar Water Heating
TA	technical assistance
ToRs	Terms of Reference
USD	United States dollar
ZAR	South African rand

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SOUTH AFRICA
RENEWABLE ENERGY MARKET TRANSFORMATION
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A. Basic Information			
Country:	South Africa	Project Name:	Renewable Energy Market Transformation
Project ID:	P073322	L/C/TF Number(s):	TF-91191
ICR Date:	01/16/2014	ICR Type:	Core ICR
Lending Instrument:	TA	Borrower:	REPUBLIC OF SOUTH AFRICA
Original Total Commitment:	USD 6.00M	Disbursed Amount:	USD 4.65M
Revised Amount:	USD 6.00M		
Environmental Category: N/A		**Global Focal Area: Climate Change**	
Implementing Agencies: Development Bank of Southern Africa			
Co-financiers and Other External Partners: Government of South Africa			

B. Key Dates				
Process	**Date**	**Process**	**Original Date**	**Revised/Actual Date(s)**
Concept Review:	06/14/2004	Effectiveness:		09/26/2008
Appraisal:	08/30/2005	Restructuring(s):		12/14/2009 09/26/2011 12/12/2012
Approval:	06/28/2007	Mid-term Review:	06/30/2011	05/23/2011
		Closing:	09/30/2011	12/31/2012 09/30/2013

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes:	Satisfactory
Risk to Global Environment Outcome:	Moderate
Bank Performance:	Satisfactory
Borrower Performance:	Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance			
Bank	**Ratings**	**Borrower**	**Ratings**
Quality at Entry:	Moderately Satisfactory	Government:	Highly Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance:	**Satisfactory**	**Overall Borrower Performance:**	**Satisfactory**

C.3 Quality at Entry and Implementation Performance (IP) Indicators			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating**
Potential problem project at any time	No	Quality at Entry:	N/A
Problem project at any time	Yes	Quality of Supervision:	N/A
Project Development Objective (PDO)/Global environmental objective (GEO) rating before closing	Satisfactory		

D. Sector and Theme Codes		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Central government administration	48	48
General finance sector	3	3
Other renewable energy	49	49
Theme Code (as % of total Bank financing)		
Climate change	33	33
Environmental policies and institutions	33	33
Micro, small, and medium enterprise support	17	17
Regulation and competition policy	17	17

E. Bank Staff		
Positions	**At ICR**	**At Approval**
Vice President:	Makhtar Diop	Obiageli Katryn Ezekwesili
Country Director:	Asad Alam	Ritva S. Reinikka
Sector Manager:	Lucio Monari	S. Vijay Iyer
Project Team Leader:	Karan Capoor	Xiaodong Wang
ICR Team Leader:	Karan Capoor	
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F. Results Framework Analysis

Project Development Objective (PDO) and Key Indicators (as approved)
The PDO was to establish policy and regulatory frameworks and build institutional capacity for renewable energy (RE) development in South Africa. In line with Global Environment Facility Operational Program 6, the global environmental objective is to remove the barriers to, and reduce the implementation costs of, RE technologies to help mitigate greenhouse gas emissions. The specific priority is CC-3 power sector regulatory frameworks and policies for grid-based RE.

PDO/GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Support the government and the electricity regulator to develop a legal, policy, and regulatory framework for grid-based renewable energy.			
Value	No frameworks in place	Policy and regulatory frameworks effective		Policy and regulatory frameworks effective
Date achieved	06/30/2007	09/30/2009		09/30/2011
Comments	Target achieved. Indicator was amended to include implementation support for renewable energy (RE) frameworks being developed. The National Energy Act of 2008 set the stage for approval by the regulator of the Renewable Energy Feed-In Tariff (REFIT) framework in 2009 , which included a draft standardized power purchase agreement, for which the REMT Project supported a review by a specialist law firm and comments by project developers. The power planning process was revamped based on key inputs from REMT and was finalized in March 2011 with large allocations for RE. Regulations for the procurement of RE were announced in May 2011, setting the stage for large-scale implementation of the government's flagship Renewable Energy Independent Power Producer Procurement Program (REIPPPP) announced in August 2011.			
Indicator 2:	Develop and make a renewable energy resource database available.			
Value	No information on solar, biomass, hydro available	RE resource database developed and available to private developers		RE resource database made available to private developers
Date achieved	06/30/2007	09/30/2010		11/30/2010
Comments	Target achieved. The REMT Web site made available maps with high-level information on solar, wind, and biomass resources. In addition, the REMT Web site provided a link to the wind resource database that was developed by the South African Wind Energy Program, a Department of Energy–United Nations Development Programme project.			
Indicator 3:	Assist 10–14 potential RE power generation developers, and prepare 4–6 pre-feasibility studies through REMT's Matching Grants (MG) program.			
Value	Very few RE projects by private developers	10–14 firms assisted and 4–6 pre-feasibility studies		14 firms and 33 pre-feasibility/pre-investment studies

		conducted		supported
Date achieved	06/30/2007	09/30/2011		09/30/2013
Comments	Target achieved. This indicator was amended in 2009 to include support for pre-investment studies for eligible project developers. Support from the REMT's Matching Grant (MG) program was provided to 14 beneficiaries to develop projects with a combined generation capacity of 275 MW. MGs sometimes supported multiple pre-investment studies for projects and sometimes supported more than one project being developed by an applicant firm. REMT support contributed to at least 5 of these projects with a generation capacity of 85 MW being selected as preferred bidders and accepted for implementation under the first round of the government's flagship Renewable Energy Independent Power Producer Procurement Program (REIPPPP. As of December 2013, 1 of these projects had been commissioned, while the remaining 4 had achieved financial close and were in an advanced stage of construction. Another 6 REMT-supported projects with a generation capacity of 190 MW have been notified that they have met the requirements of the oversubscribed third round of independent power producer procurement, and are on the reserve list as the government considers increasing the financial allocation for the round.			
Indicator 4:	Increased knowledge about renewable energy in relevant official agencies and private-sector financial institutions.			
Value	Lack of RE experience	Training, workshops conducted		Training, workshops conducted
Date achieved	06/30/2007	09/30/2011		09/30/2013
Comments	Target achieved. The government has supported the establishment of a strong RE market with well-established knowledge, experience, and capacity among public- and private-sector institutions. In addition to the conferences, training and workshops supported by the REMT Project, the promotion of legal, policy, and regulatory frameworks, developed by the government with support from the project and other development partners, added knowledge and capacity among the relevant official agencies and private-sector financial institutions, as well as hundreds of global and local project developers, suppliers, commercial banks, and development finance institutions.			
Indicator 5:	Formulate industry standards and codes for solar water heating (SWH).			
Value	Limited standards in place	Standards and codes adopted		Standards and codes adopted
Date achieved	06/30/2007	09/30/2011		09/30/2013
Comments	Target achieved. The project focused on SWH promotion, implementation, and training as appraised, and also provided limited support testing of SWH systems through a performance grant. Industry standards and codes for SWH had already been developed by the South African Bureau of Standards by 2009. These included SANS 1307:2009 ("Domestic solar water heaters"), SANS 10106 ("The installation, maintenance, repair, and replacement of domestic solar water heating systems," 3rd edition), SANS 6210 ("Mechanical qualification tests"), and SANS 6211 ("Thermal performance of solar water heaters"). The project supported the government to develop a training program to accredit SWH installers. The certification program, implemented through accredited vocational training institutions, includes the plumbing elective course Unit Standard ID 244499 and core			

	course Unit Standard ID 262784. Installers are expected to possess a Further Education Training (FET) Certificate in Plumbing at National Qualification Framework (NQF) Level 4 (Qualification ID 58782).			
Indicator 6:	Install 200 commercial solar water heating (CSWH) systems.			
Value	40 systems in place	200 systems installed		> 312,350 residential SWH systems installed
Date achieved	06/30/2007	09/30/2011		09/30/2013
Comments	Target exceeded. As a technical assistance facility, the project did not directly finance the installation of SWH systems, except by providing early limited grant support to develop, demonstrate and document an innovative design for speedy SWH installation, resulting in several hundred SWH installations annually. The 2009 project restructuring redefined and expanded CSWH to include support for implementation of all SWH, recognizing the need for urgent scale-up of demand-side management measures. The target values of indicators were not changed during restructuring. Supported by the government and financed through the energy rebate from the regulator and utilizing carbon finance incentives, the SWH program was implemented aggressively by Eskom, the state-owned utility, resulting in 156,000 installations by September 2011 and more than 312,000 installations by September 2013.			
Indicator 7:	Avoid power generation (gigawatt-hours [GWh]).			
Value	15 GWh avoided	85 GWh avoided		At least 422 GWh avoided
Date achieved	06/30/2007	06/30/2012		09/30/2013
Comments	Target exceeded. See comments for Indicator 6, above. Avoided power generation is computed based on data from installation of 214,444 low-pressure (LP) and 67,906 high-pressure (HP) systems by Eskom by September 2013. It assumes an average savings of 1,250 kilowatt-hours (kWh)/year and 2,050 kWh/year for LP and HP systems, respectively. Eskom's implementation of more than 30,000 government-funded residential SWH installations is excluded from this computation, which is deemed conservative.			
Indicator 8:	Invest in SWH systems.			
Value	$1.8 million invested	$9.0 million invested		$148 million invested
Date achieved	06/30/2007	09/30/2012		09/30/2013
Comments (including % achievement)	Target exceeded. See comments for Indicator 6, above. Eskom's implementation of more than 30,000 government-funded SWH installations is excluded from this computation, which is deemed conservative. In addition, the government allocated ZAR4.7 billion (US$480 million) for SWH installations over a 3-year period starting 2012–13.			
Indicator 9:	Avoid carbon dioxide (CO_2) emissions (cumulative) with SWH.			
Value	Negligible	0.75 million tons CO_2 avoided (cumulative)		0.75 million tons CO_2 avoided (est. cumulative)
Date achieved	06/30/2007	09/30/2012		09/30/2013

Comments (including % achievement)	Target achieved. See comments for Indicator 6, above. The cumulative CO_2- avoided target appears to have been overstated at appraisal. Cumulative emissions avoided is computed from the result for power generation avoided (Indicator 7, above) and the emission factor of 1.07 kilograms (kg)/kWh from the Project Appraisal Document (PAD) at annualized CO_2 emissions avoided of 0.44 million tons as of September 2013, and estimated cumulative emissions avoided of more than 0.75 million tons. Additional CO_2 emissions avoided can be expected through ongoing implementation of the national SWH roll-out program, as well as the REPG projects under the REIPPPP.

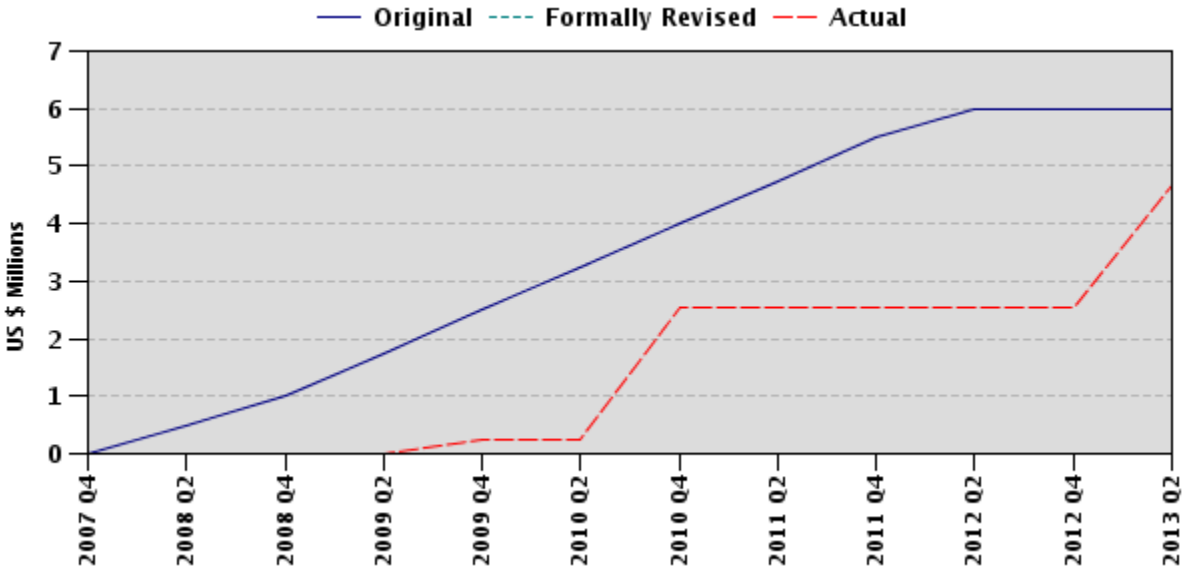
G. Ratings of Project Performance in Implementation Status Reports (ISRs)

No.	Date ISR Archived	GEO	IP	Actual Disbursements (USD millions)
1	12/13/2007	Satisfactory	Satisfactory	0.00
2	06/02/2008	Satisfactory	Satisfactory	0.00
3	06/16/2008	Moderately Satisfactory	Moderately Unsatisfactory	0.00
4	12/24/2008	Moderately Satisfactory	Moderately Satisfactory	0.00
5	06/24/2009	Moderately Satisfactory	Moderately Satisfactory	0.26
6	12/15/2009	Moderately Satisfactory	Unsatisfactory	0.26
7	06/22/2010	Satisfactory	Moderately Satisfactory	2.53
8	03/28/2011	Satisfactory	Moderately Satisfactory	2.53
9	01/11/2012	Satisfactory	Satisfactory	2.53
10	11/14/2012	Satisfactory	Satisfactory	4.65
11	06/08/2013	Satisfactory	Satisfactory	4.65

H. Restructuring

Restructuring Date(s)	Board-Approved PDO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring (in US$ millions)	Reason for Restructuring & Key Changes Made
		DO	IP		
12/12/2012		S	S		Extension of closing date to **September 30, 2013**
09/26/2011		S	MS		Extension of closing date to **December 31, 2012**; **re-allocation** to reflect rapidly changing market priorities, including additional resources for implementation of **MGs** and additional resources to provide **real-time policy support** to the Department of Energy.
12/14/2009		MS	MS		Addition of new category to **cover operational costs** for the Implementation Support Unit; expand definition of support to the Department of Minerals and Energy and the National Energy Regulator of South Africa to develop "**and implement"** a legal, policy, and regulatory framework for RE; replace CSWH with **SWH** to include residential, commercial, and industrial installations; re-allocate additional resources to the MG component and expand eligibility **beyond private-sector beneficiaries**; facilitate investment and support for pre-feasibility studies to include **"pre-investment activities"**; increase allocation for training and workshops.

