

Document of  
The World Bank

Report No: ICR00003836

IMPLEMENTATION COMPLETION AND RESULTS REPORT  
(IBRD-77430, IBRD-77440, IBRD-77450)

ON A

LOAN

IN THE AMOUNT OF €23.1 MILLION  
(US\$30 MILLION EQUIVALENT)  
TO AMEN BANK

IN THE AMOUNT OF €15.4 MILLION  
(US\$20 MILLION EQUIVALENT)  
TO BANQUE DE L'HABITAT

AND

IN THE AMOUNT OF €3.9 MILLION  
(US\$5 MILLION EQUIVALENT)  
TO BANQUE DE FINANCEMENT DES PETITES ET MOYENNES ENTREPRISES

WITH A GUARANTEE OF THE

REPUBLIC OF TUNISIA

FOR AN

ENERGY EFFICIENCY PROJECT

September 27, 2016

Energy and Extractives Global Practice  
Middle East and North Africa Region

CURRENCY EQUIVALENTS  
(Exchange Rate Effective September 6, 2016)

Currency Unit	=	Tunisian Dinar (TND)
US\$1.00	=	TND 2.197
SDR 1.00	=	US\$1.396
SDR 1.00	=	€1.252
€1.00	=	US\$1.120

FISCAL YEAR  
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

4ECP	Four-year Energy Conservation Program
AB	Amen Bank
AFD	<i>Agence Française de Développement</i> (French Development Agency)
ANME	<i>Agence Nationale pour la Maitrise de l'Énergie</i> (National Agency for Energy Conservation)
BFPME	<i>Banque de Financement des Petites et Moyennes Entreprises</i> (Small and Medium Enterprise Financing Bank)
BH	<i>Banque de l'Habitat</i> (Housing Credit Bank)
CPS	Country Partnership Strategy
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
EEISP	Energy Efficiency Program/Industrial Sector Project
ESCO	Energy Service Company
FI	Financial Intermediary
FNME	<i>Fonds National de Maitrise de l'Énergie</i> (National Fund for Energy Conservation)
GEF	Global Environment Facility
GHG	Greenhouse Gas
GoT	Government of Tunisia
ICR	Implementation Completion and Results Report
IRR	Internal Rate of Return
ISR	Implementation Status and Results Report
LOC	Line of Credit
M&E	Monitoring and Evaluation
MDB	Multilateral Development Bank
NDP	National Development Plan
NPV	Net Present Value
PAD	Project Appraisal Document
PDO	Project Development Objective
PFI	Participating Financial Intermediary
PMU	Project Management Unit
RE	Renewable Energy
STEG	<i>Société Tunisienne de l'Electricité et du Gaz</i> (Tunisian Company of Gas and Electricity)
TA	Technical Assistance

Senior Global Practice Director:	Anna Bjerde (Acting)
Practice Manager:	Erik Fernstrom
Project Team Leader:	Ferhat Esen
ICR Team Leader:	Anas Benbarka

**TUNISIA**  
**Energy Efficiency Project**  
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<b>A. Basic Information</b>			
Country:	Tunisia	Project Name:	Energy Efficiency Project
Project ID:	P104266	L/C/TF Number(s):	IBRD-77430 IBRD-77440 IBRD-77450
ICR Date:	09/27/2016	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrowers:	Amen Bank (AB); Banque de l'Habitat (BH); Banque de Financement des Petites et Moyennes Entreprises (BFPME)
Original Total Commitment:	US\$55.00 million	Disbursed Amount:	US\$33.99 million
Revised Amount:	US\$40.00 million		
<b>Environmental Category: F</b>			
<b>Implementing Agency:</b> <i>Agence Nationale pour la Maîtrise de l'Energie (ANME)</i> – National Agency for Energy Conservation			
<b>Guarantor:</b> The Republic of Tunisia			

<b>B. Key Dates</b>				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	04/18/2008	Effectiveness:	08/31/2009	02/04/2010
Appraisal:	04/06/2009	Restructuring(s):		11/07/2012 02/26/2014 07/08/2015
Approval:	06/30/2009	Mid-term Review:	06/01/2012	04/13/2012
		Closing:	02/28/2014	01/31/2016

<b>C. Ratings Summary</b>	
<b>C.1 Performance Rating by ICR</b>	
Outcomes:	Moderately Satisfactory
Risk to Development Outcome:	Significant
Bank Performance:	Moderately Satisfactory
Borrowers' Performance:	Moderately Satisfactory

The assessment of the overall achievement of the PDOs (efficacy) of the project follows the ICR guidelines (Appendix B) on the rating of the outcome of projects with formally revised targets for the PDO indicators. The split evaluation yields a **Moderately Satisfactory** rating on the achievement of the PDOs, which equates to a Substantial rating.

<b>C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)</b>			
<b>Bank</b>	<b>Ratings</b>	<b>Borrower</b>	<b>Ratings</b>
Quality at Entry:	Moderately Satisfactory	Borrowers: Amen Bank, BH and BFPME	Moderately Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
<b>Overall Bank Performance:</b>	Moderately Satisfactory	<b>Overall Borrowers Performance:</b>	Moderately Satisfactory

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

<b>D. Sector and Theme Codes</b>		
	<b>Original</b>	<b>Actual</b>
<b>Sector Code (as % of total Bank financing)</b>		
Energy Efficiency in Heat and Power	90	100
Other Renewable Energy	10	0
<b>Theme Code (as % of total Bank financing)</b>		
Other financial and private sector development	67	67
Climate change	33	33

<b>E. Bank Staff</b>		
<b>Positions</b>	<b>At ICR</b>	<b>At Approval</b>
Vice President:	Hafez M. H. Ghanem	Daniela Gressani
Country Director:	Marie Françoise Marie-Nelly	Mats Karlsson
Practice/Sector Manager:	Erik Fernstrom	Jonathan Walters

Project Team Leader:	Ferhat Esen	Silvia Pariente-David
ICR Team Leader:	Anas Benbarka	
ICR Primary Author:	Nourredine Bouzaher	

## F. Results Framework Analysis

### Project Development Objectives (from Project Appraisal Document)

The project development objective of the Energy Efficiency Project is to scale up industrial energy efficiency and cogeneration investments and thereby contribute to the Government's new Four-year Energy Conservation Program.

### Revised Project Development Objectives (as approved by original approving authority)

The PDO was not revised.

#### (a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
<b>Indicator 1:</b>	Cumulative energy savings achieved (ktoe)*			
Value (Quantitative or Qualitative)	0	96	83.79	87.63
Date achieved	12/21/2009	02/28/2014	07/08/2015	01/31/2016
Comments (including % achievement)	Target exceeded against revised indicator values (104%) following first project restructuring in November 2012, which entailed a partial cancellation of the loan amount (from US\$55 million to US\$40 million) due to decreased interest from investors for EE projects and commercial banks readiness to fund these projects, and following last project restructuring in July 2015, which adjusted calculation methodology of target values for energy savings and emissions reduction.			
<b>Indicator 2:</b>	Cumulative reductions in GHG emissions (ktCO <sub>2</sub> )**			
Value (Quantitative or Qualitative)	0	239	170.9	205.84
Date achieved	12/21/2009	02/28/2014	07/08/2015	01/31/2016
Comments (including % achievement)	Target exceeded against revised indicator values (124%) following first project restructuring in November 2012, which entailed a partial cancellation of the loan amount (from US\$55 million to US\$40 million) due to decreased interest from investors for EE projects and commercial banks readiness to fund these projects, and following last project restructuring in July 2015, which adjusted calculation methodology of target values for energy savings and emissions reduction.			

*Note:* \* The units of the PAD were corrected from millions of tons of oil equivalent to thousands of tons of oil equivalent. The change was implicitly formalized through the project restructuring in November 7, 2012.

\*\* The units of the PAD were corrected from million tons of CO<sub>2</sub> to thousand tons of CO<sub>2</sub>. The change was implicitly formalized through the project restructuring in November 7, 2012.

**(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
<b>Indicator 1:</b>	Cumulative funds disbursed under the credit line (US\$, millions)			
Value (Quantitative or Qualitative)	0	55	40	33.99
Date achieved	12/21/2009	02/28/2014	11/07/2012	01/31/2016
Comments (including % achievement)	This intermediate outcome indicator was not fully achieved (85%) <sup>1</sup> due to the uncertainty in Tunisia’s business environment caused by the Tunisian revolution and the economic slowdown in Europe, which affected energy efficiency (EE) investment decisions of PFIs. Funds were not fully disbursed because some projects were still under review by the closing date of the project.			
<b>Indicator 2:</b>	Total associated* investments (US\$, millions)			
Value (Quantitative or Qualitative)	0	110	52	42.71
Date achieved	12/21/2009	02/28/2014	11/07/2012	01/31/2016
Comments (including % achievement)	This intermediate outcome indicator was partially achieved (82%). To attract investors, the commercial banks required a minimum equity funding of 20%. However, the difficulty investors had in mobilizing internal financing resources is partly the reason for the underachievement of this indicator.			

*Note:* \* The term ‘associated’ is misleading because it does not refer to the cumulative equity contribution of EE investors but to cumulative investments comprising both the World Bank’s credit line, which is measured by intermediate outcome indicator 1 above, and the equity contribution of EE investors.

**G. Ratings of Project Performance in ISRs**

No.	Date ISR Archived	DO	IP	Actual Disbursements (US\$, millions)
1	12/22/2009	Satisfactory	Moderately Satisfactory	0.00
2	05/20/2010	Satisfactory	Moderately Satisfactory	0.00
3	01/03/2011	Moderately Satisfactory	Moderately Satisfactory	0.00
4	08/02/2011	Moderately Unsatisfactory	Moderately Unsatisfactory	0.82
5	03/11/2012	Unsatisfactory	Unsatisfactory	0.82

<sup>1</sup> Due to exchange rate appreciation of the U.S. dollar versus the euro, which is the loan currency in the IBRD Loan Agreement, the revised loan amount of US\$40 million was reduced to US\$37.18 million, of which US\$33.99 million were disbursed, equating to a disbursement rate of 91.5%.



6	12/25/2012	Unsatisfactory	Moderately Unsatisfactory	3.94
7	08/20/2013	Unsatisfactory	Moderately Unsatisfactory	4.93
8	03/12/2014	Moderately Unsatisfactory	Moderately Satisfactory	7.45
9	09/16/2014	Moderately Unsatisfactory	Moderately Satisfactory	17.36
10	04/06/2015	Moderately Unsatisfactory	Moderately Satisfactory	21.04
11	06/09/2015	Moderately Satisfactory	Moderately Satisfactory	25.42
12	01/25/2016	Moderately Satisfactory	Moderately Satisfactory	33.85

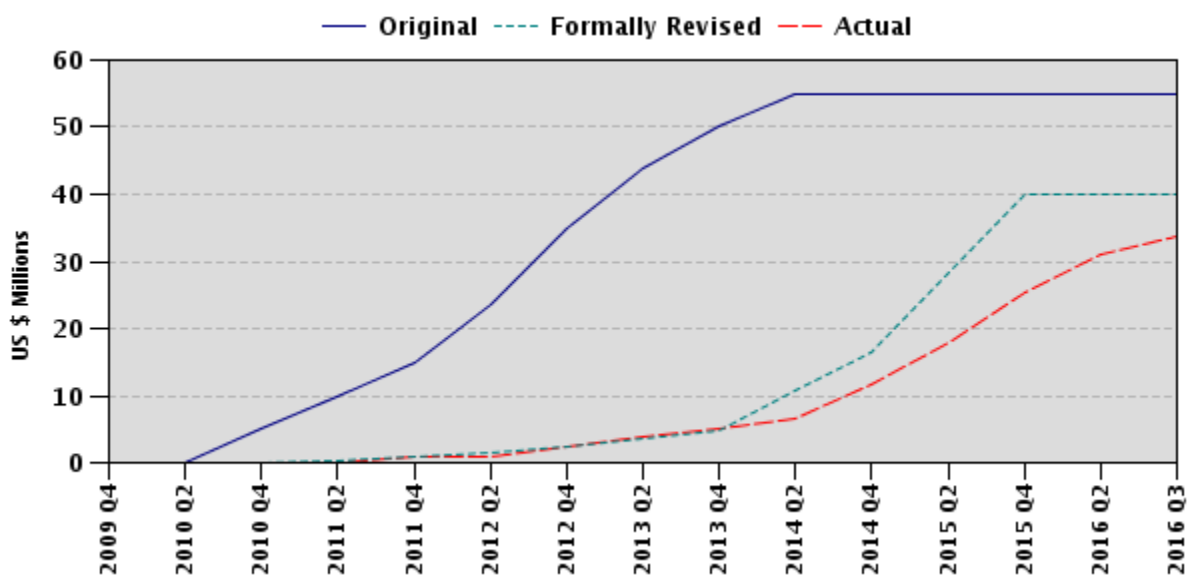
## H. Restructuring (if any)

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		
11/07/2012		U	MU	2.55	<b>The project objective and the original project design with its one component remained unchanged.</b> The PDO remained unchanged. However, the result indicators target values were changed to reflect the smaller scope of the performance targets of the Project due to the cancellation of loan amounts.
02/26/2014		MU	MS	7.45	<b>The project objective and the original project design with its one component remained unchanged.</b> The changes concerned the extension of the closing date of the project by 16 months (that is, until June 30, 2015), the increase in the designated account ceilings set in the original Disbursement Letters, and the revision of the disbursement plan.
07/08/2015*		MS	MS	25.70	<b>The project objective and the original project design with its one component remained unchanged.</b> The changes concerned the extension of the closing date of the project by 7 months until January 31, 2016, and

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		
					the revision of indicator target values reflecting a change in calculation methodology for energy savings and emissions reduction, as proposed by the Bank.

