A. Basic Information

Country:	Armenia	Project Name:	GEOFUND 2: ARMENIA GEOTHERMAL PROJECT
Project ID:	P114409	L/C/TF Number(s):	TF-93653
ICR Date:	03/05/2013	ICR Type:	Core ICR
Lending Instrument:	APL	Borrower:	REPUBLIC OF ARMENIA
Original Total Commitment:	USD 1.50M	Disbursed Amount:	USD 1.24M
Revised Amount:	USD 1.24M		
Environmental Category: C		**Global Focal Area: C**	
Implementing Agencies: Renewable Resources and Energy Efficiency Fund			
Cofinanciers and Other External Partners:			

B. Key Dates

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	06/16/2008	Effectiveness:	04/30/2009	04/22/2009
Appraisal:	07/15/2008	Restructuring(s):		06/29/2010
Approval:	02/24/2009	Mid-term Review:		
		Closing:	04/30/2011	09/30/2012

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes:	Satisfactory
Risk to Global Environment Outcome	Low or Negligible
Bank Performance:	Satisfactory
Borrower Performance:	Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance

Bank	Ratings	Borrower	Ratings
Quality at Entry:	Satisfactory	Government:	Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Satisfactory
Overall Bank Performance:	Satisfactory	**Overall Borrower Performance:**	Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA):	None
GEO rating before Closing/Inactive status	Satisfactory		

D. Sector and Theme Codes		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Other Renewable Energy	100	100
Theme Code (as % of total Bank financing)		
Climate change	100	100

E. Bank Staff		
Positions	**At ICR**	**At Approval**
Vice President:	Philippe H. Le Houerou	Shigeo Katsu
Country Director:	Henry G. R. Kerali	Asad Alam
Sector Manager:	Ranjit J. Lamech	Gary Stuggins
Project Team Leader:	Ani Balabanyan	Ani Balabanyan
ICR Team Leader:	Artur Kochnakyan	
ICR Primary Author:	Arsen Petrosyan	

F. Results Framework Analysis

Global Environment Objectives (GEO) and Key Indicators(as approved)

The project development objective is to assess the feasibility of exploratory drilling of the geothermal site with the estimated highest geothermal potential.

Revised Global Environment Objectives (as approved by original approving authority) and Key Indicators and reasons/justifications

N/A

(a) 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 :	Decision whether to drill or not to do drill exploratory wells for the geothermal sites, based on the results of site investigation works.			
Value (quantitative or Qualitative)	N/A	"drill" or "not to drill" decision made		The Government decided to drill exploratory wells at the Karkar geothermal site
Date achieved	03/16/2009	04/30/2011		09/30/2012
Comments (incl. % achievement)	100% achievement. The achievement is due to results of studies confirming likelihood of existence of geothermal resource at Karkar site.			

(b) Intermediate Outcome 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 :	Surface geological map is produced containing fault structures, potential recharging zones and surface geological manifestations.			
Value (quantitative or Qualitative)	N/A	Surface geological map is produced with proposed areas for further investigations		Surface geological map was produced with proposed areas for further investigations
Date achieved	03/16/2009	04/30/2011		09/30/2012
Comments (incl. % achievement)	100% achievement. The results were achieved due to good quality results of field scouting and magneto-telluric (MT)sounding studies.			
Indicator 2 :	Two cross sections with the visualization of the rock formation resistivity are produced; also the need for performing 3D seismic is assessed.			

Value (quantitative or Qualitative)	N/A	Two cross sections are produced and the justification for 3D survey is assessed		Two cross sections were produced and the justification for 3D survey was assessed
Date achieved	03/16/2009	04/30/2011		09/30/2012
Comments (incl. % achievement)	100% achievement. The MT sounding study and interpretation of MT study results generated the required information and data.			
Indicator 3 :	3D images of site subsurface structure with main fault zones and the depth, extent and thickness of permeable zones are produced; at least 3 cross sections, of N-S orientation and 3 of E-W orientation are prepared. Drilling decision is supported.			
Value (quantitative or Qualitative)	N/A	3D images of the site subsurface structure are produced; and the cross sections are prepared. Justification, number, depth and precise locations of potential exploratory wells is determined.		3D images of the site subsurface structure were produced; and the cross sections were prepared. Justification, number, depth and precise locations of potential exploratory wells were determined.
Date achieved	03/16/2009	04/30/2011		09/30/2012
Comments (incl. % achievement)	100% achievement. The 3D MT study and independent interpretation of results generated the required 3D images of subsurface structures and provided the required data to make a decision on exploratory drilling at the Karkar site.			
Indicator 4 :	The economic and financial rates of return are assessed and sensitivity analysis conducted.			
Value (quantitative or Qualitative)	N/A	The economic and financial analysis is completed.		The economic and financial analysis for the Karkar site was completed.
Date achieved	03/16/2009	04/30/2011		09/30/2012
Comments (incl. % achievement)	100% achievement. The economic and financial analysis of the potential geothermal plant at the Karkar site was completed in timely manner to allow the Government to make a final decision on exploratory drilling.			

G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	GEO	IP	Actual Disbursements (USD millions)
1	06/22/2009	Satisfactory	Satisfactory	0.00
2	10/14/2009	Satisfactory	Satisfactory	0.34

3	04/23/2010	Satisfactory	Satisfactory	0.61
4	10/09/2010	Satisfactory	Satisfactory	0.61
5	03/24/2011	Satisfactory	Satisfactory	0.62
6	08/12/2011	Satisfactory	Satisfactory	0.64
7	05/25/2012	Satisfactory	Satisfactory	0.98
8	08/12/2012	Satisfactory	Satisfactory	1.31
9	09/25/2012	Satisfactory	Satisfactory	1.31

H. Restructuring (if any)

Restructuring Date(s)	Board Approved GEO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		GEO	IP		
06/29/2010	N	S	S	0.61	The project was restructured to replace 3D seismic study of the Karkar field with 3D MT sounding study given the geology specifics identified during early phases of field studies. Moreover, closing date was extended by seventeen months to allow sufficient time for completion of the 3D MT study.

I. Disbursement Profile