I. Disbursement Profile



1. Project Context and Design

1.1 Context and Appraisal

1. **South Africa's economic performance from 1994 to 2004 was impressive.** The average annual growth rate in gross domestic product was 3 percent during this period, before reaching 4.9 percent and 4.6 percent in 2005 and 2006, respectively. In 2004, South Africa had a well-developed power sector, with a total installed capacity of 42 gigawatts (GW) and total electricity production of 244,607 gigawatt-hours (GWh). Power production was predominantly coal-fired (92 percent), and South Africa has historically had high levels of greenhouse gas (GHG) emissions. The generation and transmission of power were concentrated in Eskom, the vertically integrated state-owned utility, which was also the largest single distributor in terms of energy sales for final consumption and number of customers. From around 2006, the country started to experience power supply shortages, with potentially serious consequences for the economy. In response, Eskom was planning to build 1,500 megawatts (MW) of generation capacity per year over five years.

2. **In early 2000, the Minister of Minerals and Energy had requested the Bank's assistance on utilization of renewable energy (RE) resources and stimulation of productive uses of electricity in rural areas.** In response, the Bank took on a number of discrete activities, including helping to draft the Renewable Energy White Paper (REWP), which was approved in 2003. A key element of the REWP was a target of 10,000 GWh of final energy consumption from renewable sources in 2013, which was expected to account for about 4 percent of the estimated overall electricity demand. The Renewable Energy Market Transformation (REMT) Project, to be supported through a grant from the Global Environment Facility (GEF), was aimed at supporting the government to jump-start the implementation of the REWP goals.

3. **Despite South Africa's strong industrial and financial sectors, the country faced significant barriers to RE development**. The long period of isolation due to the country's racial segregation policies (or apartheid) and historical reliance on cheap coal-fired power generation made it difficult to develop the RE sector without targeted assistance. Barriers to renewable energy power generation (REPG) included average tariff levels well below the long-run costs of expansion and of most RE technologies; the lack of an adequate policy and institutional framework for the sale of power into the main grid; the unfamiliarity of potential project developers with the government's approach to promoting RE; as well as inadequate knowledge about RE in government agencies, the private sector, and financial institutions. The barriers to the strong uptake of solar water heating (SWH) included the lack of recognized industry best practices, standards, and codes, as well as low levels of market acceptance. At the time of project appraisal, the government (1) adopted a plan to develop a Renewable Energy Feed-in Tariff (REFIT) Program as the main way to stimulate investments in RE generation; and (2) was considering a program of SWH installation.

4. **The Bank was well positioned to support the South African government in RE development.** The Bank had a comparative advantage in both providing high-level technical support, as it demonstrated in finalizing the government's REWP, and mobilizing a significant amount of carbon funds and other private resources for RE development. Further to the South African Department of Minerals and Energy's (DME's) request for the Bank's assistance envisaged

that the Bank involvement would (1) introduce international best practices and cutting-edge knowledge of RE development, in particular RE policy frameworks; (2) link the REMT Project to the Bank's overall power sector and climate change policy dialogues in South Africa; (3) build local capacities; and (4) leverage public-private financing instruments, such as carbon credit financing. The project was consistent with the 2007 Country Partnership Strategy, which focused on "fostering social and environmental sustainability," and with the Bank's mandate from the 2005 Gleneagles G8 summit to undertake a Climate Change Initiative in Group of Five (G5) countries, including South Africa.

1.2 Original PDO/GEO and Key Indicators (as approved)

5. **The REMT's Project Development Objective (PDO) was to establish policy and regulatory frameworks and build institutional capacity for RE development in South Africa.** The technical assistance (TA) facility, along with existing support from the Danish International Development Agency, was expected to help South Africa to put into place a structure to support RE development by focusing on new policy and regulatory frameworks, as well as improve the institutional capacity of the DME and various stakeholders, including the private sector. In line with GEF Operational Program No. 6, the project's global environmental objective (GEO) was intended to remove the barriers to RE technologies to help mitigate GHG emissions. The specific strategic priority under GEF Climate Change Priority No. 4 was to promote on-grid electricity from renewable sources. The principal outcomes of the project were expected to be establishment of (1) the policy and regulatory frameworks and institutional capacity required to meet the government's RE target, and (2) an SWH industry.

6. **The REMT Project's output indicators, grouped according to the project component to which they related, were as follows:**

Renewable Energy Power Generation (REPG) component:

- Indicator 1: Legal, policy, and regulatory frameworks for grid-based RE power prepared by the government and electricity regulator
- Indicator 2: Database for RE resource made available
- Indicator 3: Number of potential RE power project developers assisted and number of pre-feasibility studies prepared
- Indicator 4: Knowledge about RE increased in relevant government agencies, private sector, and financial institutions

Commercial Solar Water Heating (CSWH) component:

- Indicator 5: Industry standards and codes formulated
- Indicator 6: Number of commercial solar water heaters installed
- Indicator 7: Fossil fuel-based power generation avoided
- Indicator 8: Investments in CSWH systems
- Indicator 9: Carbon dioxide (CO_2) emissions avoided (cumulative)

7. The PDO/GEO was not revised.

8. **The definition of some key indicators was amended**, as information about the country's energy demand-supply balance and the emergence of severe power and coal shortages called for an

urgent need to implement both supply-side investments in generation as well as energy efficiency and demand-side management (DSM) measures to address base-load and peak-load management. Indicator 1 (above) was amended through a 2009 project restructuring that included support for implementation of the legal, policy and regulatory frameworks developed. At the same time, Indicators 6–9 were amended to include all SWH to reflect the urgent need to scale up implementation of the country's DSM efforts as well as to expand energy services for all South Africans, especially those in poorer communities with limited or no energy access. A subsequent 2011 restructuring expanded the definition of investment facilitation activities to include support for pre-investment studies (Indicator 3) under the project's matching grants (MG) window to help prepare RE generation projects to be technically and commercially viable and bankable. Target values for the indicators were not changed through the restructurings.

1.3 Primary Beneficiaries

9. The project's primary beneficiaries were the government, (primarily the DME, which later became the Department of Energy [DoE]), National Energy Regulator of South Africa (NERSA), other state-owned and municipal entities, as well as emerging private enterprises that were involved or interested in RE market development.

1.4 Original Components

10. **The REMT Project provided financing from the GEF for TA and capacity building, not investments,** with the exception of limited support for the CSWH industry's capacity-building and demonstration subprojects. The project's original components were:

Component 1 - REPG (US$4.05 million): This component included technical assistance TA) and capacity building to eliminate barriers to RE-based power generation in South Africa. It was designed both to support the development of policy and regulatory frameworks for grid-connected RE generation, and to conduct capacity-building activities to strengthen relevant public- and private-sector institutions and enable them to meet the RE generation target under the REWP. The TA was expected to help facilitate RE investments by providing Matching Grants (MG) for project developers to conduct pre-feasibility studies for RE investments. According to the Project Appraisal Document (PAD), the total renewable generation capacity with GEF support was anticipated to be "about 100-135 MW with a capital cost of US$ 90-120 million."

Component 2 - CSWH (US$1.40 million): This component included support for TA and capacity-building measures to address market and business barriers to developing a market for large-scale CSWH South Africa. TA activities under this component were intended to support the development of the SWH industry to international best practice by assisting with developing standards and codes, promotion campaigns, and training. In addition, the component was intended to provide business development support for small and medium private enterprises and demonstrate best practice for improved design, testing, and installation through MG and performance grants (PG). According to the PAD, since SWH transactions were not linked to transmitting power over the main grid, at appraisal there was "no need to involve the grid operator (Eskom) in promoting the resource."

11. The components were not revised.

1.5 Other Significant Changes

12. **Three restructurings extended the project completion date from September 30, 2011, to December 31, 2012, and subsequently to September 30, 2013,** and amended certain definitions and the focus of some activities to reflect the changes in the environment, although the original targets and indicators were not amended. These changes did not require Board approval, and are described below:

- The first restructuring of December 2009 recognized that several policy and regulatory activities were already underway in the wake of the country's urgent power shortages, and amended the grant to emphasize stronger implementation support, including for the DoE and NERSA to develop "and implement" a legal, policy and regulatory framework. The amendment added "facilitating pre-investment activities" under MGs for RE project developers, and expanded eligible beneficiaries to include entities outside the private sector (e.g. municipalities and state-owned enterprises). It also expanded the definition of the CSWH component to include implementation support for all SWH. Finally, it increased resources for training and workshops, and created a new category for operational expenses related to the Implementation Support Unit (ISU).
- The second restructuring of September 2011 followed the project's Mid-Term Review (MTR) and extended the project to December 31, 2012. As the government combined elements of the REFIT design into a competitive public tender process known as the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), the amendment included a specialized consultant to provide "real-time" support to the DoE, reflecting the rapid changes in the RE landscape in South Africa, as well as the dramatic decline in prices of global RE technology and equipment. Streamlining of the MG program application and approval processes, and earmarking of additional resources through re-allocation, enabled the project to tap into and serve renewed demand from developers seeking pre-investment support for the preparation of projects, some of which were slated to participate in the REIPPPP. The amendment reduced the allocation under performance grants (PG), reflecting rapid implementation of SWH, and added more resources to training and workshops. Recognizing the REMT Project as an efficient means of supporting and promoting market development nationally, the DoE released the government's counterpart funding, which was allocated in part toward supporting the project's operational expenses.
- The third restructuring of December 2012 extended the closing date to September 30, 2013.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design, and Quality at Entry

13. **GEF Grant resources were to be mobilized to overcome barriers to jump-start progress in achieving South Africa's long-term goals for RE development.** The barriers noted at appraisal included the challenges of projects achieving financial closure and being commissioned, availability of supportive international finance, ease of accessing the grid, private investment in RE, feasibility and affordability of projects, and market uptake of renewable energy technologies. The appraisal noted that that the TA, including external funds and GEF grant resources, would provide the incremental costs "to jump-start significant progress towards meeting its long-term target,

which will be met many years after the project is over." The PAD noted that with GEF support "perhaps two or three of the [pilot RE projects] will reach financial closure in the next few years with official or international funds."

14. **South Africa's financial sector was assessed as being prepared to provide financing to well-structured projects supported by an appropriate legal, policy, and regulatory framework.** Based on discussions with three of the four largest commercial banking groups in South Africa at that time, as well as with specialized public-sector development finance institutions (DFIs), the appraisal recognized that South Africa had the financial capability to raise significant resources in the domestic and international financial markets to finance RE projects. The assessment recognized that financial institutions would "carefully scrutinize the quality of the power off-take agreements" and that long-term price predictability through long-term power purchase agreements (PPAs), with transparent and adequate pricing, was the most important factor in making projects bankable to attract commercial RE financing.

15. **The REMT Project design took into account the lessons from other countries that had introduced programs to develop RE.**[1] The PAD expressed the government's clear preference for "production" or "output-based" incentives, such as the NERSA-approved feed-in tariffs, which the project was expected to review. The appraisal identified gaps in the development of the RE market—e.g., the development of an appropriate legal, policy, and regulatory landscape to enable investment into the RE sector, as well as policy, standards, and codes to scale up installation of SWH systems. The importance of supporting the government with high-level technical support was recognized in this regard. Capacity-building interventions were also designed to help increase awareness and knowledge about RE. The technical feasibility of achieving the REWP target was assessed on the basis of a "cost curve" of RE. In addition, the project was designed to provide grants for project developers to access incentives and prepare projects for commercial financing.

16. **South Africa is a vibrant democracy and a major emerging economy, with a strongly participatory process of policy development and implementation.** The process of preparing and obtaining approvals for the project was highly participatory, and included the National Treasury, as well as the then DME, now the DoE, NERSA, the Central Energy Fund (CEF) Group and Eskom. The DoE, as the main counterpart, took the lead in outlining the government's requirements for the development of the RE market, and for the REMT Project's supportive and value-added role.

Risk Identification and Mitigation Options

17. **At appraisal, the main risks were identified and appraised as low**. The Development Bank of Southern Africa (DBSA) was designated by the DoE as the project's implementing agency to allow the project to benefit from the DBSA's infrastructure focus and its financial management and procurement systems and processes. As a result, implementation risks were considered to be

[1] Examples reviewed included the limitations of investment-based incentives as compared with output-based incentives (India); the effect of supportive regulatory frameworks (China and Sri Lanka); the effect of a combination of supportive regulatory frameworks and capacity building (Costa Rica and Mauritius); and the effect of the use of feed-in tariffs (Spain and France), RE portfolio standards (Denmark, Italy, and the United States), and public tendering systems (California and Ireland).

minimal. However, several months elapsed before a suitable Project Coordinator could be appointed, thus delaying the effectiveness date of the project. Another project implementation risk that was not fully considered at appraisal related to procurement processes. The government's consideration of black economic empowerment (BEE) as an evaluation criterion in procurement processes differed from the Bank's requirement for selection processes, which are based on technical and financial grounds only. As a result, it took time before the matter was resolved, resulting in early implementation delays.[2]

2.2 Implementation

18. **Any policy or project implementation success occurs within a context and necessarily rests on invaluable contributions from several numerous domestic stakeholders and external partners** that can rightfully claim to have played a role in supporting the government in the development of the market, thereby potentially creating an issue of attribution. This challenge is addressed in this report by showing a tight linkage between specified REMT project outputs that supported and contributed to the accelerated achievement of certain key outcomes and milestones in the development of the overall market, or of development of specific market segments.

19. **Starting in 2006-07, South Africa's electricity sector experienced a tightening in the supply-demand balance, and power shortages,** which were first experienced in the Western Cape and eventually affected the entire country. These shortages turned out to significantly greater and more persistent than had been anticipated, while Eskom's supply remained under development and coal supply issues emerged. Recognition of the seriousness of the challenges ahead spurred an unprecedented level of urgency in the response by a wide variety of institutions, agencies and other stakeholders, who advocated for a diverse set of relevant and complementary concerns included for urgent new supply-side generation, energy efficiency and DSM measures, climate change response strategy, emphasis on job creation efforts, and fiscal moderation and cost-effectiveness. The nature and persistence of the power shortages over time placed constraints on base-load power, which was a strong incentive on implementing SWH, not only as an aggressive DSM measure for peak demand management, but also as an energy efficiency measure to enhance energy security. South Africa's hosting of major international events such the 2010 World Cup soccer tournament and the 2011 Durban Climate Change Conference of the Parties added an international context to the internal urgency to show strong results on SWH and on REPG development.