*Note:* \* This is the date recorded in the World Bank’s system. However, because the closing date was June 30, 2015, this may mean a retroactive extension of the closing date of the project (to January 31, 2016). The internal memorandum requesting the extension of the closing date was dated June 29, 2015.

### I. Disbursement Profile



## 1. Project Context, Development Objectives, and Design

### 1.1 Context at Appraisal

1. Tunisia has been a pioneer among developing countries in the energy management policy, having formulated and implemented a policy for rational use of energy and promotion of renewables as early as 1985. Energy intensity stabilized in the 1990s and declined to the lowest level in the Middle East and North Africa Region. However, by the early 2000s, because of the depletion of its oil reserves and fast-growing domestic demand, Tunisia became a net importer of energy. Energy efficiency (EE) and energy expenditures were high—energy consumption valued at international energy prices accounted for 12 percent of gross domestic product in 2006, which was higher than some European countries, such as Greece where energy expenditures represented 7 percent of gross domestic product. There was therefore a wide room for improvement. At the same time, Tunisia was under increasing pressure to improve the competitiveness of its export-oriented industrial sector. Reinforcing EE performance was necessary to help companies both lower their production costs, making them more competitive, and enhance their environmental performance by lowering greenhouse gas (GHG) emissions.

2. As a result, the Government of Tunisia (GoT) launched the 11th National Development Plan (NDP) for the period 2007–2011, which set the broad directions of energy policy, including gradual reduction in energy subsidies, and called for scaling up of investment in EE and renewable energy (RE). The GoT also formulated a Four-year Energy Conservation Program (4ECP) for the period 2008–2011, whose objective was to reduce the energy intensity of the Tunisian economy by 3 percent per year over the period and to increase the contribution of renewables to 4 percent of primary energy demand, in addition to further strengthening the existing institutional and legal frameworks to promote EE investments.

3. Tunisia's National Agency for Energy Conservation (*Agence Nationale pour la Maîtrise de l'Énergie*, ANME), created in 1985, saw its mandate expanded in 2004 to oversee the implementation of the energy management policy, supporting research and development activities, communication, information, and training; promoting EE and RE investments; and managing the process of allocating the investment subsidies. A National Fund for Energy Conservation (*Fonds National de Maitrise de l'Énergie*, FNME) was created in 2005, under the management of ANME to provide investment subsidies for EE and renewable projects. A legal framework was also established for the operation of energy service companies (ESCOs) in 2004, and seven have been established since then.

4. In addition to the lack of appropriate price signals, there were other barriers to the smooth development of EE and RE markets in Tunisia. For example, financing and regulations regarding cogeneration and the development of wind energy under independent power production or self-generation arrangements were inadequate.

5. Financial resources, including grants provided by the FNME, to support EE and RE investments were limited, and their coverage was often too narrow. Furthermore, despite earlier efforts under the Global Environment Facility (GEF)-Tunisia Energy Efficiency Program/Industrial Sector Project (EEISP) (P078131) led by the World Bank, many industries were still unaware of the benefits of EE for competitiveness. Commercial banks did not find EE

investments attractive because of the generally small transactions and high cost, lack of EE experience, and difficulty in structuring EE arrangements for financing and implementation. The priority was instead given to productive investment by well-established firms, and EE investments were subjected to a high collateral requirement, high interest rates, and short loan tenors.

6. The ESCO model introduced under the EEISP did little to remove these constraints. Being newly established, they did not have better access to financing resources than industrial companies. As a result, they acted more as technical consultants than financial advisors and intermediaries.

7. As recognized in the 4ECP, scaling up of EE/RE in Tunisia needed more attractive financing mechanisms and substantially more resources, given the overall investment requirements of TND 1.3 billion or about US\$600 million for the NDP, of which the FNME and other sources covered only a portion (16 percent). Therefore, the critical challenge to achieving the EE/RE objectives was to provide the right conditions and financial incentives to encourage investments in EE through the removal of investment barriers, including access to other sources of financing, such as multilateral development banks, bilateral donors, and commercial banks. A number of measures to support EE/RE investments were therefore recommended, including dedicated lines of credit (LOCs), supported by complementary resources and arrangements, such as interest rate reduction, introduction of longer grace periods for reimbursing principal, setup of guarantee mechanisms, and use of carbon credits.

8. In addition to financial incentives, the GoT put in place a conducive policy/regulatory framework to promote EE investments (4ECP). It set up a comprehensive system to implement and monitor its goal of reducing energy intensity under its Energy Management Program and empowered ANME to implement its policies. The GoT also focused on EE awareness and technical delivery capacity and empowered ANME to lead this effort. For EE institutions/market intermediaries, ESCOs were put in place during the GEF-funded EEISP, and a limited number of technology providers are active in the country. Overall, the conditions were deemed right for an EE intervention in Tunisia.

9. In parallel, the GoT embarked on reforming energy subsidies and putting in place cost-reflective prices of energy products, seen as the best tool for demand management. To win over the public in a tense social context, the implementation of this reform dictated a gradual approach and prior setup of other incentives to jump-start EE/RE investments. It was viewed as easier to implement a subsidy reduction scheme in an economy with good EE performance, as the resulting consumer price increase had less of a negative impact on the economy and on the standard of living.

10. Given the well-established institutional and legal framework for EE/RE, the stable macroeconomic environment, and the relative soundness of the financial sector, the conditions were deemed right for establishing LOCs to finance EE/RE projects. The principle was to offer funds at attractive terms (maturity, interest rate) to participating banks, which would onlend to final beneficiaries, under dedicated credit lines, thus overcoming some of the financing barriers to EE investment in Tunisia.

11. Taking into account previous experiences in Tunisia and other countries of operations, and priorities set by the 4ECP, the LOC focused on supporting industrial EE and cogeneration projects, where financing needs were estimated at TND 167 million (or about US\$117 million), well beyond the financial support that could be obtained from the FNME and other government institutions.

### **Rationale for Bank Assistance**

12. The Energy Efficiency Project was proposed in the lending program of the 2007 **Country Assistance Strategy (CAS) Progress Report** and was thus a core part of the World Bank's strategy for Tunisia. The project supported one of the pillars of the CAS (FY05–FY08), which called for the improvement of the competitiveness of the Tunisian economy. The World Bank Group's **Country Partnership Strategy (CPS)** for the period FY10–FY13 set out the enhanced strategic engagement in Tunisia in support of the country's NDP. The NDP charted an ambitious course to generate sufficient employment through the transformation of the Tunisian economy to a higher value-added one. The GoT and the World Bank Group agreed on **three CPS strategic pillars**: (a) employment, growth, and competitiveness; (b) sustainable development and climate change; and (c) improving the quality of service delivery. The Energy Efficiency Project, together with the package of World Bank support to the energy sector, was a key element of the World Bank assistance in helping Tunisia enhance the competitiveness of its economy, deal with the climate change impacts of energy production, and use and improve the quality of service delivery. The World Bank was a pioneer in the area of EE in Tunisia. The Energy Efficiency Project strategically complemented and built upon previous work the World Bank had undertaken for more than two decades in the area of EE and RE in Tunisia with the GEF-supported **Solar Water Heating Project** (1994) and GEF-supported **EEISP** (2004). The objective of the first project was to encourage the substitution of fossil fuels by renewable solar energy in public institutions and private commercial establishments to mitigate global warming by maximizing CO<sub>2</sub> displacement and demonstrating the potential of solar water heating to reduce global warming. The objective of the second project was to promote sustainable commercial EE investment activities in Tunisia's industrial sector, by removing investment barriers, lowering transaction costs, and developing the ESCOs as a delivery mechanism for industrial EE projects. The Energy Efficiency Project capitalized on these previous experiences and continued supporting implementation of EE investments. The Energy Efficiency Project also supported the World Bank's corporate commitment to increase lending for EE/RE investment and contribute to the World Bank's effort to develop a new clean energy framework.

### **1.2 Original Project Development Objectives (PDO) and Key Indicators**

13. The project appraisal document (PAD) states that the project development objective (PDO) was to 'scale up industrial energy efficiency and cogeneration investments, and thereby contribute to the Government's new Four-year Energy Conservation Program'. This program, which was adopted by the Council of Ministers on January 15, 2008, was designed to reduce the energy intensity of the Tunisian economy.

14. The key performance indicators presented in the PAD, against which the GoT and the World Bank agreed to measure the project performance, included two PDO-level indicators (1 and 2) and two intermediate outcome indicators (3 and 4):

- (1) Cumulative energy savings achieved (ktoe)
- (2) Cumulative reduction in GHG emissions (kt CO<sub>2</sub>)
- (3) Cumulative funds disbursed under the credit line (US\$, millions)
- (4) Total associated investments (US\$, millions)

15. **Indicator measurements.** In annex 3 of the PAD, the measurement for the cumulative energy savings (PDO indicator 1 above) was mtoe, which was defined in the abbreviations as million tons of oil equivalent. However, progress against this indicator was reported as thousand tons of oil equivalent (ktoe). Likewise, the units used in annex 3 of the PAD for the cumulative reductions in GHG emissions (PDO indicator 2) were million tons of CO<sub>2</sub>, while progress in the Implementation Status and Results Report (ISR) was reported as thousands of tons of CO<sub>2</sub>. The technical characteristics of the project clearly indicate that the unit of measurement should have been thousands and not millions.<sup>2</sup> This was recognized early in the life of the project (ISR Sequence 1) and formalized through the November 27, 2012, restructuring.

### **1.3 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification**

16. The original project objective and key indicators were not revised during the life of the project. However, the target values of the key indicators were adjusted twice, first following the first project restructuring in November 2012, and second following the last project restructuring in July 2015 as shown table 1. The reason for the first adjustment in 2012 was the partial cancellation of the World Bank loan amount from US\$55 million to US\$40 million due to decreased interest from investors for EE projects and commercial banks' readiness to fund these projects for various reasons (see section 2.2 for more details). The reason for the second adjustment of target values in 2015 was a change in estimation methodology for energy savings and emissions reduction as proposed by the Bank, on the basis of projects already implemented<sup>3</sup>. During the second project restructuring (February 2014) and the third (July 2015), the project closing date was extended until June 30, 2015, and January 31, 2016, respectively.

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<sup>2</sup> In annex 3 of the PAD, the target for cumulative reductions in GHG emissions was set at 239 million tons of CO<sub>2</sub>. This target does not make sense when we compare it to Tunisia's total GHG emissions in 2010, which were about 28 million tons of CO<sub>2</sub> (*Source*: United Nations Framework Convention on Climate Change - UNFCCC - Intended Nationally Determined Contribution Tunisia, August 2015). The same applies to the target cumulative energy savings achieved, set at 96 mtoe in annex 3 of the PAD, as compared to an estimated total energy consumption of 10 mtoe in 2013 for Tunisia (*Source*: International Energy Agency).

<sup>3</sup> The initial target indicators were estimated at appraisal based on a disbursement/energy savings ratio, given that no sub-projects were financed/implemented at that period and no data on realized energy savings were available. In contrast, the new proposed indicators are estimated based on a trend of realized/measured energy savings and corresponding CO<sub>2</sub> emissions savings from projects already implemented.

**Table 1. Revised indicators following 2012 and 2015 Restructurings**

Indicator	Baseline Value	Original Target Values (from PAD)	Formally Revised Target Values (Project Restructuring 2012)	Formally Revised Target Values (Project Restructuring 2015)
<b>PDO Indicators</b>				
Cumulative energy savings achieved (ktoe)	0	96	50.29	83.79
Cumulative reductions in GHG emissions (ktCO <sub>2</sub> )	0	239	125.72	170.9
<b>Intermediate Outcome Indicators</b>				
Cumulative funds disbursed under the credit line (US\$, millions)	0	55	40	40
Total associated investments (US\$, millions)	0	110	52	52

#### 1.4 Main Beneficiaries

17. The primary target group identified in the PAD is the Tunisian industrial sector with benefits to the global environment through the reduction of GHGs and the Tunisian economy at large (increased competitiveness of the economy, enhanced security of supply, a lesser burden of subsidies on the government budget, and the transition to a low carbon economy).