20. **REMT support, along with other development partners, played an important and value-added role in preparing the ground for the government to enable private sector participation in renewable energy.** By supporting the government, and, in particular the DoE and NERSA, REMT contributed to key targeted interventions required for the implementation of urgent energy demand- and supply-side measures in the country. The project's efforts were in the form of capacity-building activities, including for private-sector project developers, as well as legal, policy, and regulatory framework reviews undertaken by the ISU from the beginning of 2009. Sponsored activities included convening of public workshops and conferences in cooperation with the

[2] To address this issue, the Bank and the DoE agreed to include local consultants as an evaluation criterion, without reference to BEE. They also allocated 17 percent of the project's budget categories, excluding capacity building, to local consultants, based on the understanding that such expenditures would be funded from the DoE's contribution.

government that brought together key stakeholders, and facilitated informed and participatory decision making in response to some of the key energy-sector issues. Project implementation focused on filling gaps—e.g. building early market confidence in the process and comfort in key project documentation, creating an analytical and planning framework for greater share of renewables, and further developing market segments, such as SWH for residential and low income communities nationally. Implementation accelerated after the first and second project restructurings.

Renewable Energy Power Generation Component

21. **REMT procured the services of a specialist energy project finance law firm for review of the draft standardized PPA published by NERSA in July 2009**. REMT played a value-added role by contracting with a specialist project finance law firm to assist local project developers to comment on NERSA's draft standardized PPA developed under the REFIT program. Recommendations based on global best practice in project finance on such issues as risk allocation built early market confidence by not only enhancing the commercial viability and bankability of the proposed PPA, but also by reducing initial apprehensions of project developers in the government's process to procure RE. The specialist review laid the foundation for the standardized PPA that was used later as the basis for bankable independent power producer (IPP) transactions.

22. **REMT's review of the 2003 REWP included a modelling of RE technology learning curves which proved instrumental to expanding allocations for RE in the Integrated Resource Plan (IRP).** A key output of the review process was the modeling of RE technology learning curves, which coincided with the national electricity planning process of South Africa's IRP.[3] The DoE recognized the relevance of the technology learning curves emerging from the REMT review, and facilitated their incorporation into the IRP process. This resulted in a cost-optimized IRP model that allocated greater capacity for RE, thereby providing a sound analytical basis for planning the implementation of the DoE's policy of substantially increasing the share of RE in the projected energy mix. According to the resulting IRP, with a projected capacity of 17,800 MW of generation from wind, solar photovoltaic (PV) and concentrated solar power (CSP) by 2030, RE was projected to account for approximately 20 percent of generation capacity.

23. **The resulting higher IRP allocation for RE coincided with the dramatic decline of global prices for RE technologies starting in 2010–11.** Consistent with the constitutional requirement for competitive and cost-effective procurement, the IRP provided South Africa with an opportunity to pivot quickly from the REFIT platform toward implementation of the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), South Africa's flagship program for RE, which was announced in 2011. The first two bidding windows (rounds) of the REIPPPP resulted in estimated investments of US$7.45 billion[4] for the addition of about 2,445 MW of newly installed grid-connected RE capacity, including nearly 1,200 MW of new wind power, more than 1,000 MW of solar PV, and 200 MW of CSP.

[3] The IRP is the instrument used for planning the introduction of new generation capacity.

[4] US$ 2.31 billion of this investment amount was slated to be spent on the procurement of local goods and services in support of the Government's re-industrialization and job-creation drive.

24. **Each of the three REIPPPP rounds conducted so far has seen a sustained drop in average bid prices.** The second round saw average bid prices of approximately US 9.09 cents/kilowatt-hour (kWh) for wind power, down from an average bid price of US 11.58 cents/kWh from the first bidding window and a 40 per cent average bid reduction for solar PV. In late 2013, the DoE announced that an additional estimated capacity of 1,400 MW of renewable generation capacity was procured through the third round of IPP procurement. Over time, the wind tariffs are expected to converge with Eskom's average tariff, which has been escalating annually.

Table 1: Aggregated Results of first two rounds of the REIPPPP

Rounds	Capacity (MW)			Average price (US cents/kWh)			Investment (USD billions)		
	Wind	**Solar PV**	**CSP**	**Wind**	**Solar PV**	**CSP**	**Wind**	**Solar PV**	**CSP**
Bid window 1	634	631.5	150	11.58	27.95	27.22	1.29	2.22	1.16
Bid window 2	562.5	417.1	50	9.09	16.67	25.46	1.10	1.22	0.46
Total	**1,196.5**	**1,048.6**	**200**				**2.39**	**3.44**	**1.62**

25. **Accelerated implementation of the REMT MG program following the first and second restructurings helped provide timely preparation support to several project developers**. REMT provided pre-investment support to the development of 14 RE projects for a generation capacity of 275 MW. Five of the REMT-supported solar PV projects with a combined generation capacity of 85 MW are shareholders in project Special Purpose Vehicles (SPV) that have been selected as preferred bidders in the first round of the REIPPPP, together representing an estimated combined estimated investment of XYZ. These projects include Momentous Energy (RustMo1 - 7 MW), SunEdison Southern Africa (Witkop and Soutpan Solar Parks, 30 MW and 28 MW, respectively) and Aurora Power Solutions (Konkoonsies and Aries, 10 MW each). The 7-MW grid-connected RustMol PV plant—had been commissioned by the end of 2013, while the other four were at an advanced stage of construction in preparation for commercial operation in 2014. Two of the successful REMT-supported IPPs, currently under construction are in South Africa's Limpopo Province, a region with high socioeconomic development needs. Under the third window of REIPPPP, an additional four (4) solar PV projects with combined generation capacity of 190 MW were notified that they had "met requirements" for the over-subscribed third round of the REIPPPP. These projects, which include Ample Solar's projects (75 MW and 50 MW) and BNM Fruil Energy's projects (10 MW and 55 MW) are currently on the "reserve list," with the expectation that they would be informed by the government around the end of March 2014 of any possibility of increasing the maximum financial allocation to the round in order to accommodate bidders that met program requirements.

26. **REMT supported a CSP workshop in September 2009. One of the outcomes was the formation of the Southern Africa Solar Thermal and Electricity Association (SASTELA)**, which has since played a crucial role in the development of the CSP industry in South Africa by making inputs to the IRP and positioning CSP as a viable peaking-power option. SASTELA's members have also participated in the REIPPPP. REMT also supported the Upington Solar Park Investors' Conference, which highlighted the trade-off between fixed REFIT rates and a large scale-

up of the REIPPPP. Some of these considerations were reflected in the government's implementation of the REIPPPP. Finally, REMT supported the government in collaboration with the DBSA and the Biogas Industry Association of Southern Africa to convene a biogas energy conference in 2013, in order to encourage interest by project developers to demonstrate interest in developing small IPPs using biogas, which had seen very limited interest from project developers in the first two REIPPPP rounds.

27. **REMT procured an expert consultant to provide specialized "real-time" support directly to the DoE.** The project facilitated an expert review of public comments on legislation to facilitate easier access to the grid by IPPs. Inputs by the legal advisory specialist resulted in a timely contribution to the development of legislation to restructure the transmission system as a way of further facilitating the entry of IPPs. The draft legislation, known as the Independent System and Market Operator (ISMO) Bill, is currently undergoing processing by the South African parliament.

Solar Water Heating Component

28. **REMT supported South Africa's SWH industry through targeted studies, reports, grants, and capacity building.** As of September 2013, more than 312,000 residential SWH systems had been installed nationally, representing an overall investment of US$148 million.[5] SWH implementation in South Africa was scaled up in the wake of the urgent need for energy efficiency and DSM, and the market's interest shifted to accessing capital for the installation of SWH systems, largely through the Eskom-administered electricity tariff-based rebate program. To receive the rebates, installers had to be certified under SWH industry standards and codes that had been developed by the South African Bureau of Standards (SABS) in 2009.[6] As a TA facility, the project did not directly finance the installation of SWH systems, except by limited performance grant support to develop, demonstrate, document, and patent an innovative ladder design for SWH installation, as well as to test SWH systems on a pass/fail basis. Another REMT grant-supported SWH beneficiary, Digital Energy Solutions, has reported over four thousand SWH installations. The project scaled back the SWH grant program based on accelerated implementation of SWH installations from ongoing assessment of market development and focused on the most urgent market gaps and needs identified.

29. **The REMT-sponsored National Solar Water Heating Framework (NSWHF) contributed to the development of a national rollout program,** involving the DoE and Eskom, as well as the CEF Group, DBSA and Industrial Development Corporation (IDC), among other institutions. Recognizing the importance of expanding access to SWH to lower-income communities across the nation, REMT supported the development of an SWH Business Plan for the Free State province of South Africa in 2010. The study provided a detailed outline of the key practical challenges and considerations for the rollout of SWH systems as key design elements of the framework, which, in turn, recommended key elements of the national rollout program,

[5] These amounts include the effect of Eskom's rollout program for its own account (since 2008), as well as the initial tranche of the substantial US$480 million fiscal allocation for SWH.

[6] These included SANS 1307:2009 (Domestic solar water heaters), SANS 10106 (The installation, maintenance, repair, and replacement of domestic solar water heating systems, 3rd edition), SANS 6210 (Mechanical qualification tests), and SANS 6211 (Thermal performance of solar water heaters).

including centralized purchasing of SWH products and services. The DoE's designation of Eskom as the entity that would purchase SWH systems from various manufacturers was based on a recommendation of elements of a "bulk buyer" or "Super-Esco" concept, thereby helping to create the economies of scale necessary to build a sustainable SWH industry, including job creation through the local manufacture of SWH components and training of installers.

30. **REMT supported the government to develop a training program to accredit SWH installers under the NSWHP**. The certification program was developed with REMT support to train and certify installers across the country, especially those in smaller towns and provinces. The program, which offers the plumbing elective course Unit Standard ID 244499 and core course Unit Standard ID 262784, is to be implemented with DoE resources through accredited vocational training institutions across South Africa.[7]

2.3 Monitoring and Evaluation (M&E) Design, Implementation, and Utilization

31. **REMT provided targeted, strategic assistance in support of developing a market that had been effectively nonexistent at appraisal.** The project sought to support the development and subsequent implementation of legal, policy, and regulatory frameworks; to make available a database of RE resources for project developers in support of feasibility studies; and to build capacity among key public-sector institutions and private-sector participants in support of the government's significant efforts to promote RE investment. Between 10 and 14 enterprises were to be supported in the development of RE generation projects, with a corresponding target of 4 to 6 feasibility studies. It was envisaged that increasing knowledge would primarily be in the form of workshops and training interventions, as well as through a "help-desk" supporting the MG program.

32. **While the project design selected adequate indicators to measure progress toward the PDO/GEO, some target values within the results framework were not aligned.** CO_2 emissions avoided (tons/CO_2) from SWH were computed as the product of power generation avoided (GWh) and the grid emission factor. However, the target values indicated for CO_2 avoided in the PAD were not proportionate to the power generation avoided, suggesting an error in calculating the target value for CO_2 avoided. As a result, although the project far exceeded the target for avoided power generation, it achieved, but did not exceed, the PAD's cumulative target for avoided CO_2 emissions.

33. **The results framework for the TA operation logically included several indicators that were outside the direct scope of project activities**. As a TA operation, it was logical that REMT would support and catalyze actions and investments that were outside of the project's direct scope of activities. It was expected that if successful, the role of the project, in cooperation with development partners, was to support the government in the development and implementation of the legal policy and regulatory frameworks, in order to catalyze an RE market that would leverage

[7] Installers are also expected to possess a Further Education Training (FET) Certificate in Plumbing at National Qualification Framework (NQF) Level 4 (Qualification ID 58782).

significant investments from the private-sector. The project design logically anticipated this potential leverage of external resources, and several of the outcome indicators reflect this role.

34. **REMT was proactively restructured three times during its implementation to proactively respond to market conditions.** By the time the project became effective, South Africa's institutions had already started to respond urgently to system-wide power shortages with a range of measures, including aggressive implementation of DSM measures. Eskom, which began to implement a SWH program as a DSM measure in November 2008, started to develop SWH standards and codes, along with the Department of Trade and Industry (DTI) for consideration by the SABS. Rather than duplicate efforts, the project focused on providing support for implementation of all SWH, including development of training for installers, and development of a national SWH program, including among low-income household segments. The target values of relevant indicators were not updated during implementation.

Data Collection and Use of Data

35. **Project data were used as an input to make strategic decisions on a national level, as well as for project-level re-allocation of resources through restructurings and revised procurement plans.** South Africa has a multitude of institutions that have a role in the development of an RE market, including institutions concerned about rapidity of implementation, while also balancing important elements, such as project cost, project financing, job creation, environmental sustainability, availability of transmission networks, access to government guarantees and fiscal policy. The extent to which M&E data were collected in the project depended on the indicator and institution concerned, as described below:

- **Legal, policy, and regulatory frameworks for grid-based studies:** The DoE facilitated the application of the concept of RE technology learning curves in the IRP modeling process, based on the preliminary data and analysis from the modeling of technology curves undertaken as part of the REMT-supported review of the REWP. This resulted in an increased share for RE in planned generation capacity in the period to 2030, and formed the basis of the REIPPPP targets.
- **Number and quality of project developer applications supported**: Data on the low percentage of **successful** applications in the first round of the MG program provided the basis for improving the quality of subsequent MG applications and the project's ability to support them. The information was used to organize multiple promotional workshops across the country to tap market demand from project developers to prepare for the REIPPPP; to implement a multi-round MG procurement process; to increase the resources allocated for MG for renewable power generation; and to increase the maximum MG amount per beneficiary. These interventions resulted in significant increases in the quantity and quality of applications received by the MG program from project developers.
- **Number of SWH systems installed:** Although this indicator was amended from CSWH and expanded to include all SWH in 2009, the corresponding target was not revised. Market feedback was used to reduce the allocation for SWH grants following the 2011 MTR, and the **project** focused on defining various SWH market segments, which included low-income households. Data from the SWH Business Plan for the Free State province of South Africa (first half of 2010) provided a detailed outline of the key practical considerations for the rollout of SWH systems, especially in low-income communities. Historical investment

patterns were used to develop the national SWH program and to re-allocate SWH spending across South Africa's provinces. Eskom and NERSA used program data to assess SWH as a demand-side measure and to determine the extent to which electricity tariffs could be used to fund the installation of SWH systems.