#### 1.5 Original Component

18. The project had only one component: a LOC financed by World Bank loans totaling US\$55 million to participating financial intermediaries (PFIs) to fund industrial EE and cogeneration projects. The IBRD loans were lent, with a guarantee from the GoT, to three commercial banks, which onlent the funds to industrial companies for eligible EE and cogeneration subprojects following their lending policies and procedures. The three commercial banks that were selected in partnership with the Central Bank of Tunisia as PFIs were Amen Bank (AB), *Banque de l'Habitat* (BH, a housing credit bank), and *Banque de Financement des Petites et Moyennes Entreprises* (BFPME, a small and medium enterprise financing bank).

19. Original loan amounts to PFIs were the following:

- AB: US\$30 million
- BH: US\$20 million
- BFPME: US\$5 million

#### 1.6 Revised Component

20. Following the first project restructuring in November 2012, the loan amounts to PFIs were reduced as follows:

- AB: US\$30 million
- BH: US\$10 million
- BFPME: US\$0 million

21. The project implementation was slow to take off. As of September 2012, only two cogeneration subprojects were funded, and US\$2.55 million (6 percent of the revised loan amount) was disbursed from the LOC, against an originally projected disbursement rate of 72 percent. As a result of the lagging implementation, the project's overall rating was rated 'Unsatisfactory' for both development objectives and implementation progress. The lack of readiness of PFIs was compounded by uncertainties in the investment climate created by the Tunisian revolution and the euro crisis, which resulted in a weak pipeline of bankable subprojects (see section 2.2). In view of this, BH requested a partial cancellation of allocated loan amount as it revised downward its projections for potential EE projects it could finance. BFPME requested full cancellation as it was new to the EE business and required risk sharing arrangements and cofinancing mechanisms that could not be accommodated by investors.

22. As a result, the total World Bank loan to the three PFIs decreased from US\$55 to US\$40 million. There was no further reduction to the World Bank loan during the two subsequent project restructurings in February 2014 and July 2015.

### **1.7 Other Significant Changes**

23. The first project restructuring occurred in November 2012 as the project was suffering significant delays in disbursement. It entailed (a) revision of the target values of the PDO-level and intermediate-level results indicators in the Results Framework, as indicated in section 1.3; (b) partial and full cancellation of allocated loan amounts to PFIs as described in section 1.6; and (c) a revision of the disbursement plan.

24. The second project restructuring occurred in February 2014. It entailed (a) the extension of the project closing date by 16 months from February 28, 2014, until June 30, 2015; (b) the increase in the designated account ceilings set in the original Disbursement Letters and the revision of the disbursement plan. The level of the project indicators remained as set out during the first restructuring in November 2012. Disbursement slightly improved between the first and second restructuring, reaching US\$7 million in February 2014 (17 percent disbursement rate), and the closing date was extended to make up for slower disbursement during the first years of implementation.

25. The third and last project restructuring occurred in July 2015. It entailed another extension of the project closing date by 7 months from June 30, 2015, to January 31, 2016. The main reason for this change was to allow further time for project implementation as disbursements accelerated between 2014 and 2015, reaching US\$25.4 million in June 2015 (63.5 percent disbursement rate). The restructuring also entailed revision of the target values of the PDO-level results indicators in the Results Framework as indicated in section 1.3.



26. Except for the removal of BFPME as one of the PFIs, institutional arrangements for implementation remained unchanged throughout the project life.

## **2. Key Factors Affecting Implementation and Outcomes**

### **2.1 Project Preparation, Design, and Quality at Entry**

#### **Soundness of the Background Analysis**

27. The project was designed on the basis of a relatively solid background analysis, an adequate and inclusive participatory process on the part of both the Government and the World Bank, and lessons learned by the World Bank from previous experiences in Tunisia and other countries of operations. Based on the experience accumulated during the preparation, implementation, and operation of energy projects in Tunisia, particularly the GEF-supported EEISP (P078131), the project design benefited from the following lessons:

- (a) Avoiding lengthy and cumbersome industrial EE loan applications that commercial banks will not be interested in financing
- (b) Providing some comfort and hand-holding to commercial banks that are unfamiliar with EE investments and whose appreciation of risk may be magnified, by having ANME work closely with them during the whole application process, particularly in providing technical assistance (TA) in the preparation of documents and pre-screening of potential investors
- (c) Providing EE investors with an integrated technical and financial analysis for industrial EE projects to be financed by commercial banks/PFIs
- (d) Integrating other sources of financing, such as grants from the FNME, to work in a complementary and mutually reinforcing manner to lower, in particular, one barrier at entry by reducing the investor's equity
- (e) Not subsidizing interest rate as this will distort the market
- (f) Using a different financing mechanism for EE projects. Though ESCOs were created to promote EE investment, their effectiveness was mitigated as witnessed during the implementation of the EEISP. They were only recently formed and had no track record that would give comfort to the commercial banks to lend to them. To address this issue, it was agreed to use an LOC to commercial banks that would fund EE and cogeneration projects.
- (g) Putting in place a TA to train and support PFIs, the Project Management Unit (PMU), and developers of EE subprojects. As seen in previous experiences in Brazil, China, India, and elsewhere, its absence can delay project implementation, sometimes significantly. For the Energy Efficiency Project, while the project team and ANME agreed to put in place a TA component, they decided to separate it from the LOC and include it as a component of a contemplated GEF project (Tunisia-GEF Energy Efficiency and Biomass Project [P121364]), a grant of US\$2.5 million that

was being prepared with the National Agency for Waste Management, the *Agence Nationale pour la Gestion des Déchets*. Meanwhile the Energy Efficiency Project was approved by the World Bank without a TA component, assuming it would come at a later stage with approval of the GEF project. Unfortunately the Tunisian revolution made the identification and preparation of the biomass component and its pilot projects a difficult endeavor. As a result the GEF Energy Efficiency and Biomass Project (P121364, including the envisaged TA component) was dropped following the GEF's recommendation and the GoT's request in 2012. Ultimately the Energy Efficiency Project was implemented without a TA component.

28. The preparation of the project also took into account some recent background analysis and analytical work on the EE in Tunisia and other countries:

- (a) The **Energy Sector Management Assistance Program** study “A New Impetus for Tunisia’s Energy Management Policy,” which identified barriers to the efficient use of energy and development of RE and proposed solutions. The study recommended the setup of financing mechanisms dedicated to EE and RE, such as LOCs, equity funds, or guarantee mechanisms. The Energy Efficiency Project implemented some of the recommendations by developing one of the suggested financing mechanisms, namely, an LOC.
- (b) The **Middle East and North Africa** regional EE study “Tapping a Hidden Resource: Energy Efficiency in Middle East and North Africa” stated that the right financial arrangement depended on factors such as the capacity of financial institutions, the EE market segments, and the capacity of both project sponsors and commercial banks. The LOC that had been set up took into account the specific situation in Tunisia, which had strong institutional capabilities and a pipeline of cogeneration projects waiting for financing, as well as a long and relatively successful experience with EE.
- (c) More generally, the Energy Efficiency Project leveraged the World Bank’s experience in EE/RE lending through numerous operations in China, Turkey, Croatia, Romania, and elsewhere, as reported in the recently World Bank published book “Financing Energy Efficiency.” Key principles included the following: (a) delivery mechanisms need to be customized, based on an intensive study of the local institutional environment; (b) market distortion must be avoided for the EE market to be sustainable and scalable, and end users should, as much as possible, face commercial terms for financing and technical services; (c) appropriate incentives must be included for every important player to participate, or deal flows will not occur. In line with these recommendations, the World Bank’s LOC was designed specifically for the Tunisian situation, included no subsidized interest rate that would distort the market, and provided incentives to commercial banks to finance industrial EE projects.

## Assessment of Project Design and Quality at Entry

29. **Strategic alignment.** The objective of the project responded to World Bank priorities for Tunisia to increase industrial competitiveness by reducing the energy intensity of the economy and reduce GHG emissions. The CAS in 2007 and the CPS of 2010–2013, which both covered the period when the Energy Efficiency Project was prepared, appraised, and implemented, invariably called for higher, sustainable, and broad-based growth to generate employment, raise the living standards, and mitigate climate change, and EE was a key ingredient in achieving these objectives. The Energy Efficiency Project also fitted government priorities to reduce the energy intensity of the economy to improve the country’s competitiveness and deal with the climate change impacts of energy production and use, as fleshed out in the 4ECP (2008–2011).

30. **LOC.** The Energy Efficiency Project introduced a new financing mechanism involving a public-private partnership between the Government, ANME, commercial banks, and industry. While credit lines to commercial banks, including for some EE projects, by other donors, such as the French Development Agency (*Agence Française de Développement*, AFD), were not new in Tunisia, credit lines entirely dedicated for cogeneration and EE were. The World Bank’s LOC was among the main financial mechanisms marketed by ANME to promote EE and cogeneration investments.

31. **Role of ANME.** The role of ANME was crucial in the project design. It supported the participating banks and industry in a variety of ways, in particular through vetting the eligibility of potential investors for financing, supporting them through the application process until their investments are submitted to PFIs for consideration, EE training for participating banks and investors, and so on. ANME provided assistance to investors in preparing and developing their projects (prefeasibility/feasibility studies, energy audits, program contracts, and so on), including investment subsidies from the FNME. On behalf of PFIs, ANME was also responsible for overall monitoring and evaluation (M&E) of project implementation progress, including the collection of project performance information and reporting on the impact and results of the project, implementation of safeguards policies, and so on. Finally ANME represented the GoT, which gave a guarantee for the World Bank loan.

32. **Subproject pipeline at appraisal.** During project appraisal, given its central role in the industrial sector and activities undertaken with clients, ANME was best positioned to provide the World Bank and PFIs with a preliminary pipeline of potential subprojects that could qualify for financing under the LOC. A total of 18 cogeneration subprojects were identified for a total of 73 MW (annex 4 of PAD). Though the project was to promote EE and cogeneration investments, there was no specific requirement to ensure a proper mix between cogeneration and EE subprojects. PFIs were free to select the projects they could finance under the LOC as they were assuming the credit risk. As EE investments were not attractive because of the generally small transactions and high cost and difficulty in structuring EE arrangements for financing and implementation, the outcome was that most subprojects funded through the LOC were cogeneration investments (see annex 2 for more details). It was expected that BFPME would promote some of these smaller projects (mostly small EE interventions) given its expertise with small and medium enterprises, but it ultimately cancelled its loan portion.

33. **Absence of TA.** ANME had many experiences with the World Bank and other donors and particularly with the GEF-supported EEISP. At the time of appraisal, the project team felt that ANME already had strong internal capabilities and external resources, allowing it to provide the support required to PFIs in the area of business planning and subproject evaluation and to assist investors in developing their project. Nevertheless the team tried to include a TA component as part of a separate project (Tunisia-GEF Energy Efficiency and Biomass [P121364]) as discussed earlier, which was never approved. Though the project team could not foresee this outcome, there was an inherent risk in separating the TA component from the Energy Efficiency Project, which occurred in this case. According to ANME and the participating banks, the inclusion of a TA in the Energy Efficiency Project would have improved project implementation (see section 2.2 for more details).

34. **PFI selection criteria.** The GoT issued a circular to all banks operating in Tunisia requesting them to express their interest in participating in the World Bank's LOC. A questionnaire was also sent to the banks to assess them against various eligibility criteria. Each question was weighted and a rating was derived for each bank that submitted a complete questionnaire. The first set of criteria was aimed at ensuring minimum standards of compliance with prudential rules and regulations (license to operate, level of compliance with banking rules and obligations, nonperforming loan ratio, and so on). The second set of criteria has been developed based on best practice in the World Bank LOC operations worldwide and to meet the requirements of OP 8.30. These criteria set out minimum financial performance benchmarks for PFI that must be met to enable participation of a Financial Intermediary (FI) in the LOC (asset quality, capital adequacy, liquidity, profitability, operating efficiency, and so on) Other criteria were related to management including risk management and internal controls and corporate governance structure. The PFIs were also ranked according to their experience/appetite for industrial and EE project financing, the level of guarantee required to obtain financing, and so on. Ultimately this led to the selection of AB, BH, and BFPME.

35. The selection criteria used were more skewed toward ensuring compliance with prudential rules and regulations and good financial performance. Those criteria weighted much more over those relating specifically to PFI EE experience/appetite. Given the importance of a robust subproject pipeline from the onset, there could have been room to devise more robust 'EE readiness criteria' for PFI selection, separate from prudential/financial criteria.

36. As it was, the selected PFIs initially encountered difficulty in disbursing from their respective share of the credit line, especially BFPME, which was newly created and required risk sharing through a cofinancing of EE projects for its portion of the credit line. BFPME was unsuccessful in attracting cofinancing and its loan of US\$5 million was cancelled at its request. The project was restructured in November 2012 and the amount of the credit line was reduced from US\$55 million to US\$40 million (see section 1.6 for details).

37. **Environmental safeguards.** As a category F project with regard to safeguards, the project design took into account the World Bank’s safeguards policies,<sup>4</sup> including procedures and implementation arrangements, to ensure full consideration of environmental and social safeguards even though commercial banks were not familiar with World Bank policies. ANME, on behalf of the PFIs, was responsible for safeguards compliance by investors. It discharged its duties well. The rating for environmental and social safeguards compliance was Satisfactory throughout the life of the project as further discussed in section 2.4.

### Adequacy of Governments’ Commitments

38. The commitment to, and ownership of, the project were strong at the time of preparation and appraisal and were sustained throughout the life of the project. The Government provided a legal, institutional, and regulatory framework to promote EE investments. It announced publicly its commitment to reducing the energy intensity of the Tunisian economy (including openly encouraging the banking sector to support the initiative) under its 4ECP for 2008–2011. The 4ECP set clear targets to reduce energy intensity by 3 percent per year and reach cumulative energy savings of 3.2 Mtoe, of which the industrial sector’s contribution represented 20 percent. The GoT set up a comprehensive system to implement and monitor its goal of reducing energy intensity under its Energy Management Program and empowered ANME to implement its policies. Mandatory measures included periodic energy audits for companies and new projects. Incentive measures included subsidies for energy audits and EE investments, and a specific framework for the promotion of cogeneration, including the law of 2009 allowing self-generation of electricity from RE and cogeneration and the right to sell it to the national utility company Tunisian Company of Gas and Electricity (*Société Tunisienne de l’Electricité et du Gaz*, STEG). The Government also supported the EE program by reforming the electricity tariffs to give consumers the correct price signal and use electricity efficiently and by pushing the reform of energy subsidies to promote the long-term financial sustainability of the energy sector. The GoT ultimately lent its support by exceptionally providing a sovereign guarantee to back up the LOC from PFIs.

### Assessment of Risks

39. Table 2 shows the risks and mitigation measures identified in the PAD along with a brief description of how these risks evolved during the implementation of the project.

**Table 2. Risks and Mitigation Measures**

Original Perceived Risk	Risk Rating	Original Mitigation Measure (from PAD)	Comments
Reduction in government policy commitment to support EE initiatives	Low-Medium	<ul style="list-style-type: none"> <li>GoT announced publicly its commitment to reducing the energy intensity of the Tunisian economy (including openly encouraging the banking sector to support the initiative)</li> </ul>	This risk did not materialize. The government commitment to EE and to the Energy Efficiency Project in particular remained strong throughout, despite the political upheaval the

<sup>4</sup> The project required an environmental and social review of the first two subprojects for each bank. The World Bank team however extended this review to all subprojects, and a lead safeguards specialist randomly visited three completed projects to assess and confirmed their compliance with World Bank safeguards policies at completion.

		<p>under its latest 4ECP for 2008–2011</p> <ul style="list-style-type: none"> <li>• GoT had set technical guidelines and standards to encourage EE efforts.</li> <li>• A comprehensive system had been set up by the government to implement and monitor its goal of reducing energy intensity under its 4ECP (3% drop per year) and NDP.</li> </ul>	country went through.
Slow disbursement of the LOC due to low demand from project developers	Medium	<ul style="list-style-type: none"> <li>• ANME had already identified a very strong and well-documented pipeline of candidate projects that are currently seeking financing</li> <li>• The selected PFIs were already active in EE business development</li> <li>• Numerous programs for EE awareness raising existed in Tunisia, managed by ANME or other institutions</li> <li>• Terms and conditions of industrial EE and cogeneration LOC are attractive compared to the other average financing resources on the market.</li> </ul>	This risk did materialize and its occurrence should have been rated High because the history of this project is almost entirely related to the slow disbursement of the LOC. PFI readiness and appetite for EE projects were lower than expected, compounded by a severe economic environment due to the Arab Spring events and the economic slowdown in Europe and Tunisia.
The lack of interest from FIs in financing EE projects	Medium	<ul style="list-style-type: none"> <li>• Support from ANME to financial institutions for EE business development and capacity building</li> <li>• PFIs selected on the basis of their interest in EE lending</li> <li>• Demonstration effect of the project to increase confidence in the viability and benefits of financing EE activities</li> </ul>	For the same reasons described above, the PFIs did not show, at least during the first three years of project implementation, much proactivity, notably by marketing the LOC to potential investors in the industrial sector due to the Arab Spring event, euro crisis, longer than expected learning curve of the PFIs, and lack of TA facility.
Financial difficulties of PFIs leading to limited disbursement of the LOC (no financial risk for the World Bank, as loans are guaranteed by Tunisia)	Low	<ul style="list-style-type: none"> <li>• Selection of PFIs among best performing banks in Tunisia</li> <li>• Financial covenants will give early signal of difficulties, allowing parties to react on time.</li> </ul>	The PFIs did not experience financial difficulties, and the low risk rating was justified.
<b>Overall Risk Rating</b>	<b>Medium</b>		

## 2.2 Implementation

40. The project was approved in June 2009 and closed in January 2016. The implementation period of six years and seven months was characterized by two distinct phases: a period of significant delays and no disbursement, which lasted roughly three years and a half, until the end of 2012, and a period of active implementation, which lasted about three years and one month until the project closure in January 2016.

41. The early implementation period (June 2009 to November 2012) was characterized by a slow start. While the project was approved in 2009, it only became effective 8 months later as the Tunisian Parliament's approval of the loan guarantee was delayed due to slower activity during the month of fasting (Ramadan) and the preparation of the October 2009 general elections. At the time of the first restructuring (November 2012), only 6.5 percent of the revised project amount had been disbursed, against an original expectation of about 64 percent of the original amount. Various endogenous factors contributed to this significant disbursement delay:

- **PFI's/investors' readiness for EE investments.** As mentioned earlier, though there was a pipeline of potential subprojects identified by ANME during project appraisal, most of these leads did not materialize into bankable projects for PFIs (only two subproject were funded by the LOC and a new subproject pipeline was built up throughout the project life-span). On the supply side, selected PFIs did not fully appreciate EE investments to properly market them to potential and existing clients and lacked aggressiveness to identify new projects. As they assumed the credit risk, PFIs were more inclined to invest in productive assets with their existing client base rather than funding new EE investors and projects whose economics, based on energy savings, seemed less tangible/credible, in addition to higher transaction costs for EE subprojects (as compared to cogeneration) given smaller investments. PFIs also had limited capacity to manage EE projects. Taking the case of one of the PFIs, BH, while it requested that its loan be reduced from US\$20 to US\$10 million during the first project restructuring (November 2012), its situation changed dramatically after a change in the management unit in charge of EE financing in 2013. By project closure, BH disbursed more than 99 percent of its (reduced) credit line and had shown interest in further borrowing from the World Bank as its new project pipeline corresponded almost to the loan portion it requested to cancel. On the demand side, investors were also less keen to undertake these EE investments given the same bias toward productive revenue-generating investments, low (subsidized) energy prices leading to challenging subprojects with lower returns, and poor appreciation of energy savings generated by these subprojects. The lack of readiness for PFIs and investors was further exacerbated by the absence of a TA component in the project.
- **Absence of TA.** While ANME had the proper technical expertise and some funding from other donors, more support was needed for (a) training and capacity building of the commercial banks in the area of EE and cogeneration; (b) providing support to potential project developers to assist in the preparatory studies and business development assistance, including technical and financial feasibility studies; and (c) supporting targeted awareness and training to support pipeline development efforts. As mentioned in the previous section, this issue was identified very early in the project life. The project team decided to push for a TA component under a separate project, the GEF Energy Efficiency and Biomass Project (P121363). However, ultimately the GEF project was dropped following GEF recommendation and the GoT's request due to lack of interest in biomass component and thus never approved, leaving the Energy Efficiency Project without a TA component. The TA need could not be met through a project restructuring either as the funds lent to commercial banks and secured by Loan Agreements could not be reallocated for other purposes during project implementation. The Government only guaranteed the World Bank

loan to the commercial banks that bore the ultimate responsibility for repaying the loans to the World Bank. A new project would have been necessary to fund a TA component. As a result, ANME used its in-house capacity and funds for necessary audits and subproject preparation to support PFIs.

- **Financial issues/features of the World Bank LOC.** During this early implementation period, the Tunisian banking sector was facing a difficult environment: political instability, high inflation, increasing interest rates, and weak penetration of the financial sector. World Bank supervision specifically noted the following:
  - **Interest rate volatility.** PFIs and EE investors were concerned about the volatility of the Libor-based variable spread of the World Bank LOC, which reduced its attractiveness compared to other funding sources. PFIs therefore requested the World Bank to change the terms of the loans accordingly. While initially World Bank rules prevented such a change, the fixed interest rate request was finally accommodated in July 2012, which further facilitated disbursements from the LOC.
  - **High inflation.** The high inflation in Tunisia made repayment of credits more onerous.
- **Direct competition** from another subsidized credit line partially dedicated to EE projects provided by another donor (AFD) supported by a European Union grant.

42. The challenges cited above were further compounded by the following exogenous factors:

- **Economic slowdown.** By the time the project became effective in February 2010, there was already a slowdown in the eurozone (Tunisia's main trading partner), which affected the Tunisian economy and made potential investors rethink their priorities and take a wait-and-see attitude relative to contemplated EE investments. This resulted in limited subproject materialization by PFIs and ANME during the implementation phase.
- **The Tunisian revolution and terrorism.** The Tunisian revolution started on December 18, 2010 (just 10 months after project effectiveness). It introduced a further element of uncertainty to the business environment in Tunisia. This uncertainty was compounded by various terrorist acts that added to the fragility of the Tunisian economy, and investment decisions, particularly in EE, were either postponed or taken only timidly.

43. On balance, it is difficult to assess which of the factors, whether endogenous to the project or outside it, have had the most negative impact on project implementation. Between project effectiveness (February 2010) and the beginning of the Tunisian revolution (January 2011), no disbursement occurred, suggesting that endogenous factors were at play that could/should have been addressed during project design/preparation. Following that, exogenous



factors only worsened the situation for a few more years. During this slow disbursement period, the overall implementation progress and development objectives ratings of the Energy Efficiency Project dipped to mostly Moderately Unsatisfactory and Unsatisfactory. The project midterm review took place on April 13, 2012, to examine the issues that had slowed disbursements. It focused on remedial measures to accelerate implementation, improve disbursement, and streamline cooperation among ANME, PFIs, and investors. The midterm review, while agreeing to a project restructuring, otherwise confirmed the continued relevance of the PDOs and its LOC component. The project was therefore restructured in November 2012 to factor in implementation challenges and the difficult lending environment for PFIs. BFPME required risk sharing from investors through a cofinancing of EE projects out of its portion of the credit line. This could not be accommodated and its portion of the credit line (that is, US\$5 million) was cancelled. The second PFI, BH, requested that its loan be reduced from US\$20 to US\$10 million. Target values of the result indicators were also revised as a consequence.

44. Even though project start-up was slow, the World Bank, ANME, and the PFIs persevered and rose to the challenges posed. Following the first project restructuring, the second implementation period (January 2013 to January 2016) was characterized by a notable improvement in all results indicators. Disbursements accelerated rapidly from 6.5 percent of the revised credit line amount in November 2012 to 44 percent in December 2014. With improved perspectives of achieving its objectives, the project was restructured on February 26, 2014, to extend its closing date by 16 months until June 30, 2015, and then, given continued good progress, another closing date extension was granted in July 2015 until January 31, 2016. By January 31, 2016, disbursement reached 85 percent of the revised loan amount, or a total of US\$33.99 million. Acknowledging the absence of TA, the World Bank team intensified its supervision and worked closely with ANME and the PFIs to organize and attend marketing events to promote EE investments and meet with potential clients. For instance, 5 of 12 subprojects were identified through the marketing activities jointly initiated and promoted with the World Bank team. The efforts of the project team and their proactive stance to engage with ANME and the PFIs contributed to ensure project disbursement after a long period of underperformance. The intensive collaboration benefitted ANME and the PFIs as they improved their strategies to market and develop EE projects. In January 2016, nine subprojects were fully implemented while three were being completed. Other exogenous factors also helped the investment environment during this phase, such as (a) the increase in electricity tariffs and the increase of natural gas price with the gradual removal of energy subsidies in the framework of the energy sector reform and (b) the improvement of the political and economic situation of the country.

45. As a consequence, overall project ratings improved toward the waning years of project implementation (Moderately Satisfactory in 2014 for the IP and Moderately Satisfactory in mid-2015 for the PDOs, seven months before the project closing date). At project closure in January 2016, a total of US\$3.18 million of the IBRD loans to PFIs was not disbursed and the loans were thus cancelled.