2.4 Safeguards and Fiduciary Compliance

36. **Gaps identified between the World Bank's procurement and financial management processes and the DBSA's procedures were proactively resolved**. The ISU developed an Operations Manual as a way of clarifying the interfaces between REMT's procurement processes and the DBSA's procedures. The World Bank team scheduled procurement training sessions on applicable World Bank procedures, and input from the Post Procurement Review helped strengthen the ISU's capacity to execute its fiduciary responsibilities. The DBSA also made available a procurement specialist, who provided valuable support to the ISU. The World Bank provided support to the ISU and the DBSA's Financial Management Unit (FMU), and the ISU addressed early gaps identified as part of preparing for the project's first external audit. These adjustments were made in time for the commencement of the MG program in 2010, and following the MTR when the number and average value of transactions increased.

2.5 Post-completion Operation/Next Phase

Sustaining Reforms and Institutional Capacity

37. **The policy and regulatory reforms initiated by REMT** are on track to be sustained through implementation of national programs for both renewable power generation and SWH. Well-balanced PPAs, among other interventions, underlined RE investments and are a continuing legacy of the project, which made important contributions to their development.

38. **Institutional capacity was enhanced at institutional, enterprise, and industry levels.** South Africa's thriving RE market is a legacy to which the project made timely and important supporting contributions. The formation and support of industry associations resulting from national conferences are a sustaining benefit of the project. SASTELA's advocacy is expected to continue as the South African RE market evolves. The SASTELA model set the stage at a 2013 conference for the establishment of a fledgling industry association of biogas producers that is expected to play a key role in the evolution of the DoE's proposed small RE IPP program.

39. **Key recommendations and decisions will provide local job creation opportunities.** The DoE has developed a national training program for installers and has designated Eskom as the centralized entity to purchase SWH systems from various manufacturers as part of the REMT-sponsored NSWHF and the national rollout of the SWH program. Eskom's access to the substantial ZAR4.7 billion (US$480 million) fiscal allocation for this purpose would help create the economies of scale necessary to build a sustainable SWH industry, including for local manufacture of SWH components and training of installers, with opportunities for job creation as an important step for the establishment of a "green economy" in South Africa.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design, and Implementation
Rating: High

40. **The PDO/GEO remains relevant, especially in light of the rapid changes that took place in the South African energy policy environment while the project was underway.** South Africa continues to address a number of ongoing policy issues related to climate change mitigation, including diversifying the country's energy mix and strengthening its institutional capacity. Given the continued relevance of the objectives, design, and implementation, a key question for the DoE is how it would continue to systematically support a number of ongoing initiatives started with REMT support. In particular, in light of the DoE's announcement of a procurement program for small RE IPPs in mid-2013, it is recognized that emerging project developers could benefit from an MG program similar to that supported by REMT.

41. **The project's legal, policy, and regulatory outcomes remain relevant to future evolution of the market for RE power generation.** Given the importance of the IRP as a planning and policy decision-making tool, REMT's review of the socioeconomic impact of various planning scenarios remains relevant, especially as it could support the government's intention to develop a green economy. The IRP model, which incorporates technology curves, will continue to enhance system planning, including proper modeling of the competitiveness of grid-connected RE relative to fossil fuel-based power generation. National legislation for the ISMO Bill is under consideration by the South African parliament.

42. **Provision for development of training and certification services has reinforced the continuing relevance of the PDO/GEO**. The successful rollout of the national SWH program is dependent on reliable equipment and skilled installers. The use of a standards-based testing process for quality assurance is relevant, especially for the promotion of locally manufactured SWH systems, and is also as a model for new initiatives, such as the small RE IPP program.

3.2 Achievement of PDO/GEO
Rating: Satisfactory

43. **REMT played a supportive, catalyzing role providing targeted, strategic assistance toward the achievement of the PDO/GEO.** In the context of South Africa's rapidly changing policy and planning environment,[8] the project's legacy includes its timely support to the DoE in particular, and through its contributions to the development of the RE market, as outlined in this report. According to the IRP developed with key insights from an REMT-supported study, with a projected capacity of 16,800 MW of generation from wind and solar PV by 2030, RE is projected to account for approximately 20 percent of generation capacity, far surpassing expectations at the time of appraisal. Through the NSWHF, the project has provided the basis for a collaborative effort

[8] A detailed account of the achievement of the PDO/GEO is presented in Annex 2. The Results Framework outlined in the PAD provides a basis for assessing achievement, the focus being the associated outcome indicators and targets. Wherever applicable, causal linkages between the project's outputs and outcomes are highlighted.

between the DoE and Eskom in broadening the SWH program to low-income households, as well as facilitating the development of a local SWH industry.

44. **The achievements from successful implementation of the first two bidding windows of the REIPPPP, including for local job creation, are likely to continue.** Of the more than US$7 billion in investments from the first two rounds of the REIPPPP, US$2.31 billion was slated to be spent on the procurement of local goods and services in support of the government's re-industrialization and job-creation drive. As has been publicly reported, at least two solar PV projects had been connected to the grid at the time of compiling this ICR, including the 75-MW Scatec plant and the 7-MW RustMo1 plant (the second project benefited from REMT MG support). Other projects from the first two rounds are at various stages of construction. Toward the end of 2013, the DoE announced the preferred bidders from the third bidding window. Of 93 bidders, 17 projects were selected. The preferred bidders in the third round were expected to provide an additional 1,472 MW of RE generation capacity. Four (4) projects supported by REMT were notified that they had met the requirements of the third window, and were placed on a "reserve list", pending further budgetary allocation for the window. Further bidding windows are envisaged, especially taking into account the interest generated by the REIPPPP and the government's re-industrialization and job-creation drives.

45. **REMT facilitated national multi-stakeholder workshops for discussions on REPG (including CSP) and SWH.** REMT supported the DoE with the planning and organization of five major national events, including the 2009 National SWH Workshop, the 2009 Renewable Energy Summit, the 2009 CSP Industrial Potential Workshop, the 2009 National SWH Conference and the 2010 Solar Park Investors Conference. One of the outcomes at the CSP event was the establishment of a CSP industry association, SASTELA, which continues to play a constructive role in the development of the CSP sector in South Africa. Further outcomes of the events were increased interest and action on implementation of SWH in the public and private sectors, and significant fiscal allocations for future installations. Finally, REMT supported the government in collaboration with the DBSA and the Biogas Industry Association of Southern Africa to convene a biogas energy conference in 2013, in order to encourage interest by project developers to demonstrate interest in developing small IPPs using biogas, which was an area with very little interest shown in the first two rounds of the REIPPPP. A thriving market for RE power development exists today in South Africa, having developed over a few short years, during which the project, along with other development partners, provided timely targeted support to the government and stakeholders.

3.3 Efficiency
Rating: Satisfactory

46. **Efficiency has been assessed using different approaches and methods**, including quantitative assessment of the performance of the project itself. In addition, given the project's catalytic role as a TA operation, this report also quantitatively assesses the projected performance of the national SWH rollout program, and qualitatively assesses the project's contribution to the REIPPPP.

47. **The quantitative assessment for SWH (Component 2)** uses as its basis the national SWH rollout program, which has received considerable financial support from the Government of South

Africa. A summary of the assessment, including a similar assessment that was undertaken at project appraisal, is included in Table for comparison. Taking into account steep increases in electricity tariffs, a weakened local currency, and the government's policy thrust to broaden access to SWH in favor of low-income households, the estimated internal rate of return (IRR) (without accounting for CO_2 emission reductions) is 15 percent. This compares with an IRR of 14 percent at project appraisal, which was based on a projection of a much smaller number of demonstration SWH systems. Taking into account the effect of CO_2 emission reductions at the same price used at project appraisal (i.e., US$4 per ton) results in an estimated IRR of 16 percent, compared with 17 percent at project appraisal. The IRR taking into account the effect of CO_2 emissions would be higher if higher carbon prices are assumed—e.g., approximately US$12 per ton under the proposed South Africa carbon tax. The details of the analysis are included in Annex 3.

Table 2: Assessment of efficiency: Solar water heating (SWH)

	SWH systems	**Capital cost**	**Projected electricity savings**		**Net economic benefits**	**Projected CO_2 reductions**		**Net economic and Environmental benefits**
	Projected units	USD (million)	GWh	USD (million)	USD (million)	kT	USD (million)	USD (million)
Project appraisal	105	0.03	1. 73	0.063	0.032	1.850	0.0074	0.04
	IRR (over 15 years)				**14%**			**17%**
ICR	468,870	391	3,840	896	505	4,109	16	522
	IRR (over 15 years)				**15%**			**16%**

48. **The GEF's leverage of additional resources in support of RE power generation (Component 1) and SWH installations (Component 2)** is demonstrated by the project's contribution to the REIPPPP and by the number of SWH installations. This TA, through small, but well-directed support, along with other support from development partners, leveraged multibillion-dollar private investment support for RE generation. The multi-billion dollar investment value generated by the REIPPPP provides a qualitative indication of the efficiency with which the relevant aspects of the project's PDO/GEO were catalyzed, in part, through TA activities supported by the project, but outside of its direct scope. Similarly, the GEF's leverage of additional resources in support of SWH installations (Component 2) is reflected in the implementation to date of well over 316,000 SWH systems, far above what had been anticipated at appraisal. Table 3 shows the private sector's contribution to the MG program, as outlined in detail in Annex 3. The MG program performed the best among the various project activities from the perspective of the outcomes that were in the project's direct scope of activities supported, taking into account the disbursement profile and implementation of planned activities (i.e., grant funding and technical support). The total direct financial amount advanced by both the Project and the private-sector entities to the MG program was ZAR27.02 million (US$2.74 million).

Table 3: Private sector Contributions to Matching Grants

Expenditure Category	Amount (ZAR)	Including private-sector contribution to MG (ZAR)
Total consultant services	10,114,442.66	10,114,442.66
Total goods and services	663,529.35	663,529.35
Total MG	13,513,741.73	**27,027,483.46**
Total PG	-	-
Total training and workshops	433,110.57	433,110.57
Total disbursements	19,783,233.59	38,238,566.04
Total operational expenditure (Opex)	2,022,588.80	2,022,588.80

49. **Ex-post incremental cost analysis of GEF funding shows that the project's global benefits exceed what was anticipated at the time of appraisal.** At project close, it is noted that the market has indeed been jump started in its long-term goal to develop 10,000 GWh, and many of the barriers noted (e.g., challenges to financial closure) have been addressed; the cost differential between RE and fossil fuels has been reduced; and the market has seen development of wind, solar PV, and CSP projects at a large scale. Project development has been promoted, and the results have been seen through the implementation of the first two rounds of the REIPPPP, which combined elements of incentive systems with typical features of bidding/tendering mechanisms, and resulted in leveraging billions of dollars for RE project development in South Africa.

3.4 Justification of Overall Outcome Rating
Rating: Satisfactory

50. The project is rated overall as **Satisfactory**, as a result of considering the rating of its relevance, achievements, and efficiency, each of which is rated as **Satisfactory**.

51. **The project made strategic choices to support activities related to legal, policy, and regulatory frameworks and capacity building,** which addressed critical issues related to both RE power development and SWH. The effect, in close coordination with the government, was to leverage other resources in the development of these sectors in South Africa, especially noting that these had been nonexistent at project appraisal. The data sheet of this paper identifies the achieved results and outcomes in detail, including those within the scope of the project, as well as results leveraged outside the scope of the project through well-directed TA and capacity building activities.

52. **With respect to RE power generation, the key outcome is the REIPPPP**, whose establishment and implementation the project supported through contributions to a bankable PPA leading to early market confidence in the process; to a greater share of RE in the IRP; and to development of the CSP sector in South Africa. Further bidding windows are envisaged, especially taking into account the interest generated by the REIPPPP and the government's re-industrialization drive. The Project supported several project developers to prepare for this process through MG, with some notable successes reported.

53. **With respect to SWH**, **the main strategic contribution was through project contributions to the framework that led to the development of the national SWH rollout**

program. The key outcomes relate to the segmentation of the SWH market in a way that also included low-income households, which contributed to the national roll-out of the SWH program; and the establishment of a central SWH purchasing agency as a way of reducing costs and creating scale. The central SWH purchasing agency contributed to prospects for the development of local SWH manufacturing capacity, as this enabled bulk procurement and the large-scale application of approved standards. As of September 2013, 316,000 SWH systems were installed, representing an overall investment of US$148.4 million.[9] Project support through a PG to an innovative installation process has resulted in several hundred installations annually by the beneficiary. REMT support for development of an installer training program will continue with DoE support, and will help extend the scope of SWH installations to less represented provinces and a broader socio-economic group of beneficiaries.

3.5 Overarching Themes, Other Outcomes, and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

54. **Development policy in South Africa, in part because of the pernicious effects of apartheid, is focused on job creation and economic development**. The scope and design of the project did not entail reporting specifically on poverty impacts, gender-related aspects, and social development. Nevertheless, two of the RE projects that were supported through REMT's MG program and were successful in the first round of the REIPPPP are located in two relatively underdeveloped provinces in South Africa (i.e., Limpopo and Northern Cape). The requirement of the REIPPPP for project developers to provide for local development means that all RE IPP projects must make a positive contribution to the social welfare of the communities within which they plan to operate. Finally, a key outcome of REMT's support for market segmentation of SWH implementation resulted in the development the national rollout of the SWH program to encourage implementation among lower-income households.

(b) Institutional Change/Strengthening

55. **The South African RE sector at project close was markedly different from where it was at appraisal.** Institutionally, the RE market—comprising regulators; governmental institutions; and the private sector, including project developers, commercial lenders, and service providers—had demonstrated remarkable progress in their knowledge, experience and capacity and have produced concrete results over a relatively short period. The REIPPPP experience, in combining elements of a feed-in tariff within a tendering procurement process, is a RE model for other countries seeking to initiate and scale-up RE investments in a sustainable and cost-effective manner.

[9] This amount includes the effect of Eskom's rollout program for its own account (since 2008), as well as the initial tranche of the substantial US$0.48 billion fiscal allocation from the DoE.