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

46. **M&E design.** The monitoring system was simple and based on measurable outputs. The project documentation only had two PDO outcome indicators: cumulative energy savings and

CO<sub>2</sub> emission reductions. These indicators were deemed appropriate to measure project performance with respect to EE and were in line with the indicators set to measure the 4ECP to which the project contributed. There were also two intermediate outcome indicators, namely, the cumulative funds disbursed under the credit line and the total associated investments, which were also deemed adequate to track investment scale-up. The units of measurement of the PDO outcome indicators of the PAD were corrected from millions of tons of oil equivalent and millions of tons of CO<sub>2</sub> to a more realistic metric (that is, thousands of tons and not millions of tons). The new units were in effect since the first ISR and formalized through the November 7, 2012, restructuring. The term ‘associated’ attached to the intermediate outcome indicator 2 most likely refers not to the cumulative equity contribution of EE investors but to cumulative investments comprising both the World Bank’s credit line, which was measured by intermediate outcome indicator 1, and the equity contribution of EE investors (see section F of the datasheet and section 1.3). The project included monitoring of result indicators as included in annex 3 of the PAD and issuance of periodic progress reports. The format, content, and frequency of reporting were agreed upon and included in the Operations Manual. The project could have put in place additional indicators to track its contribution to EE investment scale-up (first part of the PDO), its contribution to the Government’s 4ECP (second part of the PDO), and the split between EE and cogeneration investments.

47. The causal chain between all of the activities that the project was designed to carry out under the LOC component and the expected attainment of the project objectives could have been improved. There was no direct indicator to measure the scale-up of EE investments per se, but rather indicators were available to measure energy and emission savings generated by these EE investments funded through the LOC. There was no indicator to measure the project’s contribution to the 4ECP. However, in this case the indicator for cumulative energy savings (in tons of oil equivalent) was the same used by the GoT to track performance of the 4ECP.

48. **M&E implementation.** The PMU within ANME was responsible for overall M&E of implementation progress, including the collection of project performance information and reporting on the impact and results of the project. A member of the PMU was assigned to collect information from the PFIs and maintain a database to monitor the implementation performance of the LOC. Performance monitoring of the project included the monitoring of performance indicators, as included in annex 3 of the PAD and periodic progress reports comprising detailed reporting on disbursements, projects under review or approved and submitted to commercial banks for review with the view of their financing, and financial and environmental and social compliance. In November 2012, the project was restructured and the results indicators (PDO-level and intermediate) targets were changed to reflect an overall smaller loan amount (from US\$55 to US\$40 million). In July 2015, the results indicators (PDO-level) were further modified to reflect a change in estimation methodology for energy savings and emissions reduction. They were then kept unchanged until the closing date of the project.

49. **M&E utilization.** The M&E framework was monitored and updated in a systematic manner and was made available in progress reports and supervision documents. The data collected were evaluated and used to inform decision making. For example, the verification of cumulative funds disbursed under the credit line enabled ANME and the PFIs to devise action plans to speed up disbursements. The M&E framework was implemented satisfactorily by the PMU during the project, and the M&E rating was Satisfactory throughout the project life. The

sustainability of the M&E arrangements beyond the project implementation period is likely because several funding agencies, such as AFD, European Investment Bank, and others have shown a keen interest in fostering EE in Tunisia, and the experience accumulated under the previous GEF EEISP and the Energy Efficiency Project would be valuable in the M&E of future World Bank and non-World Bank interventions in Tunisia.

## **2.4 Safeguard and Fiduciary Compliance**

50. **Environmental and social safeguards.** The World Bank's safeguards policy Environmental Assessment (OP/BP 4.01) was triggered under the project. The project was assigned a category F because individual subprojects to be financed by the PFIs were to be identified during project implementation.

51. Overall, the project had beneficial environmental effects, with reduction of GHG emissions (see section 3.2 for details) as a consequence of reduced energy consumption (energy savings). No negative environmental impact was reported as caused by the project. As required for category F projects, ANME prepared a Framework Environmental Impact Assessment Document ('Framework Document'). The Framework Document described procedures to be followed by any sub-borrower and ANME to satisfy both Tunisian and World Bank environmental regulations and policies. The Framework Document is described in annex 10 of the PAD. The PFIs delegated to ANME the responsibility to assess and review compliance with the World Bank's applicable safeguards policies according to the procedures described in the Framework Document. An assessment of the capacity of ANME to implement the required safeguards due diligence was carried out and led to an agreement with ANME to assign a competent staff to this function. The World Bank periodically fielded supervision missions to ensure that the M&E arrangements were correctly implemented.

52. All subprojects and each specific environmental assessment were subject to a screening and appraisal process. The following subprojects were however excluded from consideration for financing from the LOC: subprojects requiring a full environmental impact assessment as identified during screening (equivalent to World Bank category A), or subprojects located in protected areas such as forest reserves, national parks or sanctuaries, as well as subprojects that would trigger OP/BP 4.30 (Involuntary Resettlement), in particular projects involving land acquisition or displacement (even temporary). An analysis of implemented subprojects shows that these criteria did not limit the subprojects' pipeline. All subprojects subject to an Environmental Management Plan were reviewed and cleared by the Bank.

53. The World Bank environmental specialist reviewed and approved all subprojects, although the requirement was only to review the first two subprojects for each PFI. The World Bank specialist made various site visits to completed subprojects in the Tunis metropolitan area and Sousse (Nejma Huiles and Maklada), to compare environmental and social safeguards measures before and after the projects' implementation and to ascertain compliance with World Bank rules and procedures in this area. The environmental specialist also noted that the environmental form and the environmental and social screening checklist were completed as required. The Environmental Management Plans were prepared and implemented according to the findings of the screening checklist. The field visits also revealed that the companies that

benefited from financing had qualified environment, health, and safety staff and had expertise in environment, health, and safety practices.

54. The EE and cogeneration subprojects financed under the LOC were within the existing premises of EE investors and did not require land acquisition. The projects did not therefore trigger OP 4.12 on Involuntary Resettlement. In addition, there was no negative social impact. The direct and indirect social impacts on the population of EE investments, although some were difficult to measure, were definitely positive and translated into some employment, training of EE and RE specialists in the field, reduction in pollution levels, lower cost for less-energy-intensive products, a reduction in the Government's energy subsidy, and an increase in government resources that could be dedicated to social sectors.

55. The compliance with environmental and social safeguards was rated Satisfactory throughout the project life.

56. **Financial management.** The project was implemented by three PFIs and then two after the project restructuring in November 2012. It was coordinated and monitored by ANME. Each PFI signed a Loan Agreement with the World Bank. At appraisal, an assessment of the PFIs' financial management systems capacity was conducted, confirming they had in place reliable systems for project implementation. However, the recently created BFPME had limited experience in managing LOCs compared to the other PFIs. It dropped off the project following the project restructuring. The financial reporting system that was in place, at each of the PFIs, was used to follow up project expenditures and generate project reports.

57. The main fiduciary risks identified were as follows: (a) lack of previous experience with World Bank-financed projects for the PFIs and (b) project implementation by three PFIs and coordination/monitoring by ANME, which created a risk relating to the flow of information and documentation between the various entities involved in the project. A capacity-building program targeting the staff of the three PFIs working on the project was delivered by the World Bank's financial management team. The Operations Manual included clear procedures and guidelines defining the flow of information and documentation between the various entities and ANME. Each PFI was to remit to the World Bank two sets of audited financial statements. The first audit report was for the financial statements of the activities financed through the loan and the Government (FNME subsidy) under the project. The second audit provided an opinion on the overall financial statements of the PFI. The auditor also reported any weaknesses of the internal control system, as observed in the course of its mandate. Such audits were conducted by external independent auditors acceptable to the World Bank. However, given the slow disbursement experienced by the project and the delays in preparing and transmitting audit reports and interim financial statements to the World Bank, the financial management of the project was downgraded from Satisfactory to Moderately Satisfactory in April 2013. The financial management rating remained at that level until the project closing date in January 2016.

58. **Procurement.** Because the core and only component of the project was an LOC that was used by private beneficiaries with established private sector and commercial practices, the procurement procedures that were used by the implementing entities were defined in paragraph 3.13 of the Procurement Guidelines and concisely described in the Operations Manual, which included a specific section regarding procurement. ANME provided guidance and support to the

PFI and EE investors. ANME, which gained procurement experience under World Bank guidelines in the implementation of the GEF-funded EEISP, had a team of procurement officers and lawyers to rely on. Nonetheless, an ex post review of contracts procured by private sector beneficiaries according to the 'established commercial practices' method described in paragraph 3.13 of the Procurement Guidelines was undertaken initially (for a period of 18 months) through technical audits, including procurement aspects, performed by technical auditors appointed by ANME. In addition, the World Bank reviewed the findings of the audits. The arrangements were found satisfactory and remained unchanged over the life of the project. Procurement was rated Satisfactory over the life of the project.

## **2.5 Post-completion Operation/Next Phase**

59. Potential investors in EE projects have expressed great interest in the acquisition of cogeneration equipment and hence favored the borrowing under competitive terms from the World Bank through the LOC. The PFI noted an increase in the demand for cogeneration and EE projects due to a combination of factors, notably (a) the forthcoming increase in electricity tariffs and the increase in the price of natural gas with the gradual removal of energy subsidies in the framework of the energy sector reform; (b) the improvement of the political and economic situation in the country; and (c) the improved communication/marketing campaigns in coordination with ANME and the World Bank's team.

60. These changes made EE and cogeneration investments more attractive by reducing or eliminating a major impediment or barrier to the promotion of EE in Tunisia. This strong interest partly translated itself into faster disbursement of the credit line in the waning years of the Energy Efficiency Project, which was also helped by an important pipeline of potential projects identified by the PFIs and ANME. Furthermore, with the gradual dismantling of electricity subsidies and the consequent rise in electricity prices, potential EE investors clearly appreciate cogeneration and EE investments not as a choice but a necessity to optimize their costs over the medium to long term.

61. One should also note the satisfaction expressed by industries that benefited from the World Bank's credit line for financing their cogeneration projects. These industrial companies have noted a decrease in their energy bills (Somocer, a ceramic producer, expects energy savings close to US\$1 million per year) as well as some employment creation (250 temporary jobs during construction and 50 permanent jobs for the 9 subprojects). The World Bank missions had also observed the setting up of energy management systems within the beneficiary industries and the monitoring of energy consumption following the implementation of EE and cogeneration investments.

62. As a result of this project and other factors (subsidy reform and lessons learned on the EE/cogeneration project implementation), there is today a stronger interest from the PFIs to continue lending in the EE sector (27 potential cogeneration subprojects from 2016 to 2020). Both participating PFIs have expressed such interest in letters addressed to the World Bank and are keen on having in place an additional finance from the World Bank to respond to increasing demand from project developers and industry. This trend was confirmed in subsequent discussions with AFD, which is contemplating a second LOC, although they intend to focus on different segments, such as small and medium enterprises, with lower investment ceilings (about

US\$1 million). The World Bank's LOC was the only one to address the need for EE/cogeneration in the industrial sector with a relatively significant investment ceiling. Nonetheless, changes and spillovers are to be expected because of the pressure to address the strong demand for EE and cogeneration and the importance and availability of the financing being deployed.

### **3. Assessment of Outcomes**

#### **3.1 Relevance of Objectives, Design, and Implementation**

##### **Overall Rating: Substantial**

##### **Relevance of Objectives**

##### **Rating: High**

63. The development of the EE market in Tunisia remains a critical piece of the World Bank's CPS 2016–2020 to improve the competitiveness of the economy, reduce the demand-supply gap for energy products, and mitigate climate change of energy production and use. Pillar 5 (Promoting green growth for sustainable development) states that the sound utilization of natural resources will be a key consideration, with an emphasis on rationalizing water and energy consumption. The CPS further states that in its Intended Nationally Determined Contribution, presented during the Paris Conference of the Parties (COP) 21 environmental conference, Tunisia proposed to reduce its GHG emissions across all sectors. Its mitigation efforts will be particularly centered on the energy sector by promoting EE measures to reduce primary energy demand. The World Bank is currently supporting analytical work on the future energy mix in Tunisia taking into account that domestic production of gas, which fuels a large share of electricity generation, is expected to sharply decline after 2020. The heightened interest of donors for EE in Tunisia and their declared intention of supporting it with significant financing through credit lines and other instruments is a confirmation both that Tunisia has a large potential of EE projects and activities with attractive economics and that EE continues to be relevant for Tunisia and its development partners (IBRD, AfDB, AFD, EBRD, European Investment Bank, and so on).

64. Promoting EE is facilitated by energy subsidy reforms, which the Government is now addressing through a dialogue with the International Monetary Fund and the World Bank, in addition to complementary investments. The Energy Efficiency Project addressed the removal of the financing barrier to EE investments in Tunisia. However, much more needs to be done given the significant potential for EE projects. The project objective and the activities it supported were, and still are, highly relevant to the Government's economic program. Tunisia continues to stand out with the most comprehensive policy framework for energy efficiency improvements among peer countries in Middle East and North Africa<sup>5</sup>, including its recent adoption of the third national energy efficiency plan for the period 2016 – 2020, and the Tunisian Solar Plan, which includes specific measures to further promote energy efficiency. The industrial sector still represents close to 50 percent of expected energy savings from EE projects, including promotion

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<sup>5</sup> Arab Future Energy Index (AFEX) Energy Efficiency 2015. Regional Center for Renewable Energy and Energy Efficiency (RCREEE).

of cogeneration, with the objective to reach 440 MW by 2020. In January 2016, PFIs (Amen Bank and BH) addressed letters to the Bank to seek its support, through a LOC (additional financing), to support a subproject pipeline of 27 new EE/cogeneration subprojects requiring about US\$50 million of financing.

65. Other institutions and donors continue supporting the GoT in implementing its EE programs, including provision of funding support through the LOC. AFD, for example, announced in April 2016 that it is preparing a new LOC for EE for about €100 million or almost three times the revised amount of the Energy Efficiency Project.

66. Based on the abovementioned details, the relevance of objectives is rated High.

### **Relevance of Design and Implementation**

#### **Rating: Modest.**

67. The project comprised one component: an LOC. The component was logically tied to the objective of scaling up industrial EE and cogeneration investments, and the link between this project objective and its PDO indicators was adequate, namely, the cumulative energy savings achieved and the cumulative reductions in GHG emissions generated by the project. The indicators were similar to those used to track the performance of the Government's 4ECP, to which the project contributed. However, the PDO formulation was broad (scale-up of EE and cogeneration investments) and could have been further narrowed/improved during the project life. There could have been more intermediate indicators to track PFIs performance to implement subprojects, to ensure adequate split between cogeneration and EE projects, and to measure project-specific contribution toward the 4ECP (investment, energy savings, and so on). The link between PDO indicators and project objectives could have been refined to directly measure both investment scale-up to which the project contributed and energy savings generated by these investments.

68. Other improvements in design could have included a push for energy subsidy reform as a strong tool for demand management, a better grip on the incentive framework for the PFIs and EE investors (for example, preference for a fixed rate, and so on), and the inclusion of a TA component in the project to support capacity building in EE investments and speed up project implementation.

69. As discussed in section 2.2, the project implementation suffered from significant delays during the first three years due to several endogenous factors (PFIs/investors readiness for EE investments, absence of TA, features of the Bank LOC, etc.) compounded by exogenous factors (Economic slowdown in Eurozone, Tunisian Revolution). Some of the endogenous factors could have been mitigated/avoided if there was a stronger assessment of PFIs readiness during project preparation, in addition to putting in place an adequate support through a TA.

70. Based on the abovementioned details, the relevance of design is rated Modest.

### **3.2 Achievement of the Project Development Objectives**

#### **Rating: Substantial**

71. The achievement of the PDO of scaling up industrial EE and cogeneration investments was measured by the following indicators: (a) cumulative energy savings and (b) cumulative reductions in GHG emissions. Both indicators remained unchanged throughout the project's life. Table 3 gives the results achieved at completion.

**Table 3. Achievement of Project Objectives at Completion**

Indicator	Original Target Values (from PAD)	Formally Revised Target Values (Project Restructuring 2015)	Actual Value Achieved at Completion
<b>PDO Indicators</b>			
Cumulative energy savings achieved (ktoe)	96	83.79	87.63 (Target exceeded 104%)
Cumulative reductions in GHG emissions (ktCO <sub>2</sub> )	239	170.9	205.84 (Target exceeded 124%)
<b>Intermediate Outcome Indicators</b>			
Cumulative funds disbursed under the credit line (US\$, millions).	55	40	33.99
Total associated investments (US\$, millions)	110	52	42.71

72. The PDO target indicators were exceeded against revised indicator values following the first project restructuring in November 2012, which entailed a partial cancellation of the loan amount (from US\$55 million to US\$40 million) due to decreased interest from investors for EE projects and commercial banks readiness to fund these projects, and following the last project restructuring in July 2015, which entailed a change in estimation methodology (proposed by the Bank) for energy savings and emissions reduction.

73. **Outputs.** The project has completed the implementation of nine cogeneration subprojects (28 MW installed capacity). In addition, three cogeneration projects were under construction and completion is expected by October 2016 (additional 10 MW). According to ANME preliminary audits, the 12 subprojects have ensured a total of 87,630 tons of oil equivalent energy savings, which represented a contribution of 9.2 percent to the Government's 4ECP. Total estimated CO<sub>2</sub> reduction stood at 206,000 tons of CO<sub>2</sub> equivalent, corresponding to 9.7 percent contribution to the 4ECP. Most of the industries covered by the project are in the agro-industrial or construction materials (bricks, sanitary, tiles, and so on) sectors. The size of the firms varies from 150 to more than 300 employees, and the firms are basically medium-scale enterprises. The cogeneration projects substitute for electricity produced, transmitted, and distributed by the national utility STEG and produce efficiently heat/steam needed for their processes, thereby reducing their energy bill—electricity and natural gas (see annex 3 for more details). The technology used by almost all industries is a natural gas-fired engine. About 84 percent of the cost of the cogeneration projects was financed through the World Bank's credit line and 16 percent through equity contribution. It has been estimated that the subprojects generated about 250 temporary jobs during their construction period and about 50 permanent jobs.

74. Aside from cogeneration, no other type of EE project was financed under the credit line, mainly because they were relatively small projects that were mostly financed by investors' equity, and the PFIs were unable to handle them, given their limited capacity in appraising small EE projects, high transaction costs associated with these small projects (review of applications,



credit worthiness assessment, and follow-up), and limited creditworthiness of new investors promoting these projects.

75. The reform of natural gas in 2013 and 2014 had a strong positive impact on investors' willingness to invest in cogeneration as the gas price increased by 10 percent in each of those years and the economics of cogeneration became more apparent. For political and social reasons subsequent to the Tunisian revolution, the Government decided a pause in the increase in energy prices. While the Government is still in dialogue with the International Monetary Fund and the World Bank on this issue, there is currently no clear agreed agenda or path for reform of energy prices.

76. **Intermediate outcomes.** At the project closing date, the two intermediate outcome indicators were substantially achieved as follows: (a) cumulative funds disbursed under the credit line reached US\$33.99 million against a target of US\$40 million (85 percent disbursement rate<sup>6</sup>) and (b) total associated investments were US\$42.71 million against a target of US\$52 million or 82 percent. There was no indicator to track the project's contribution to the Government's 4ECP investment program.

77. **Outcomes** included contribution to the 4ECP implementation for the period 2010 – 2014, with increased competitiveness of the Tunisian economy due to energy savings generated by the 12 projects, reduction in the supply-demand gap for energy products and services, and lower investments in generation, transmission, and distribution by the national utility given investments onsite in cogeneration. The scope and sustainability of these outcomes will be enhanced if the Government's energy subsidy reform program moves ahead, to encourage further investment in EE and cogeneration.

78. **Overall assessment of the achievement of the PDOs.** The assessment of the overall achievement of the PDOs (efficacy) of the project follows the Implementation Completion and Results Report (ICR) guidelines (Appendix B) on the rating of the outcome of projects with formally revised targets of the PDO indicators, which require separate outcome rating weighted in proportion to the actual credit disbursements made before and after formal restructuring. As stated, the two PDO-level indicator targets were revised twice (in 2012 and 2015), and the revised targets were exceeded. Table 4 details the achievement of the original and revised PDO indicators.

**Table 4. Split Evaluation for Achievement of Objectives**

	<b>Pre-restructuring/ Original Targets</b>	<b>First restructuring (2012)</b>	<b>Second restructuring (2015)</b>	<b>Overall</b>	<b>Comments</b>
1. Rating	Unsatisfactory	Moderately Satisfactory	Moderately Satisfactory	—	Significant improvement
2. Rating value	2	4	4	—	—

<sup>6</sup> Due to exchange rate appreciation of the U.S. dollar versus the euro, which is the loan currency in the IBRD Loan Agreement, the revised loan amount of US\$40 million was reduced to US\$37.18 million, of which US\$33.99 million was disbursed, equating to a disbursement rate of 91.5 percent.

3. Weight (% disbursed before/after target change)	7.5	73.9	18.6	100	—
4. Weighted value (2 × 3)	0.15	2.96	0.74	3.85	—
5. Final rating (rounded)	—	—		4.0	Moderately Satisfactory

79. Project rating following the two restructurings has the largest impact on overall rating given the significant disbursement rate during that period. The split evaluation yields a **Moderately Satisfactory** rating on the achievement of the PDOs, which equates to a Substantial rating.

### 3.3 Efficiency Rating: Substantial

80. The economic benefits of the project include (a) the avoided cost of electricity, that is, cost of electricity that, if not cogenerated, will be purchased from the grid; (b) avoided cost of heat/steam, that is, cost of heat/steam that, if not cogenerated, will be produced by boilers; (c) the revenue from selling excess electricity to the grid, if any; (d) carbon credits due to the reduction of CO<sub>2</sub> emissions; and (e) the postponement of STEG investment in generation and transmission made possible by the nine subprojects and estimated at about 25 MW valued at about US\$25 million .

81. A financial and an economic analysis using basically the same methodology as the one used at appraisal was undertaken for two cogeneration projects, one relatively large (Somocer) and one relatively small (Nedjma Huiles) to ascertain the continuous financial and economic attractiveness of cogeneration investments (see annex 3).

**Table 5. Financial and Economic Analysis of Cogeneration Investments at Completion**

<b>Financial</b>	<b>Somocer</b>	<b>Nedjma Huiles</b>
NPV at 10%	TND 30 million	TND 1.23 million
IRR (%)	56	22
<b>Economic</b>		
NPV at 10%	TND 46 million	TND 9 million
IRR (%)	82	85

*Note:* NPV = Net Present Value; IRR = Internal Rate of Return.

82. For Somocer, which was studied **at appraisal**, the expected NPV and IRR were as shown in table 6.

**Table 6. NPV and IRR Values of Somocer at Appraisal**

<b>Financial</b>	<b>Somocer</b>
NPV at 10%	TND 1.057 million
IRR (%)	41
<b>Economic</b>	
NPV at 10%	TND 1.625 million
IRR (%)	57

83. The **difference can be explained** by the fact that the investment cost is vastly superior from what was foreseen at appraisal (TND 10 million versus TND 680,000). Among other major

differences are the energy produced for internal consumption and sold to STEG, the value of process heat whose benefit was omitted from calculations at appraisal, and the higher value adopted for the social cost of CO<sub>2</sub>.<sup>7</sup>

84. **Sensitivity analysis.** A sensitivity analysis was also carried out to quantify the impact of alternative assumptions on the NPV and the IRR. The switching values (or values at which the NPV becomes zero) for critical variables such as tariffs, price of natural gas, and the discount rate are given in table 7. The two cogeneration subprojects examined show that the results will still be positive under a wide variation in critical variables but nevertheless show some sensitivity to variations in the price of natural gas, which is the main fuel for cogeneration.

**Table 7. Switching Values**

<b>Financial</b>	<b>Somocer (%)</b>	<b>Nedjma Huiles (%)</b>
STEG electricity tariff	-89	-18
Domestic price of natural gas	95	28
Discount rate	558	115
<b>Economic</b>		
Cost recovery tariff	-100	-84
Economic price of natural gas	137	37
Discount rate	760	850

### **3.4 Justification of Overall Outcome Rating**

#### **Rating: Moderately Satisfactory**

85. The relevance of the PDOs with regard to narrowing the supply-demand gap, raising the competitiveness of industrial firms, and benefitting the environment is rated High. The relevance of project design and implementation is rated Modest because of the design deficiencies described earlier. The overall relevance of objectives, design, and implementation is rated Substantial. The achievement of the project objectives is rated Moderately Satisfactory based on the split evaluation results and the actual performance on PDO-level indicator targets. Finally, the recalculated efficiency (NPV and IRR) rating of Substantial in this ICR confirms the positive efficiency of the project, albeit with partial achievement of the intermediate project indicators. The combination of the relevance of objectives and design, the achievement of the PDOs, and efficiency ratings, results in an overall outcome rating of **Moderately Satisfactory**.

### **3.5 Overarching Themes, Other Outcomes and Impacts**

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

86. The direct impact of the project on low-income rural and urban population and other vulnerable groups was not explicitly taken into consideration at appraisal, and no poverty analysis was conducted at the preparation stage. Gender issues were not addressed during the project preparation, and the gender impact was not monitored during its implementation. The project, however, had a positive impact on the population through the improvement in investors'

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<sup>7</sup> Social value of carbon in project appraisal - Guidance note to the World Bank Group staff - July 14, 2014.

productivity, employment, and better air quality through the reduction of GHG emissions. There was no social development issue in the project area as there was no land acquisition.

**(b) Institutional Change/Strengthening**

87. The project's institutional development impact, which is defined in the ICR guidelines as the extent to which the project "has improved the agency's or country's ability to make effective use of its human and financial resources," has been Modest. The institutional strengthening provided in this project was mainly through the training and advice provided by ANME and World Bank staff during supervision missions.

**(c) Other Unintended Outcomes and Impacts (positive or negative)**

88. The ANME estimated that the twelve subprojects generated about 250 temporary jobs during their construction period and about 50 permanent jobs.