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

56. As part of the project close-out process, the ISU requested feedback from MG beneficiaries. The comments received from beneficiaries are summarized below:

- **The project had a beneficial impact on the ability of project developers to conduct their feasibility studies.** The project was well structured and implemented in a targeted way that made a materially positive difference to project developers. The outreach activities across the country undertaken by the Project Coordinator during the fourth round of the MG program played a critical role in marketing the program to potential beneficiaries.
- **The ISU was sufficiently flexible to accommodate external changes in implementation schedules.** The government's original intention of organizing four REIPPPP bidding windows annually could not be realized. The resulting changes in the REIPPPP implementation schedule meant that it was a challenge for some of the MG beneficiaries to adhere to the timelines agreed for grant funding purposes. However, ISU team members showed flexibility in responding to changing requirements of project developers to meet these needs. Certain delays in implementation of the MG program from the second half of 2012 could have been mitigated by better communication from the ISU, in particular, regarding the lack of continuity of a Project Coordinator in 2013, resulting in delays to contracting with the beneficiaries approved in the final round of the MG program**.**
- **A project similar to REMT, with transaction support and an MG process, could be helpful to support the small RE IPP program.** Should further financing opportunities be available, it was noted that it would be helpful if a REMT-like project could support processes related to the small RE IPP program, announced by the DoE in 2013, which targets development of RE projects with capacity not exceeding 5 MW. This program could benefit from the establishment of a small central coordinating body to facilitate project developers' and policymakers' access to transaction and technical specialists. Some of this assistance could be directed to interactions with municipalities, noting that the smaller projects would more likely connect to municipal-owned grids. Other areas of potential support indicated included the development of a capital financing instrument and legal support services for small projects, taking into account the high costs of professional fees.

4. Assessment of Risk to the GEO
Rating: Moderate

57. **Putting into place a sound regulatory system for development of RE markets has created a basis for attracting and sustaining private investment.** The country has developed a track record of attracting and supporting both public and private investment to developing RE for power generation and SWH. Taking into account the outcomes of both project components, the financial risks to the continued sustainability of the GEO are considered **Moderate.**

58. **Lower average prices bid in the three successive rounds of the competitive REIPPPP are widely viewed as a positive development.** However, it is unclear whether expectations of a continued reduction in bid prices can be sustained in subsequent rounds. An important question is whether prices in subsequent bidding rounds would fall further, and what effect this could have on the IRRs of project developers. A related question is whether the South African financial institutions that supported developers in earlier bidding rounds would have adequate financial

capacity to participate in later rounds. As the fall in REIPPPP prices also reflects the current global overcapacity in wind and solar power generation systems, the extent to which these prices reflect the long-run generation capacity constraints in South Africa is limited. Increasing grid-based electricity tariffs in South Africa could be conducive to the financial viability of distributed generation options, such as rooftop solar PV, which could prosper in an environment of increasing prices paid by end consumers for grid-based electricity. In addition, new financing models should be explored to attract long-term "yield" institutional investors to refinance projects as they get commissioned and enter regular operations. Finally, it not clear to what extent the establishment of a credit-worthy single buyer over time would have on the market.

59. **The limited number of trained SWH installers across the country presents a moderate risk to national implementation of the SWH rollout program**. The majority of SWH installations have been in and around the major metropolitan areas of Gauteng and Kwa Zulu-Natal, and, to a lesser extent the Western and Eastern Cape, respectively, which enjoy a large concentration of trained installers and plumbers. With national implementation of SWH, there is a risk of an insufficient number of trained installers in other locations across the country in the remaining provinces of Limpopo, Northern Cape, Mpumulanga, Northwest, and Free State. South Africa intends to implement appropriately developed installation training and certification programs, coupled with targeted market awareness campaigns to attract young people to serve these markets.

60. **High up-front costs of SWH systems remain a barrier to attract end consumers**. Despite steep increases in electricity prices from 2009 onward, SWH had not attracted the attention of end customers as a financially viable alternative energy source without continued rebates or subsidies. Under the Eskom SWH rebate scheme, an SWH installer receives payment (or rebate) for each accredited SWH system installed.[10] This risk could be mitigated by the development of revenue models that are based on the value of the savings in power generation and reductions in CO_2 emissions; however, low global carbon prices and the high cost of SWH systems remain barriers. The proposed introduction of a carbon tax, and the ability to offset it, could provide additional incentives to mitigate this risk. In addition, local production of SWH components could offer an opportunity for lower-cost systems.

61. **Lower energy consumption resulting from the installation of SWH systems could have adverse financial effects on municipalities.** Municipalities derive an important part of their revenue base from reselling electricity to end consumers**.** Obtaining the expected level of support for the SWH rollout program would require consideration of this issue, especially where middle- to high-income households contribute a significant share of municipal finances.

Government Ownership/Commitment
Highly Satisfactory

62. **The government has shown strong commitment to the project's PDO/GEOs.** The DoE's support, in the form of co-financing and participating in oversight functions, illustrated a very high level of government ownership. This strong commitment was illustrated by the substantial fiscal

[10] The funds for the rebates were initially derived from NERSA-approved tariffs, and later from fiscal transfers.

allocation of ZAR4.7 billion to the national SWH rollout program, and by the focus placed on ensuring that the appropriate institutional arrangements were in place to support the SWH rollout program, including the designation of an implementing agency that would be accountable to the DoE. The use of a public-private partnership (PPP) arrangements, in the form of envisaged concessions to approved SWH suppliers, supported by the implementation of a training program for SWH installation, also contributes to creating the necessary implementation capacity.

63. **More broadly, the government has made a range of related commitments that seek to strengthen the PDO/GEO.** On July 1, 2009, the government started to implement an environmental levy on the production of electricity from coal, with the intention of complementing DSM efforts. The levy was also seen as a first step toward developing a carbon tax to achieve long-term climate change objectives, which the government proposed would be designed to minimize potential adverse impacts on low-income households and industry competitiveness. An energy efficiency tax incentive in the form of a tax deduction of 45 Rand-cents/kWh to address improvement in energy use is in place, and is expected to run until January 2020. It is designed as a complementary mechanism (carrot) in anticipation of the implementation of the proposed carbon tax, with some of the proposed carbon tax revenue being recycled through the tax deduction.

5. Assessment of Bank and Borrower Performance

5.1 World Bank

(a) Bank Performance in Ensuring Quality at Entry
Rating: Moderately Satisfactory

64. The World Bank's performance during identification, preparation, and appraisal of the project is rated **Moderately Satisfactory,** reflecting some minor shortcomings in Quality at Entry.

65. **The project design was highly strategic at a time when the South African RE sector was virtually nonexistent.** The appraisal recognized South Africa's sound fiscal and monetary policies, including a strong financial sector. These policies stood the country in good stead to attract RE investments within the legal, policy, and regulatory frameworks to be developed. The project's approach was informed by the Bank's correct assessment at entry that without appropriate support mechanisms, the development of RE power generation and SWH would be limited, since prevailing electricity prices at that time were substantially lower than the costs of long-run marginal capacity expansion, primarily in relation to coal-based electricity generation.

66. **While the 2003 REWP created a policy goal, there was no legislation enabling the purchase of power from RE IPPs.** In the context of the lack of market development at the time of appraisal, it was logically correct to provide for TA support for a number of legislative, regulatory, and statutory frameworks required to facilitate the implementation of the REWP. These frameworks included the development of enabling legislation that would provide for the purchase of RE (realized in the form of the passage of the 2008 Energy Act), the detailed design of the REFIT mechanism, and the formulation of SWH standards. The project design also correctly identified the need for a robust grid-access framework for RE IPPs, and noted that it was imperative that the private sector, policymakers and regulators develop adequate knowledge about RE.

67. **The governance arrangements related to the project reflected a good mix between the policymaker (DoE), the regulator (NERSA), and an energy-sector implementing agency (CEF Group).** The location of the ISU at the DBSA, one of South Africa's premier development finance institutions, was also logically expected to contribute to the coordinated removal of RE barriers. In addition, considering the nascent state of industry development at that time, the project design also sought to increase the capacity of project developers to ensure the project remained relevant.

68. **The project risk assessment appropriately focused on the factors that could negatively affect outcomes, but some implementation arrangements were not fully addressed at entry.** The motivation for the risk assessment and ratings at entry were premised on the expectation that the DBSA, as host of the ISU, was well placed to address implementation risks. The motivation to use the DBSA's financial management and procurement expertise was essentially sound; however, the adequacy of these implementation arrangements and the provision of adequate human resource capacity were not addressed properly until project implementation began and restructurings were needed to ensure continued progress and relevance. Another shortcoming was that administrative and operating costs should have been included in the Grant Agreement budget, as they had been in the PAD.

69. **The PAD results framework provided adequate indicators for M&E, although some indicators could have been better aligned**. Indicators selected for M&E of the project's implementation, as well as progress toward the implementation of SWH and REPG projects and toward the government's REWP target were mostly adequate. Although some of the outcome indicators were not quantitatively defined (e.g., industry codes and standards adopted), it could be argued that such a qualitative design lends itself well to flexible implementation of a TA project in a quickly changing environment. The indicators for power generation and CO_2 emissions avoided were not proportionate to each other, suggesting a possible error in alignment.

(b) Quality of Supervision
Rating: Satisfactory

70. The World Bank's quality of supervision of project implementation is rated as **Satisfactory**. Despite limited resources for implementation support of GEF stand-alone operations and the hands-on role required to support implementation of TA activities, the Bank team focused closely on the project's development impact throughout the implementation period. The team regularly and consistently engaged with the government on its priorities (e.g., expanding the project's focus from commercial SWH systems to all SWH systems, including those installed in the residential sector); by fostering resilience in the face of a fast-changing policy environment (e.g., re-allocating the budget to provide more support for MG beneficiaries and providing for "real-time" specialist support to the DoE); and by facilitating flexibility (e.g., extending the project closing date to allow for the completion of contracted MG activities).

71. **The World Bank exercised its fiduciary duties in a timely manner, and regularly communicated with and provided strong client-focused implementation support for the DoE and the DBSA**. The Bank's inputs were primarily in the form of regular implementation support missions, Aide Memoires, "no objection" processes, post-procurement reviews, and financial management oversight. These inputs focused on maintaining the project's relevance, procurement planning, and implementation, as well as improving the disbursement profile and financial reporting.

The World Bank team provided procurement training for ISU team members, and consistently achieved short turn-around times for "no objection" requests related to the MG program. This approach contributed greatly to the MG program's success, while maintaining compliance with fiduciary requirements.

72. **Members of the World Bank team also led and/or participated in other similar-themed engagements in the country, providing synergies in implementation and resources.** Examples of these other operations included the Eskom investment projects; the Energy Sector Management Assisted Program (ESMAP)-supported Low Carbon Growth Strategy Study with the then Department of Environment, Agriculture and Tourism; ESMAP-supported TA for the South African Cities Network on Renewable Energy and Energy Efficiency; carbon finance cooperation with the DBSA; and regular interactions with Eskom, CEF, the IDC, and private companies. The Bank also provided advisory support to South African institutions (e.g., to Eskom on such issues as the bulk-buying of SWH systems), and supported such initiatives as reviewing the government's long-term mitigation scenarios for climate change; developing standard offer incentives for energy efficiency; advising on managing power shortages; assisting municipalities on RE and energy efficiency and various carbon credit initiatives, including through the DBSA; and helping the DoE's prepare for the United Nations Framework Convention on Climate Change's 7th Conference of the Parties in Durban. Feedback from these interactions and the Bank's coordination with the National Treasury on these issues provided opportunities for synergies in implementation that proved beneficial to the project.

(c) Justification of Rating for Overall Bank Performance
Rating: Satisfactory

73. The ICR rates the Bank's overall performance as **Satisfactory.** Gaps in the project's preparation were mitigated by active engagement during implementation. The project focus was on maintaining relevance, being flexible in the context of a fast-changing policy environment, and continually focusing on the PDO/GEO and execution of fiduciary duties. After a slow start, the project would have most likely disbursed its entire amount had it not been for the final year delay in appointing a team for ISU coordination at the DBSA, despite several proactive efforts by the government and the Bank teams to accelerate these processes.

5.2 Borrower

(a) Government Performance
Rating: Highly Satisfactory

74. The Government of South Africa, represented in the project by the DoE and the Project Steering Committee (PSC), was engaged and proactive. The Government's performance is rated as **Highly Satisfactory**.

75. **The DoE's Clean Energy Chief Directorate and New and Renewable Energy Directorate played a key role in the project's implementation.** The DoE complied with project-related covenants, including for the transfer of co-funding resources to the project. The government was highly committed to REMT and achievement of the GEOs, including strong involvement of

DoE officials during implementation (e.g., evaluations and undertaking site visits); policy and regulatory framework development (e.g., involvement in the processes related to the REWP review, ISMO Bill development, and socioeconomic assessment of the IRP); and regular communication of priorities and exchanges with the Bank as the policy environment changed. The DoE played a key coordination role between ongoing national initiatives and the project. The DoE's active engagement in the project enabled it to receive first-hand information on progress, and to provide informed guidance and inputs to the overall South African policy and regulatory process. This led to opportunities for value creation, such as the DoE's decision to apply the modeling of technology cost curves to the ongoing IRP process, and its facilitation of the project's participation in the formulation of strategies to support the national SWH rollout program.

76. **The DoE chaired the PSC, which was a platform for stakeholders to participate in the project's oversight functions**. The DoE's role on the REMT Grant Approval Committee ensured that first-level oversight was in place, thus facilitating the granting of "no objections" by the Bank for proposed procurement. As PSC Chair, the DoE was able to access information on project implementation, including potential bottlenecks, and participated actively in the 2011 MTR Report, which allowed for accelerated implementation of the MG program. The DoE supported the project's outreach activities by participating in workshops, making its Web site available as an additional channel for the dissemination of project-related information, and facilitating linkages with regional investment promotion agencies for workshops that helped increase the quality and quantity of MG applications. When required, the DoE helped to remove hurdles to project implementation and focused on transition arrangements at the project's close. The DoE was proactively involved on a number of occasions in addressing human-resource constraints at the ISU that affected the project, including through discussions with DBSA senior management.

(b) Implementing Agency's or Agencies' Performance
Rating: Moderately Satisfactory

77. Due to some moderate challenges to implementation that were ultimately resolved, the ISU's performance is rated as **Moderately Satisfactory.**

78. **The ISU coordinated interactions with external stakeholders and partners, hosted conferences and workshops, generated reports, and disseminated information.** The ISU held regular discussions with the IDC, Eskom, CEF Group, United Nations Environment Programme (UNEP), Danish International Development Agency, GIZ, and other partners to coordinate the activities related to the RE power generation and SWH programs being implemented or planned by these institutions at the time, and as part of the project's MTR in early 2011. The ISU organized several conferences, including the Renewable Energy Summit and SWH conference, which facilitated engagement on strategic issues related to the development of South Africa's RE sector. In addition, the ISU organized workshops on CSP, SWH, and biogas, and published informative documents about various aspects of the RE sector, including conference and workshop proceedings. As part of the MG program, the ISU convened workshops across the country to reach and engage prospective project developers with the MG application procedures. These workshops significantly improved the quality of MG applications and, in turn, project disbursements. The larger benefit was that developers were able to access project pre-investment resources in a timely manner to prepare their REIPPPP project applications.

79. **Although there were several strengths in the ISU's performance, certain implementation shortcomings affected REMT implementation.** The DBSA, as the DoE's implementing agency, established the ISU reporting internally to its Agencies Unit, to manage the project's daily operations. This allowed for the provision of dedicated resources toward the achievement of the PDO/GEO. With support from the World Bank team, the ISU developed capacity in following applicable World Bank procurement guidelines, and also worked closely with the DBSA's FMU in the compilation of quarterly financial reports. The DBSA's financial management and reporting arrangements served the project well, and also facilitated the conduct of annual financial audits in an effective and timely manner. The ISU's M&E arrangements were adequate and informed decision making and resource allocation. However, implementation challenges encountered included delays in the recruitment and departure of ISU team members at critical stages, including in the final year of project implementation. Whenever new ISU team members were appointed, they did their best to get the project on track, and where implementation issues required attention, the Bank and the DoE actively worked with the DBSA in their resolution. Despite these efforts, the delay in re-appointing and the subsequent departure of the ISU coordinator in the final year of the project impacted the full disbursement of the Project and its high-impact MG program.

80. **The ISU coordinated with the DoE and the World Bank in planning for implementation following the closing of the GEF project.** One of the transitional issues under discussion was the implementation of the training program for SWH installers following the close of the GEF project in September 2013. In support of the implementation process of the national SWH program, and working jointly with the Bank and the DoE, the ISU procured the services of a consultant to design and deliver training to SWH installers. The first part of this process was the production of training materials in 2013, which would be followed by the actual training of installers during 2014. As a way of managing the transition to the post-implementation phase, the training materials were procured using the Bank's portion of the co-funding, while the actual training would be funded from the DoE's portion after the GEF project closed.

(c) Justification of Rating for Overall Borrower Performance
Rating: Satisfactory

81. The ICR rates the overall performance of the Borrower as **Satisfactory.**

82. The DoE's leadership in the project is rated as Highly Satisfactory. Given the many heavy demands and requirements placed on the availability of the DoE officials who participated in the project, the DoE's active involvement, including in operational matters, was exemplary. The DoE counterpart was responsive and always assisted in the timely resolution of issues. The provision of budgetary resources illustrated the DoE's commitment to the project, and senior officials, including the DoE Director General, were engaged in the project. The ISU's expeditious implementation of the MG program, coordination of capacity-building activities, and facilitation of policy and regulatory frameworks played a major role in advancing the project's objectives. The DBSA's role in financial management and reporting contributed to good governance. Moderate shortcomings included the initial challenges to aligning procurement processes, which were overcome, and final-year challenges related to ensuring the ISU had the necessary human resource capacity, which were overcome but limited the full disbursement of funds.

6. Lessons Learned

83. When REMT was first conceptualized in the early 2000s, there was very little activity related to RE in South Africa. This changed rapidly as the country grappled with generation capacity constraints and rising concerns about its economy's carbon intensity, and as the government balanced its interest in addressing urgent power shortages through new generation and supply and through DSM, while meeting South Africa's climate change mitigation goals and expanding access and services to low-income and unserved populations. The government's efforts in this regard were supported by the REMT Project, as well as by several other development partners. The main overall lessons are:

- **Well-targeted TA activities, although time consuming, can support the enabling conditions for scale-up of RE markets.** The project focused its TA activities to complement ongoing efforts to support the removal of key legal, policy, regulatory, and information barriers to implementation. Improving and extending the capacity of relevant state-owned institutions helped provide strong leadership in the sector, including support for high-impact analytical work, such as the modeling of technology curves, which led to favorable allocation for RE in the IRP.
- **Well-designed pre-financing and financing mechanisms for RE projects are key elements of scale-up of RE investments.** In the context of South Africa's well-developed financial markets, the government's preparation of key legal, policy, and regulatory frameworks, including well-structured PPAs, was a key success factor. Recommendations for fair allocation of risks and a bankable standardized PPA in the early development phase of the market provided a basis for the introduction of project financing in the South African RE sector. The government's early preparation was invaluable, and included considerations of resource data for site identification (including integration with the grid), identifying the importance of identifying potential projects and making pre-investment resources available to make potential projects bankable. Targeted TA was a necessary success factor to unlock the liquidity in the country's financial markets to support RE investment.
- **Market-driven development of RE generation is an effective strategy.** Rather than prescribing financing of only one type of RE technology, REMT focused on the policy, regulatory, and commercial conditions required for the overall development of the RE market. When the global RE technology marketplace changed in 2009–10, South Africa was able to build on the regulatory frameworks developed and adopt a tender mechanism to attract investment in RE, although the technologies featured, and the process for procuring and financing RE capacity were different from those that were favored at project appraisal.
- **South Africa combined elements of both feed-in-tariffs and competitive tendering in the implementation of the REIPPPP, creating a replicable model of RE development for other countries.** FiTs can be important in initiating (or 'kick-starting') RE investments, while competition through tendering mechanisms can be an effective strategy to attract such investments in a sustainable and cost-effective manner. As the global market changed and prices of RE equipment and technology fell, and in line with the constitutional requirement for cost-effective procurement, the Government pivoted to a tendering process and the FiTs were set as the maximum amount (ceiling) that could be bid through the competitive process. The resulting competition put pricing pressure on the submitted bids, which came in below the ceiling price.

- **Flexible project design allows clients to move quickly to adjust to changing global market conditions.** The project's support proved timely and relevant, when South Africa decided to evolve the regulatory approach developed under REFIT to a tendering process to procure new capacity from private-sector entities. This allowed South Africa to benefit from extremely favorable market conditions and pricing of RE technology on the global markets. In general, governments need flexibility to respond to market conditions.
- **Effective project implementation seeks to harmonize with the country's broader and urgent goals.** While Eskom's SWH implementation was designed primarily as an energy DSM initiative, the DoE identified opportunities to scale up energy access through the development of the national SWH rollout program. Recognizing the value of having one centralized agency to procure and install SWH, the government designated Eskom to install SWH systems on its account. This had scale implications for the cost of procuring and installing SWH systems, including for local production and job creation as well as for expanding access to low-income households. Overall, the project was well harmonized with broader national goals, such as securing energy capacity, increasing energy security, mitigating climate change, and creating jobs.

6.1 Lessons Learned Relevant to Project Preparation

- **Creating dedicated in-house project management capacity by locating the ISU at the DoE could have been considered as an option.** This option would have required establishing appropriate procurement, recruitment, and financial management arrangements. Although the provision for the DoE to outsource the project to an implementing agency was sensible, it did not guarantee the necessary implementation capacity would be available. The choice of an external ISU also meant that project implementation capacity on fiduciary issues was not built within the DoE.
- **Attracting and retaining qualified personnel on the basis of fixed-term employment contracts can be a challenge for project implementation.** As an alternative, the services of ISU team members could have been procured through consulting contracts, as was the case with at least one of the Project Coordinators. Besides minimizing the disruptions to implementation caused by the turnover of personnel experienced during the project's implementation, this approach could have been augmented by the use of market-related remuneration structures. The ISU's organizational design could have provided for at least one additional team member (e.g., a second Business Support Manager) to match the ISU's capacity to meet the project's administrative requirements.

6.2 Lessons Learned Relevant to Project Implementation

- **The engaged and flexible approach demonstrated by the ISU, the DoE, and the World Bank during implementation was critical in maintaining the project's relevance during a period of considerable policy change.** A significant amount of progress in the project was enabled because of the strong cooperation and relationship between the government and World Bank counterparts, who communicated regularly and frankly about market evolution and needs. Since procurement of consultants was not undertaken directly by the DoE, more effort was required to ensure that the resulting policies and frameworks remained aligned with the PDO/GEO and national imperatives. Therefore, it was imperative for the ISU to go beyond mere contract and project management, and to also have insight into the

implications of the various policy options being explored. The relative positioning and status of the ISU within the host organization is also an important factor to consider.

- **Reducing turnaround time for procurement of consultants would have helped the project become even more responsive in a fast-moving policy and regulatory environment.** One way to reduce turnaround time with limited implementation capacity would be to procure panels of consultants who could be prequalified to bid for specific interventions as required based on generic terms of reference (ToRs), or who are already prequalified by the DoE or the DBSA for similar assignments. The contractual assignment of consultants would be undertaken on the basis of specific ToRs and proposals from the prequalified consultants. This approach could help reduce the turnaround time for consultant appointments, without deviating from the principles of competitiveness, efficiency, and transparency.
- **Engaging small RE enterprises to participate in the REMT MG program is a time- and resource-intensive activity and requires a significant level of ISU support.** The high-level ISU support required for the MG program and other REMT elements had a disproportionate impact on the project's administrative and operational costs, and placed heavy burdens on human resource capacity. Greater allowance for operational support in GEF projects that envisage intense engagement with sub-grantees would be helpful.
- **Successful projects require close oversight and engaged supervision with sufficient budgets.** As a stand-alone operation, the task team was able to provide implementation support by leveraging budgets from numerous smaller operations for combined missions etc. With limited implementation support resources available for stand-alone GEF operations, it is important to consider having one team assigned for related tasks sustained over time.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

84. The DoE's comments on the first draft of this ICR are attached in Annex 5 of this report, and relevant points have been incorporated in this report.

85. The ISU expressed the view that the "Moderately Satisfactory" rating of its performance does not adequately reflect the successes achieved. The ISU also requested clarity on a reference to the performance of new ISU team members. It was clarified that the reference related to all instances in which new members were appointed throughout the project implementation period, and was not directed only at the ISU team appointed in the final year of project implementation.

Annex 1: Project Costs and Financing[11]

Project Cost by Components[12]

Components	Appraisal Estimate (USD millions)	Estimate (USD millions)	Percentage of Appraisal
Total Baseline Cost			
REPG	5.75	3.64	tbc
(C)SWH	10.70	0.24	tbc
Project Management	0.85	0.20	tbc
Total Project Costs	17.30	4.08	tbc

Financing

Source of Funds	Type of Co-financing	Appraisal Estimate (USD millions)	Estimate of direct co-financing (USD millions)[13]	Percentage of Appraisal
Borrower	Direct	2.30	0.51	tbc
Global Environment Facility (GEF)	Direct	6.00	2.20	tbc
Private sector[14]	Direct/Indirect	9.00	1.37/147[15]	tbc
Total Financing Required	Direct/Indirect	17.30	4.08/152.8	tbc

[11] The numbers presented in this Annex are estimates based on unaudited financial reports prior to financial close, and are not deemed reliable. The data presented in the table await confirmation based on review of final audited statements.

[12] The 'Project Cost by Component' table reflects unaudited estimates of direct costs borne by the REMT project. It does not include amounts leveraged indirectly through the Government or indirectly from the market.

[13] These numbers are estimates based on unaudited financial reports prior to financial close, and are not deemed reliable. The data presented in the table awaits confirmation based on review of final audited statements.

[14] The PAD (Table 2) states that the project was expected to leverage US$ 9 million from the private sector under this project. The PAD clearly stated that the funds so leveraged could not be committed in the same manner as Government or donor funds. Amounts leveraged by the private sector include the over $7 billion leveraged for REPG under the REIPPPP under the first two bidding windows; over $148 million invested in SWH installations; and the $390 fiscal allocation for the national roll-out of the SWH program.

[15] The PAD (Table 3) also states that the $9 million from the private sector reflects the estimated cost of equipment installed by the SWH companies under this project. Grants for SWH under the project were curtailed based on the uptake in the SWH market and resources were focused on MG for REPG. The $1.37 million financing amount cited above includes only the direct private sector matching contribution through the REMT Matching Grants program. The $148 million cited in the Financing table above refers to the confirmed investment leveraged for SWH installations. The numbers above do not reflect the $390 million allocated for implementation of the national rollout of the SWH program.

Annex 2: Outputs and Outcomes by Component

Table 1: Assessment of Outputs and Outcomes—Renewable Energy Power Generation (REPG)

Baseline	Outputs	Outcomes
Outcome indicator 1: Government and electricity regulator prepared the legal, policy, and regulatory frameworks for grid-based renewable energy power, and submitted them for government approval by December 31, 2009.		
No frameworks in place	Received comments on the draft standardized REFIT PPA.	The comments on the draft standardized REFIT PPA, which were drawn up by a law firm in 2009, created early market confidence by private sector project developers and commercial lenders, and informed the use of a similar concept for the government's flagship RE program—the REIPPPP.
	NSWHF provided input to national rollout of SWH program.	The NSWHF provided input toward the implementation of the ZAR4.7-billion SWH rollout program as undertaken by Eskom on behalf of the DoE. Examples of such input include the concept of a single "bulk-buying" agency for SWHs, as well as the expansion of the rollout program to low-income households by introducing market segmentation.
	Revised the REWP report with significant contribution to expanding the role of RE in the IRP for the country's energy development plan	The concept of technology learning curves that was applied in the modeling scenarios for the REWP review was incorporated in the IRP modeling. The result was a lowering of the cost of RE technologies over time, thus increasing their share of projected new generation capacity in the country's energy development plan.
	Reviewed and provided comments on the draft ISMO Bill.	Comments received during the ISMO Bill parliamentary public consultations were reviewed and considered for incorporation into the bill. The bill was in the parliamentary process at the time of compiling this ICR.