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

89. Not applicable.

**4. Assessment of Risk to Development Outcome**

**Rating: Significant**

90. The energy savings and the reduction in GHG emissions (PDO indicators) are attractive and likely to be sustained because of the strong demand by industry, driven by a move toward cost reflective prices through the gradual elimination of energy subsidies. There is, however, a significant likelihood that some changes, detrimental to the project's main development outcome, may occur. The following risks have been identified:

- (a) The political risk to development outcome is High due to the challenging security environment in Tunisia affected by internal and external security threats.
- (b) The economic risk to development outcome is High due to a challenging macroeconomic situation and a further erosion of oil prices reducing the incentive to reform or to engage in EE investments.
- (c) The government ownership/commitment risk to development outcome is Low. The Government has shown interest and commitment in reforming the Tunisian economy as fleshed out in the National Strategy for Energy Conservation.
- (d) The institutional risk to development outcome is Moderate due to relatively well-trained workforce in the banking and industrial sectors in Tunisia.
- (e) The social risk to development outcome is Significant due to the current inability of the economy to create a significant number of jobs especially for the young.

91. Based on these, the overall risk to development outcome rating is Significant for all outcomes discussed in section 3.2.

## 5. Assessment of Bank and Borrower Performance

### 5.1 Bank Performance

#### (a) Bank Performance in Ensuring Quality at Entry

##### Rating: Moderately Satisfactory

92. This ICR assesses the World Bank's performance during identification, preparation, and appraisal of the project as **Moderately Satisfactory**.

93. The World Bank took into account the adequacy of project design and all major relevant aspects, such as technical, environmental, financial, and economic. A number of alternatives were considered for the project design, and the World Bank made use of the transfer of experience from similar projects in China, India, and other countries of operations. However, we note the following shortcomings: (a) absence of a TA component to support the PFIs and investors and speed up project implementation (there was an inherent risk to separate TA from the project, which materialized in this case); (b) PFI selection criteria could have been honed to better determine their readiness to undertake EE projects; (c) PDO formulation could have been better articulated, and indicators could have been added to track PFI performance in identifying and implementing subprojects, ensure a proper mix of EE and cogeneration subprojects, and measure the project's contribution to the Government's 4ECP.

94. The composition and balance of the World Bank team at appraisal was adequate (PAD, annex 11). It consisted of six core sector specialists, including an EE financing specialist, two consultants, one of whom was involved in the China EE and RE programs, and two fiduciary and safeguards members, including a senior environmental specialist and a social development specialist. The team also included two financial sector specialists. The period for the original project preparation was adequate if not long, about a year between the concept review (April 18, 2008) and appraisal (April 6, 2009). Negotiations and Board approval took place very soon after: May 27 and June 30, 2009, respectively. Strategic choices were made appropriately for the most part (except for the shortcomings mentioned earlier) at the design and preparation stage, including the focus on one objective and one component. This focus was kept unchanged throughout the life of the project.

95. Some of the potential risks were correctly identified. Some others were not, such as the slow disbursement of the LOC due to low demand from project developers or the lack of interest from FIs in financing EE projects. Both risks did materialize, and their occurrence could have been rated High. PFIs' and investors' readiness and appetite for EE projects were lower than expected during the first years, compounded by a severe political and economic environment due to the Arab Spring and ensuing events and the economic slowdown in Europe and Tunisia.

96. Overall, the project design focused on one objective and had one component, the time for preparation was adequate, and the appraisal team was adequately staffed. Project preparation took into account lessons learned from previous World Bank interventions, but there are some moderate shortcomings in preparation that could have been prevented. Quality at entry, as a whole, is therefore rated **Moderately Satisfactory**.

## **(b) Quality of Supervision**

### **Rating: Satisfactory**

97. The World Bank allocated sufficient budget and staff resources, and the project was adequately supervised. The supervision reporting was generally good and the intensity was adequate with an average of two supervision missions per year. The team's proactive supervision allowed disbursements to pick up slowly at first and then rapidly during the last two years of implementation (that is, 2014 and 2015). The intervention of the World Bank was appropriate and concentrated almost solely on finding solutions to problems that slowed disbursement. Acknowledging the absence of TA, the supervision team adopted a proactive stance by departing from traditional approaches to supervision and was proactive in reaching out to the PFIs, industries, and private investors through site visits and face-to-face meetings to market the credit line directly and thus broke a major information barrier between EE investors and the PFIs. Disbursements followed thereafter but took a sustained ascending path after the Government started increasing energy prices in 2013 and 2014 with a 10 percent increase each year. Understandably, there was internal pressure to close a nondisbursing/nonperforming project. The overall learning of the project was substantial and future credit lines would have much less difficulty in disbursing. The team had the support of management and the comments on the ISRs were generally very supportive. The support of the Country Management Unit and the Tunisia country office were particularly important and decisive. The International Finance Corporation office in Tunisia was consulted and informed about the project implementation progress, given their plans to develop similar LOCs in the country. The World Bank's financial management and procurement staff worked closely with ANME and the PFI staff to explain the rules and procedures to be applied during project implementation with regard to procurement as well as audit requirements, based on the Loan Agreements. The financial management aspects of the project were carefully reviewed, and specific recommendations to strengthen the financial management systems of PFIs were made. Shortcomings in the late compliance with the submission of audit reports and the lack of progress on disbursements led the team to downgrade the rating from Satisfactory to Moderately Satisfactory. Procurement was rated Satisfactory throughout the project life. Environmental and social specialists were often associated with supervision missions to monitor the quality of environmental and social compliance. The overall compliance with the environmental and social safeguards was rated Satisfactory throughout the life of the project. The World Bank also provided guidance and oversight in the preparation of the operational manual of ANME, which was an effectiveness condition. The last ISR, archived on January 25, 2016 (Sequence 12), rated the project's progress toward the achievement of the project's development objectives and overall implementation progress as Moderately Satisfactory.

98. Acknowledging the shortcomings in project design, the supervision team intensified its efforts during supervision and managed to turn the project around, achieve 85 percent disbursement rate on the LOC, and exceed the targets for PDO-level indicators. Based on these, the ICR rates the project's quality of supervision **Satisfactory**.

## **(c) Justification of Rating for Overall Bank Performance**

### **Rating: Moderately Satisfactory**

99. The rating of overall World Bank performance is **Moderately Satisfactory**, being Moderately Satisfactory at entry and Satisfactory during supervision.

## **5.2 Borrowers' Performance**

### **(a) Government Performance**

**Rating: Moderately Satisfactory**

100. The commitment of the GoT, which provided a sovereign guarantee for the loans to the PFIs, to the ownership of the project and to the achievement of the PDOs, was strong at the time of project preparation and appraisal and remained supportive during implementation. The PFIs and the EE investors faced a complex situation. The PFIs lacked readiness to support EE investments at the beginning and also suffered from the absence of TA during project implementation. They also reacted to a difficult environment beyond their control (political and social unrest, terrorism, and economic slowdown), and when faced with what they perceived, in the course of project implementation, as a relatively unattractive incentive framework, they did not market the credit line to industrial customers as they would have done in normal times and under the right conditions. Industrial EE investors were not keen to invest initially, given the number and severity of the uncertainties they were facing. This has naturally slowed down disbursements for a number of years (2010–2013). Disbursements, however, picked up when these two constraints were relaxed (political, security, and economic), and the incentive framework was improved (adoption of a fixed rate, the World Bank team's intensive support to dissemination and marketing, and so on). In this context, it is noteworthy that the replacement of the head of the PMU with a dedicated and proactive individual had a positive effect because it led to accelerated disbursements at BH, which ultimately reached 99 percent disbursement rate.

101. Against this, however, the borrowers were almost consistently late in submitting their audit and interim financial reports and taking actions to remedy weaknesses that auditors and/or the World Bank identified. For mainly this reason, the rating of financial management was downgraded from Satisfactory to Moderately Satisfactory for much of the project's life. The performance of the borrowers, AB and BH, is therefore assessed as **Moderately Satisfactory**.

### **(b) Implementing Agency or Agencies Performance**

**Rating: Moderately Satisfactory**

102. Implementing agency performance is rated **Moderately Satisfactory** for the following reason: for duties for which ANME was responsible, **all ratings were Satisfactory** including project management, procurement, M&E, and compliance with environmental and social safeguards. This is a very good performance by an implementing agency, especially if one takes into account the background against which the implementation of the project took place. However, even taking into account the impact of circumstances both external to the project (Tunisian revolution, terrorism, and economic slowdown) and internal, such as the perceived lack of attractiveness of the LOC package to borrowers and EE investors at the beginning, ANME was not proactive in marketing and facilitating disbursements from the credit line, especially during the early implementation period (June 2009 to November 2012).

### **(c) Justification of Rating for Overall Borrower Performance**

#### **Rating: Moderately Satisfactory**

103. The rating of overall borrower performance is **Moderately Satisfactory**, being Moderately Satisfactory for borrowers' performance and Moderately Satisfactory for the implementing agency's performance.

### **6. Lessons Learned**

104. **TA is key to the success of EE projects.** As shown by international experience in China, India, and other countries of operations, the provision of TA is key to the success of EE projects. In Tunisia, challenges in the Energy Efficiency Project implementation arose as the PFIs were unable to quickly provide finance due to lack of institutional and technical capability and experience. According to ANME and the PFIs, the provision of TA would have facilitated and accelerated the implementation of the project. Such TA should cover support to the PFIs (credit appraisals and technical due diligence, risk assessment, EE marketing, monitoring, and so on) and investors (feasibility studies, capacity building, operational training, and so on) to lift off some of the knowledge capacity barriers more efficiently and faster.

105. To create a market conducive to sustained EE investments, capacity building for participating financial institutions and for the broader EE network is recommended. TA can help develop the broader EE market, stimulate interest in EE projects, disseminate the positive results obtained from the credit line, and encourage other banks and local financial institutions to increase their lending for EE projects.

106. **Introduce a pool of resources.** Instead of allocating a credit line among the eligible banks, one should consider a pool of resources from which banks can withdraw funds to finance EE projects. This will foster healthy competition between banks and give them a strong incentive to draw on the credit line as fast as possible (a first-come-first-serve model).

107. **Develop a technical and financial information system.** Explanations as to why cost-effective investments in EE have not been made include hidden costs and/or uncertain benefits associated with new technologies and a lack of information in the marketplace. Providing more and better information about energy savings and costs of EE financing programs allows industrial consumers to make well-informed trade-off decisions between EE and other alternatives. In addition to the essential information on energy savings, information is needed on the financial performance of EE loans. To fully engage in EE financing, the financial sector needs better systematic information on defaults, delinquencies, and overall loan performance.

108. However, better information on energy savings may be necessary but not sufficient to generate more lending for EE investments. High transaction costs and low margins may continue to be a barrier for industrial EE investment in particular. This confirms that a combination of instruments working together is perhaps a better option for achieving the objective of promoting an EE market in Tunisia.

109. **Get a better understanding of credit markets.** The economic rationale for government involvement in EE financing hinges on credit market failures and rationing. Thus, to determine if policy intervention is warranted we need a better understanding of how well these markets are



working and the degree to which rationing exists. Although the Energy Efficiency Project has devoted some resources to the study of the credit market in Tunisia, future World Bank and non-World Bank interventions will profit from a more in-depth look at the work of this market and at the degree of credit rationing that may exist in it.

110. **Introduce an energy subsidy and an electricity sector reform program.** Energy subsidy reform should be an essential component of an EE and/or RE program. The team was aware that "...in principle, the most efficient measure to encourage EE and use of renewables is the application of pricing principles that are cost reflective and indicate to consumers that energy should be saved and that renewables should be preferred to conventional fossil fuels." (paragraph 9, page 11 of the PAD) but found that it would be long and protracted to implement. In 2013 and 2014, however, the Government has increased the prices of energy products and this had a direct impact on investors' interest in cogeneration; banks, for lack of funds, could not satisfy the demand. This trend will continue in the future as the Government has opted for a gradual but sustained increase in energy prices. There are also barriers and regulatory impediments to be removed in the electricity sector to encourage the development of cogeneration, including an attractive purchase tariff of excess electricity, power connection to the grid, and so on.

111. **Robust readiness criteria for PFI selection.** It is understood that various sets of criteria are needed during PFI selection to ensure minimum standards of compliance with prudential rules and regulations, to factor in best practice in the World Bank LOC operations worldwide and to meet the requirements of OP 8.30. However, in this case, those criteria overweighed those relating specifically to PFI readiness for EE investments as all criteria were weighed at once. There ought to be a two-stage approach: preselect banks that meet the prudential/financial requirements and then drill further into EE readiness to select the right candidates (management team in place, pipeline of projects, management commitment to EE investments, resources available for support, and so on). Taking one example, the experience with BH is particularly relevant because it shows the importance of having a dedicated and proactive EE investment team to improve project identification, implementation, and evaluation; marketing of financial and environmental benefits; and ensuring fluid monitoring of disbursements. BH significantly increased its disbursement rate and even fully consumed its LOC owing to staff change made within its project team.