Baseline	Outputs	Outcomes
Outcome indicator 2: Develop and make a renewable energy resource database available.		
No information on solar, biomass, hydro available	Made available high-level solar resource information via the project's Web site. Created a link on the project's Web site to the interactive wind resource map through the UNDP–GEF-sponsored South African Wind Energy Program.	As a result of the REFIT program that was announced by NERSA in 2009, and increased investor interest in the South African REIPP sector, individual project developers undertook the prospecting of solar and wind power generation sites for their own proprietary use. Commercially available satellite data were used for solar resources, while on-site wind masts were installed to gather wind energy-related resource information. In some cases, the project supported these prospecting activities through the MG program. As a result, the project only had to make available high-level resource information via its Web site.
Outcome indicator 3: Assist 10–14 potential renewable energy power generation developers, and prepare 4–6 pre-feasibility studies.		
Very few renewable energy projects by private developers	Approved MG guidelines (June 2010). Updated MG selection criteria (May 2011). Conducted 5 procurement rounds for MG applications. Organized a series of back-to-back workshops held nationally to engage prospective MG applicants during the 4th round, which attracted the most market response and applications ahead of the first round of the REIPPPP.	Assisted 14 new REPG enterprises. Conducted 33 pre-feasibility and feasibility studies, as some of the firms had portfolios with more than one project. At least 5 of the projects supported via the MG program were selected as preferred bidders at the start of the government's flagship REIPPPP in 2011 (i.e., Bidding Window 1). As of December 2013, one of the projects had been successfully commissioned. The other 4 projects had achieved financial closure and were in construction. An additional 4 projects had been notified that they met the requirements under Bidding Window 3 of the program.

Baseline	Outputs	Outcomes
Outcome indicator 4: Increase knowledge about renewable energy in relevant official agencies and private-sector financial institutions.		
Lack of renewable energy experience	Organized CSP workshop and RE summit held in 2009.	A key outcome of the RE summit was a resolution for REMT to facilitate the review of South Africa's 2003 REWP. The CSP workshop led to the establishment of SASTELA, an industry association that went on to contribute to the development of the CSP sector in South Africa.
	REMT hosted SWH workshop, conference, and launch event in 2009 and 2010.	The SWH workshop, national conference, and launch event were instrumental in building capacity, as well as allowing stakeholders to engage on the rollout of SWH systems. The NSWHF, which evolved from this engagement, provided more information on different market segments, resulting in the expansion of the SWH rollout program to low-income households
	Project Web site launched during the last half of 2010. Project Web site used both to make available reports about REPG and SWH, and as a channel for distributing MG program material (e.g., publishing guidelines and application forms).	The project Web site played the role of the "help-desk" envisaged in the PAD. This was an efficient way to increase knowledge about RE in general, and the MG program in particular. The MG guidelines and detailed application forms played a significant role in increasing the quality of applications.

Table 2: Assessment of Outputs and Outcomes—Solar Water Heating (SWH)

Baseline	Outputs	Outcomes
Outcome indicator 5: Formulate industry standards and codes.		
Limited standards in place	Supported the testing of SWH systems.	Eskom's implementation of the SWH rebate scheme began in late 2008, and it facilitated the development of standards in conjunction with the DTI. Rather than duplicate efforts, the REMT Project focused on the implementation of the standards. Implementation support came in the form of assisting SWH suppliers with the testing of their systems, which was required for participation in the Eskom rebate scheme (and later the national rollout program).
	Supported a patent application for an innovative SWH installation system through a Performance Grant (PG).	One company was supported in testing a number of SWH systems. The same company was also assisted in applying for the patenting of an innovative "solar ladder," which had been designed to increase the rate at which SWH systems could be installed. Several hundred SWH systems are being installed annually using this innovation.
	The DoE with REMT supported the design and commissioning of a training program for installers.	The SWH training program was expected to make available accredited SWH installers in support of the implementation of the ZAR4.7-billion national SWH rollout program.

Baseline	Outputs	Outcomes
Outcome indicator 6: Install 200 CSWH systems by Year 4.[16]		
40 systems installed	The DoE designated Eskom as an implementer of its SWH program, with DoE-funded installations in such areas as Tshwane and Sol Plaatjie. The DoE, jointly with REMT, supported the segmentation of the SWH market (as part of the NSWHF).	By September 20, 2013, Eskom's implementation of the SWH program had resulted in the installation of 282,350 SWH systems, comprising 214,444 low-pressure (LP) and 67,906 high-pressure (HP) SWH systems. An additional 30,000– 40,000 SWH systems were installed under contract by Eskom, but funded by the DoE, by the end of September 2013. The DoE-funded Eskom SWH installations are not included in the results reported above. In addition, based on the allocation of ZAR4.7 billion over 3 years by the National Treasury toward the national SWH rollout program, an estimated additional 107,000 systems (88,000 LP and 19,000 HP systems) would be installed in the first year of the rollout program alone. Allocation of substantial fiscal resources, supported by the designation of Eskom as a "bulk-buying" agency for SWH systems, contributed to the attractiveness of investing in local SWH manufacturing.
Outcome indicator 7: Avoid 85 GWh of power generation by Year 4.		
15 GWh avoided	Same as the outputs for Outcome Indicator 6 (i.e., segmentation of the SWH market, designation of a "bulk-buying" agency, and commissioning of a training program for installers). Related to the NSWHF.	By September 2011, the Eskom implementation of the SWH program, which started as a pilot in 2008, was avoiding 60 GWh per year nationally, according to Eskom estimates. This figure of power generation avoided is over and above the baseline of 15 GWh of power noted in the PAD, which when considered, would have brought the cumulative power generation avoided to

[16] It should be noted that although the original indicator baseline was on the basis of commercial SWH systems, this was amended to include both residential and commercial systems. The actual implementation of South Africa's SWH program focused primarily on the residential sector.

Baseline	Outputs	Outcomes
		75 GWh by 2011 (Year 3 of the GEF project). The pace of installations rapidly increased in the two subsequent years, and Eskom reports that by the end of September 2013, assuming average savings of 1,250 kWh/year for LP and 2,050 kWh/year for HP systems, at least 407 GWh is calculated to have been avoided on an annualized basis. When considered along with the baseline, this would have brought the cumulative power generation avoided to **422 GWh** by 2013. The calculation excludes the power generation avoided from the installations funded by the DoE.
Outcome indicator 8: Invest $9 million in CSWH systems by Year 4.		
$1.8 million invested	Same as the outputs for Outcome Indicator 6 (i.e., segmentation of the SWH market, designation of a "bulk-buying" agency, and commissioning of a training program for installers). Related to the NSWHF.	At least **US$138 million**, comprising ZAR962 million (US$97.5 million) and ZAR404 million (US$40.9 million), had been invested in LP and HP systems, respectively, by September 2013.This estimate is conservative and is based on Eskom's installations on its own account; it does not count DoE installations under contract. In addition, the South African National Treasury Africa has allocated ZAR4.7 billion (US$480 million) over 3 years (starting from 2012–13) toward the rollout of SWH systems.
Outcome indicator 9: Through (C)SWH, avoid 0.75 million tons of CO_2 emissions by Year 4.		
Negligible	Same as the outputs for Outcome Indicator 6 (i.e., segmentation of the SWH market, designation of a "bulk-buying" agency, and commissioning of a training program for installers).	**The cumulative target of 0.75 million tons avoided was achieved by project close.** Based on an emission factor of 0.99 kg/kWh, Eskom reported 60,000 (0.060 million) CO_2 emissions avoided annually by September 2011. Using the 1.07 kg/kWh used in the PAD, this would translate to just over 65,000 tons (**0.065 million tons) annually.** By the end of September 2013, the Eskom SWH program had ramped up implementation with just over **435,000 (0.44 million)** tons

Baseline	Outputs	Outcomes
		avoided using the 1.07 kg/kWh emission factor from the PAD. (This number does not include the additional tons from the DoE-funded Eskom installations or the SWH implemented in the first-year rollout of the national SWH program.) Considering the accelerated pace of installations in 2012 and 2013, on a **cumulative basis**, the 0.75-million-ton target was highly likely to have been achieved by the end of 2013.[17]

[17] Given that the scale of installations and the quantum of GWh avoided are several times higher than the target values, the corresponding CO_2 target of 0.75 million tons avoided by Year 4 appears to have been overstated in the original PAD.

Annex 3: Economic and Financial Analyses

Economic Analysis

Project Appraisal Stage

As outlined in the PAD, an economic analysis of installing demonstration CSWH systems was conducted. The Eskom tariff applicable at the time was used to indicate the costs that would be saved by switching to SWH, and therefore was used as a proxy for benefits. The tariff used was a combination of the "demand charge" and "energy charge," resulting in a value of 3.62 US cents per kWh. To estimate the effect of environmental benefits, in the form of CO_2 emission reductions, the carbon price used was US$4 per ton. This conservative approach indicates the lower end of the quantum of benefits from CO_2 emission reductions. Naturally, using a higher carbon price, for instance, the level of the carbon tax proposed by the South African National Treasury of US$12 per ton, would result in a higher IRR.

The analysis showed an IRR of 14 percent, taking into account only the electricity savings. With CO_2 reductions, the IRR was calculated at 17 percent. A key conclusion was that reductions in the cost of SWH systems were required to improve their attractiveness. Table 1 provides an outline of the analysis, including the key assumptions.

Table 1: Economic analysis at project appraisal: solar water heating

South Africa REMT Project												
Economic Analysis of Commercial Solar Water Heating												
	Capital Cost		Annual Electricity Savings			Net Economic Benefits		Annual CO2 Reductions			Net Economic + Environmental Benefits	
Year	ZAR	US$	kWh	ZAR	US$	ZAR	US$	tons	ZAR	US$	ZAR	US$
1	200,000	28,986	115,264	28,816	4,176	(171,184)	(24,809)	123	3,401	493	(167,783)	(24,316)
2	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
3	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
4	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
5	5,000	725	115,264	28,816	4,176	23,816	3,452	123	3,401	493	27,217	3,944
6	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
7	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
8	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
9	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
10	5,000	725	115,264	28,816	4,176	23,816	3,452	123	3,401	493	27,217	3,944
11	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
12	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
13	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
14	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
15	-	-	115,264	28,816	4,176	28,816	4,176	123	3,401	493	32,217	4,669
IRR						**14%**	**14%**				**17%**	**17%**
Notes and Assumptions												
System size (liters)						10,000						
Solar panel need (liters/square meter)						100						
Cost (installed) per panel						2,000						
Exchange rate (Rand/$)						6.90						
Electricity cost savings: (US cents/kWh)						3.62						
CO2 emissions (kg per kWh)						1.07						
Value CO2 ($/ton)						4.00						

Implementation Completion Report (ICR) Stage

The same approach followed at project appraisal was used in the analysis, using updated information. The government's ZAR4.7-billion (USD0.48-billion) national SWH rollout program was used as a basis of analysis. This included the introduction of low-pressure (LP) and high-pressure (HP) SWH systems, to be installed in low-income and middle- to high-income households, respectively.

Based on a planned LP/HP system split of 80/20, the number of envisaged LP and HP installations in the first year was 88,000 and 19,000 systems, respectively. With the support toward the cost of each LP and HP specified at ZAR7,500-00 and ZAR8,500-00, respectively, the amount expected to be committed was 82 percent of the ZAR1 billion budgeted for the first year, respectively. This LP/HP split and level of budget commitment was assumed to apply over the remaining two years of fiscal transfers. The projected capital expenditure was restricted to the initial 3-year period, although the projection of electricity savings was calculated over a 15-year period.

The effect of electricity savings was calculated on the basis of a typical municipal residential electricity tariff in the city of Johannesburg for the year 2012–13, which was 154.06 SA cents per kWh (15.61 US cents per kWh). This was considered more appropriate than the average Eskom tariff of 58.49 SA cents per kWh (5.93 US cents per kWh), which included the effect of the tariffs related to other customer groups (e.g., commercial and industrial customers). The 2012–13 average Eskom electricity price was escalated by the NERSA-approved 8 percent per year over five years to 2017–18, while the average municipal tariffs were escalated by a lower annual factor (5 percent) during the same period. Thereafter, the averages prices were escalated by the government's target annual inflation rate of 6 percent.

Electricity savings per SWH system were calculated on the basis of information sourced from Eskom.[18] According to this information, each HP SWH system was expected to save 1,600–2,500 kWh, while the corresponding range for an LP SWH system was 1,100–1,400 kWh. For the purpose of this analysis, these ranges of values were used to calculate average savings per SWH system type.

To estimate environmental benefits, a carbon price of US$4 per ton was used. This is the same as the price used at project appraisal, and takes into account prevailing carbon market conditions (e.g., oversupply of carbon credits due to a drop in global economic activity).

In US dollar terms, the IRR resulting from electricity savings only was 15 percent. The inclusion of environmental benefits, in the form of the value of CO_2 emission reductions, resulted in an IRR of 16 percent. The inclusion of environmental benefits would have resulted in a higher IRR had a higher carbon price been used.

[18] Eskom Solar Water Heating Rebate Program, November 2010.

Despite the steep increases in electricity prices that South Africa has experienced, an improvement in the IRR level was still contingent on a reduction of the cost of the SWH systems. The further evolution of the national SWH rollout program in support of meeting the government's target of 1 million units, including possible future fiscal allocations, was expected to contribute to the desired cost reduction.

Table 2 provides an outline of the analysis. The key assumptions are detailed below the table.

Table 2: Economic analysis—ICR stage: solar water heating

FY	New HP systems	New LP systems	Capital cost		Annual electricity savings			Net economic benefits		Annual CO2 reductions			Net economic and Environmental benefits	
			ZAR m	USD m	GWh	ZAR m	USD m	ZAR m	USD m	kT	ZAR m	USD m	ZAR m	USD m
2013	19329	87627	822	83	149	229.80	23.29	-592	-60	159.60	6	0.64	-585	-59
2014	31000	140533	1397	142	239	386.24	39.14	-1 010	-102	255.96	10	1.02	-1 000	-101
2015	34406	155975	1643	166	266	449.25	45.53	-1 194	-121	284.09	11	1.14	-1 183	-120
2016			-	-	266	470.81	47.71	471	48	284.09	11	1.14	482	49
2017			-	-	266	493.41	50.00	493	50	284.09	11	1.14	505	51
2018			-	-	266	517.09	52.40	517	52	284.09	11	1.14	528	54
2019			-	-	266	548.13	55.54	548	56	284.09	11	1.14	559	57
2020			-	-	266	581.02	58.88	581	59	284.09	11	1.14	592	60
2021			-	-	266	615.88	62.41	616	62	284.09	11	1.14	627	64
2022			-	-	266	652.84	66.16	653	66	284.09	11	1.14	664	67
2023			-	-	266	692.00	70.12	692	70	284.09	11	1.14	703	71
2024			-	-	266	733.53	74.33	734	74	284.09	11	1.14	745	75
2025			-	-	266	777.55	78.79	778	79	284.09	11	1.14	789	80
2026			-	-	266	824.20	83.52	824	84	284.09	11	1.14	835	85
2027			-	-	266	873.66	88.53	874	89	284.09	11	1.14	885	90
IRR								**15%**	**15%**				**16%**	**16%**

Key assumptions

The years used in the model are based on the envisaged fiscal allocation of the amount of ZAR4.7 billion from over three years. However, the actual disbursement profile would depend on the pace at which the program was implemented.

Cost (installed) per LP system - ZAR	7500
Cost (installed) per HP system - ZAR	8500
Ave annual savings per LP system (kWh)	1250
Ave annual savings per HP system (kWh)	2050
Number of LP systems (planned) 2012-2013	88000
Number of HP systems (planned) 2012-2013	19000
Allocated budget: LP systems (2012-2013) - ZAR m	660
Allocated budget: HP systems (2012-2013) - ZAR m	161.5
Total allocated budget (2012-2013) - ZAR m	821.5
Proportion of allocation (2012-2013) - %	82%
Share of budget (2012-2013) - LP systems	80%
Share of budget (2012-2013) - HP systems	20%
Average annual CPI (%)	6%
Ave weekly exchange rate (ZAR/USD): 2013 -2014	9.8683
CO_2 factor (kg/kWh)	1.07
Value of CO_2 (USD/ton)	4

	Ave price - Eskom*	**Ave price - municipality****
Electricity cost savings (SA cents/kWh): 2012/2013	58.49	154.06
Electricity cost savings (SA cents/kWh): 2013/2014	63.17	161.46
Electricity cost savings (SA cents/kWh): 2014/2015	68.22	169.21
Electricity cost savings (SA cents/kWh): 2015/2016	73.68	177.33
Electricity cost savings (SA cents/kWh): 2016/2017	79.57	185.84
Electricity cost savings (SA cents/kWh): 2017/2018	85.94	194.76
Electricity cost savings (SA cents/kWh): 2018/2019	91.1	206.45
Electricity cost savings (SA cents/kWh): 2019/2020	96.57	218.84
Electricity cost savings (SA cents/kWh): 2020/2021	102.36	231.97
Electricity cost savings (SA cents/kWh): 2021/2022	108.5	245.89
Electricity cost savings (SA cents/kWh): 2022/2023	115.01	260.64
Electricity cost savings (SA cents/kWh): 2023/2024	121.91	276.28
Electricity cost savings (SA cents/kWh): 2024/2025	129.22	292.86
Electricity cost savings (SA cents/kWh): 2025/2026	136.97	310.43
Electricity cost savings (SA cents/kWh): 2026/2027	145.19	329.06
* Escalated by 8% per annum for first 5 years, thereafter by annual CPI (6%)		
** Escalated by 5% per annum for first 5 years, thereafter by annual CPI (6%)		

Annex 4: Bank Lending and Implementation Support/Supervision Processes

(a) Task team members

Names	Title	Unit
Lending		
Arun Sanghvi	Now Retired	
Xiaodong Wang	Senior Energy Specialist (TTL)	EASCS
Luiz Maurer	Lead Industry Specialist	CBDSB
Supervision/ICR		
Karan Capoor	Senior Energy Specialist (TTL from September 2009)	AFTG1
Xiaodong Wang	Senior Energy Specialist (TTL until August 2009)	EASCS
Edith Ruguru Mwenda	Senior Counsel	LEGAM
Tandile Gugu Zizile Msiwa	Financial Management Specialist	AFTME
Chitambala John Sikazwe	Procurement Specialist	AFTPE
Jose C. Janeiro	Senior Finance Officer	CTRLA
Christiaan Johannes Nieuwoudt	Finance Officer	CTRLA
George Ferreira Da Silva	Finance Analyst	CTRLA
Moeketsi Enos Thobela	Consultant	AFTG1
David Vilar Ferrenbach	Energy Specialist	AFTG2
Maria Meer	Program Assistant	AFTG2

(b) Staff time and cost

Fiscal years	No. of staff weeks	USD thousands (including travel and consultant costs)
Lending		
FY01	4.85	20.28
FY02	1.45	68.95
FY03	9.31	71.97
FY04	4.95	71.92
FY05	6.18	75.31
FY06	7.52	61.53
FY07	7.58	41.01
Total:	**41.84**	**410.97**
Supervision/ICR		
FY08	5.22	62.35
FY09	3.51	15.50
FY10	4.76	33.17
FY11	15.99	80.12
FY12	11.54	43.45
FY13	8.36	41.80
FY14	3.37	22.24
Total	**52.75**	**298.63**

Annex 5: Summary of Borrower's ICR and/or Comments on Draft ICR

After the compilation of the first draft of the ICR, the lead ICR author met with the DoE Director of New and Renewable Energy to discuss the ICR in detail. The resulting comments are summarized in this annex. The comments are categorized according to the corresponding sections of the main body of this ICR.

Section 2.1 Project Preparation, Design, and Quality at Entry

Adequacy of participatory processes

As part of resolving the inclusion of black economic empowerment as an evaluation criterion in procurement processes, the Bank and the DoE agreed that 17 percent of project costs would be allocated to the procurement of local services and goods. This provision excluded the capacity-building and implementation support activities, which were funded fully by the Bank. (During 2011, a decision was made for the DoE to fully fund the implementation support activities in the period remaining before the project's closing date.)

Section 2.3 Monitoring and Evaluation (M&E) Design, Implementation, and Utilization

Utilization

In addition to streamlining the MG selection criteria and frequent calls for applications, the workshops on the MG application process that were facilitated by the Project Coordinator also contributed to increasing the quality and quantity of MG applications.

The substantial interest in the capacity-building workshops convened by the project—as evidenced by high attendance figures—indicated the extent to which the project contributed to the dissemination of knowledge about RE.

Section 2.5 Post-completion Operation/Next Phase

Transitional arrangements to post-completion

The process of determining how the DoE funds remaining after the project's closing date could be applied in supporting outstanding activities was underway. It was confirmed that these activities included the implementation of a training program for SWH installers, the procurement of a solar energy specialist to provide support directly to the DoE, and possibly, support toward the implementation of the RE small projects program launched by the DoE in the second half of 2013.

Section 2.5 Achievement of PDO and GEO

Outcome Indicator 1: Government and electricity regulators prepared the legal, policy, and regulatory frameworks for grid-based renewable energy power, and submitted them for government approval by December 31, 2009.

The ICR should highlight the market segmentation concept that was presented as part of the National Solar Water Heating Framework (NSWHF). This was due to the enabling role it played in broadening the SWH rollout program, such as the inclusion of low-income households.

The ICR should highlight that the REMT Project had contributed its share to the development of the ISMO Bill, and that further progress was dependent on the parliamentary process.

Outcome Indicator 2: Renewable energy resource database is available.

The ICR should also highlight that a solar resource map could have been created to support the development of the nascent rooftop solar PV the market. This would be in addition to facilitating the rollout of SWH systems nationally. This also could have assisted with government planning, for instance, in support of the implementation of a management system for environment impact assessments.

Outcome Indicator 4: Knowledge about renewable energy increases in relevant official agencies and private-sector financial institutions.

Although not documented in the applicable workshop report, the contribution of the project-sponsored CSP Industrial Potential Workshop to the establishment of the CSP industry association (SASTELA) should be highlighted, because SASTELA subsequently played a key role in developing the CSP sector in South Africa.

Outcome Indicator 8: US$9 million is invested in CSWH systems.

The project contributed indirectly to SWH investments by sponsoring the development of the NSWHF. The NSWHF provided the basis for the national rollout of SWH systems, which received ZAR4.7 billion from the National Treasury.

Outcome Indicator 9: CO_2 emissions avoided through CSWH systems.

The project contributed indirectly to the CO_2 emission reductions related to SWH investments by sponsoring the development of the NSWHF. The NSWHF provided the basis for the national rollout of SWH systems, which received ZAR4.7 billion from the National Treasury.

Section 4 Assessment of Risk to Development Outcome

Government ownership/commitment

The ICR should also highlight the DoE's commitment by ensuring that the institutional arrangements required to support the national SWH rollout program are in place. These included the designation of an implementing agency, the envisaged use of PPP instruments, such as concessions to secure SWH investments, as well as the rollout of a training program for SWH installers.

Section 5.2.a Government performance

Adequacy of beneficiary/stakeholder consultations and involvement

The ICR should mention the role played by the DoE in facilitating linkages with regional investment promotion agencies in support of the MG program. These were helpful in convening the workshops that the Project Coordinator used as a platform to share detailed information on the MG application process with prospective beneficiaries.

Relationships and coordination with donors/partners/stakeholders

Same as above

Adequacy of transition arrangements for regular operation of supported activities

The implementation arrangements were in the process of being finalized.

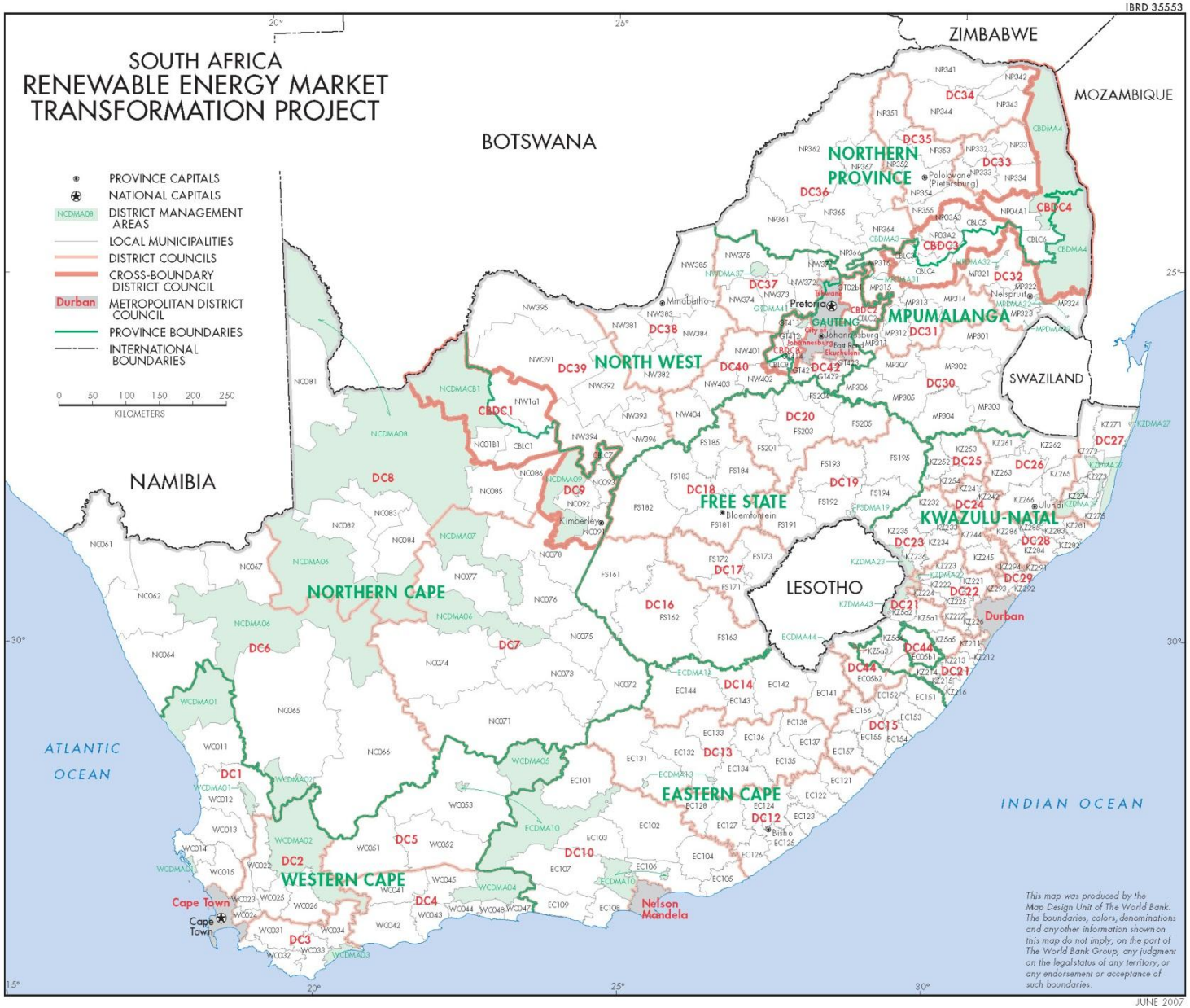
Section 5.2.b Implementing Agency's or Agencies' Performance

Adequacy of transition arrangements for regular operation of supported activities

The transition arrangements were in the process of being finalized.

Annex 6: List of Supporting Documents

Project Appraisal Document
Grant Agreement between the Bank and the DoE
Memorandum of Understanding between the DBSA and the DoE
Midterm Review Report (2011)
Restructuring letters exchanged between the Bank and the DoE
The Bank's Aide Mémoires
Implementation Supervision Reports
Interim Financial Reports
Audited Annual Financial Statements of the Project
Presentation on the Eskom Solar Water Heating Rebate Scheme
DoE–Eskom Revised SWH Contract Model
DoE–Eskom SWH Rollout Dashboard


IBRD 35553
SOUTH AFRICA
RENEWABLE ENERGY MARKET
TRANSFORMATION PROJECT
PROVINCE CAPITALS
NATIONAL CAPITALS
NCDMA08 DISTRICT MANAGEMENT AREAS
LOCAL MUNICIPALITIES
DISTRICT COUNCILS
CROSS-BOUNDARY DISTRICT COUNCIL
Durban METROPOLITAN DISTRICT COUNCIL
PROVINCE BOUNDARIES
INTERNATIONAL BOUNDARIES
0 50 100 150 200 250
KILOMETERS
ZIMBABWE
MOZAMBIQUE
BOTSWANA
NAMIBIA
SWAZILAND
LESOTHO
ATLANTIC OCEAN
INDIAN OCEAN
NORTHERN PROVINCE
NORTH WEST
GAUTENG
MPUMALANGA
FREE STATE
KWAZULU-NATAL
NORTHERN CAPE
EASTERN CAPE
WESTERN CAPE
DC1
DC2
DC3
DC4
DC5
DC6
DC7
DC8
DC9
DC10
DC12
DC13
DC14
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DC35
DC36
DC37
DC38
DC39
DC40
DC42
DC44
CBDC1
CBDC2
CBDC3
CBDC4
Pretoria
Johannesburg
Bloemfontein
Kimberley
Durban
Cape Town
Nelspruit
Polokwane (Pietersburg)
Mmabatho
Ulundi
Bisho
Nelson Mandela
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