112. **Technical review and financial intermediation under one roof.** The World Bank does have experience with EE LOCs where the technical reviews were split from the financial intermediation; these tended to do poorly. It has been a long-standing lesson that the two should be institutionalized in the same entity, which is why the provision for TA to the PFIs would have been critical. In this case, the Energy Efficiency Project was a step in that direction. The PFIs lacked technical expertise with EE projects, and ANME supported the screening and technical review of projects, until the PFIs completed their learning process and institutionalized this function. The PFIs would have been reluctant to take on loans when they only had limited experience in EE. A market has to be built before institutionalizing the two functions under one roof. However, ultimately, EE project development and implementation tools and delivery capacity should be mainstreamed within the PFIs and the FI sector in general to increase the long-term sustainability of the intervention.

113. **Pipeline development - building strong demand.** Project design needs to include efforts to build strong and stable demand for EE investments using multiple channels in addition to PFIs (government programs, energy auditors, ESCOs, equipment suppliers, and so on).

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

### **(a) Borrower/Implementing Agencies**

114. On July 18, 2016, ANME, BH, and AB provided the World Bank with their own evaluation of the implementation of the Energy Efficiency Project. A summary of this evaluation is given in annex 7. Its main conclusions are the following:

- The project performance was judged Satisfactory overall, despite delays in disbursements, several flaws in the design of the project, and two successive extensions of the closing date. The project ultimately achieved its objectives.
- **Lessons learned**
  - Technical and financial studies as well as banking procedures to secure collateral are slow.
  - Despite efforts to train the financial sector, one should not underestimate the fact that institutions are conservative in analyzing funding requests.
  - It is possible to find a remedy to design flaws as long as managers show flexibility and project managers are capable of facing reality.
  - One should not underestimate the initial phase of a project, especially if a project has design flaws (which often is the case). The contribution of international experts is essential here.
  - A suitable incentive framework and a communication plan are essential to the success of this type of project.
- **Recommendations for a future operation**
  - Give more flexibility and leeway to the manager of the LOC as well as at the level of the World Bank.
  - Allow banks to take better advantage of the funds available and not limit them to their own allocations.
  - Put in place a TA component to train stakeholders.

### **(b) Cofinanciers**

115. Not applicable.

**(c) Other Partners and Stakeholders** (annex 8)

116. The ICR mission met with several project stakeholders in June 2016, such as the PFIs, ANME, industrial beneficiaries, and AFD. One interview was conducted with one of the project beneficiaries, the company Somocer, which invested in cogeneration capacity. The main issues raised by its representative (deputy managing director) were the following:

- The Energy Efficiency Project and investment in cogeneration enabled the company to reduce its energy costs and become more competitive. It is now targeting export markets that were not considered previously in the Middle East and North Africa Region and Sub-Saharan Africa. The investment also encouraged it to expand into other lines of business (for example, wooden pallets and packaging, with high energy intensity) as spare energy from cogeneration was put to more productive use instead of selling it to the national utility, STEG.
- There were various impediments to the sale of excess electricity available from cogeneration to the grid: (a) STEG's purchase tariff for excess production of electricity from cogenerators was lower than the cost of production, thus forcing them to find alternative uses for the excess electricity generated (that is, negative incentive to sell electricity to the grid), and (b) even when selling to the grid at a lower cost than the cost of production, there are bureaucratic delays in having the power purchase agreement promptly signed and the seller remunerated on time for the excess electricity sold.

## Annex 1. Project Costs and Financing

### (a) Project Cost by Component (in US\$ million equivalent)

Components	Appraisal Estimate (US\$, millions)	Revised November 7, 2012 (US\$, millions)	Actual/Latest Estimate (US\$, millions)	Percentage of Appraisal
Line of Credit to PFIs to Finance Industrial Energy Efficiency and Cogeneration Projects	54.862	39.867	33.857	62
<b>Total Baseline Cost</b>	54.862	39.867	33.857	62
Physical Contingencies	0.00	0.00	0.00	
Price Contingencies	0.00	0.00	0.00	
<b>Total Project Costs</b>	54.862	39.867	33.857	62
Project Preparation Fund				
Front-end fee IBRD	0.138	0.133	0.133	96
<b>Total Financing Required</b>	55.00	40.00	33.99	62

### (b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (US\$, millions)	Revised November 7, 2012	Actual/Latest Estimate (US\$, millions)	Percentage of Appraisal
Borrower		0.00	0.00	0.00	0
International Bank for Reconstruction and Development		55.00	40.00	33.99	62

## Annex 2. Outputs by Component

### Component: Line of Credit to PFIs to Finance Energy Efficiency and Cogeneration Projects

1. Nine cogeneration subprojects were commissioned with a total energy saving of 66.49 ktoe and 156.18 ktCO<sub>2</sub> emission reduction, while three were still under construction at the time of project closure with a contemplated total energy saving of 11.56 ktoe and 27.15 ktCO<sub>2</sub> emission reduction. Most of the industries covered by the project are in the agro-industrial or construction materials (bricks, sanitary, tiles, and so on) sector. The size of the firms varies from 150 to more than 300 employees, and the firms are basically medium-scale enterprises. The cogeneration projects substitute for electricity produced, transmitted, and distributed by the national utility, STEG, and produce heat/steam more efficiently than if they have to produce it alone, that is, not using the heat produced by electricity generation for process or to generate steam (see annex 3 for more details). The technology used by almost all industries is a natural gas-fired engine. Investors were assisted by ANME in developing their project. ANME also ensured that investors complied with World Bank requirements of audits and environmental safeguards. About 84 percent of the cost of the cogeneration projects was financed through the World Bank's credit line and 16 percent through equity contribution (that is, the 20 percent minimum legally required equity contribution was met through combining or packaging several investments by a firm in view of their financing by the same commercial bank; some investments had more than 20 percent and some less depending on the conditions of financing for each type of project). It has been estimated that the project generated about 290 temporary jobs during the construction period of the subprojects and about 50 permanent jobs.

**Table 2.1. List of Projects Completed (TND, thousands, Unless Otherwise Indicated)**

Project	Cost	Financed by World Bank LOC	Equity	Start Date	Date of Operation	Energy Savings Since Date of Operation (toe)	CO <sub>2</sub> Reductions Since Date of Operation (tCO <sub>2</sub> )
<b>I - AB</b>							
Nejma Huiles	2,300	1,125	1,175	2011	Mar-12	4,788	11,247
IBZ	2,800	2,800	0	2010	Mar-11	50,794	119,314
MPS	4,210	4,080	130	2012	Jun-13	7,218	16,955
Vitalait	3,000	2,150	850	2013	Aug-14	2,010	4,722
UNPA	7,239	6,800	439	2014	Oct-15	778	1,828
The Residence	1,915	1,915	0	2014	Dec-15	39	91
<b>Subtotal 1</b>	<b>21,464</b>	<b>18,870</b>	<b>2,594</b>			<b>65,627</b>	<b>154,157</b>
<b>II - BH</b>							
Carthage Grains	5,450	4,430	1,020	2014	Dec-15	262	615
Somocer	10,500	8,350	2,150	2014	Dec-15	326	765
Pet Crystal	6,700	5,530	1,170	2013	Dec-15	275	646
<b>Subtotal 2</b>	<b>22,650</b>	<b>18,310</b>	<b>4,340</b>			<b>863</b>	<b>2,026</b>
<b>Total 1</b>	<b>44,114</b>	<b>37,180</b>	<b>6,934</b>			<b>66,490</b>	<b>156,183</b>
<b>I - AB</b>							
Tunisie Ouate	12,000	10,000	2,000	2015	2016	10,833	25,443
Randa	9,000	9,000	0	2014	2016	5,183	12,182
<b>Subtotal 1</b>	<b>21,000</b>	<b>19,000</b>	<b>2,000</b>			<b>16,016</b>	<b>37,625</b>

<b>Project</b>	<b>Cost</b>	<b>Financed by World Bank LOC</b>	<b>Equity</b>	<b>Start Date</b>	<b>Date of Operation</b>	<b>Energy Savings Since Date of Operation (toe)</b>	<b>CO<sub>2</sub> Reductions Since Date of Operation (tCO<sub>2</sub>)</b>
<b>II - BH</b>							
Makalada	2,800	2,280	520	2015	2016	5,121	12,035
<b>Subtotal 2</b>	<b>2,800</b>	<b>2,280</b>	<b>520</b>			<b>5,121</b>	<b>12,035</b>
<b>Total 2</b>	<b>23,800</b>	<b>21,280</b>	<b>2,520</b>			<b>21,138</b>	<b>49,660</b>
<b>Grand Total</b>	<b>67,914</b>	<b>58,460</b>	<b>9,454</b>			<b>87,628</b>	<b>205,843</b>

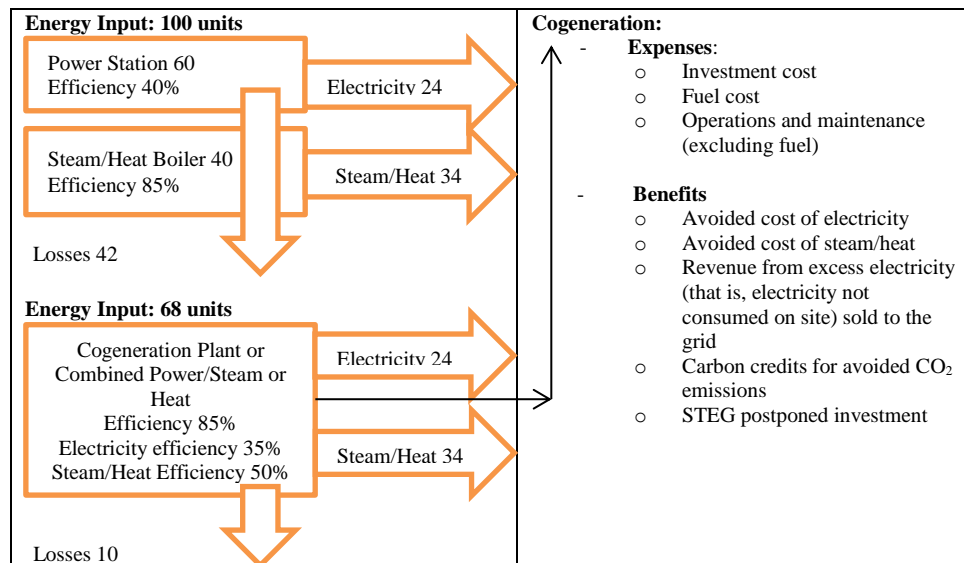
### Annex 3. Economic and Financial Analysis

1. At appraisal in 2009, a financial and benefit-cost analysis was carried out to assess the viability and attractiveness of EE projects. At completion, the financial viability and the economic efficiency are assessed again.

2. To ensure comparability with the appraisal, the financial economic analysis at project completion basically adopted the same methodology and, in some cases, the same unit valuations, such as those for the values of the discount rate and the interest rate. However, among the four companies chosen for study in the economic and financial analysis at appraisal, only two reached financial closure: Somocer and Nejma Huiles (Slima Frères in the PAD). To show the attractiveness of cogeneration financed under the credit line and in addition to Somocer, which is a comparatively large subproject (> 5 MW), we have added a comparatively small cogeneration investment (about 1 MW): Nejma Huiles S.A.

3. Cogeneration. Figure 3.1 shows what is involved. An industry requires 24 units of electrical energy and 34 units of steam/heat energy. Through separate steam/heat production and power generation, the primary energy input in the power plant will be 60 units ( $24 / 0.40$ ). If a separate boiler is used for steam/heat production, then the fuel input to the boiler will be 40 units ( $34 / 0.85$ ). With cogeneration, the fuel input will only be 68 units,  $(24 + 34) / 0.85$ , to meet both the electrical and the thermal energy requirements. Losses, which were 42 units in the case of separate steam/heat production and power generation, are reduced to 10 units with cogeneration. The main factor in this increased performance is the higher efficiency of cogeneration compared to separate power generation and steam/heat boiler production.

**Figure 3.1. Energy savings linked to cogeneration**



4. Cogeneration therefore allows (a) a saving of fossil fuels for electricity generation and steam/heat production; (b) a sale of electricity to the grid in excess of own consumption; (c) a reduction in the emission of GHGs (particularly CO<sub>2</sub> emission); and (d) a reduction of the burden on the utility generation and network by having the production of electricity on-site.

5. The basic assumptions of the economic and financial analysis at completion are the following:

- **Investment cost.** Equipment and installation costs and other ‘soft’ costs such as environmental studies and so on
- **Discount rate.** 10 percent
- **FNME subsidy.** About 5.5 percent of the cost of equipment
- **Electricity consumed on-site (from 0 percent to 100 percent).** Total electricity produced – electricity sold to the grid
- **Cost of fuel for the cogeneration system** is a function of the fuel quantity and the fuel price, that is, either the domestic price of natural gas or the economic cost of natural gas in the economic analysis.
- **Operation and maintenance cost** (excluding fuel). Estimated at about 4 percent of total investment cost per year
- **Electricity produced.** The value of electricity produced is a function of the cogenerated electricity, which is produced on-site and on the tariff structure for electricity supplied by the grid. The economic value is obtained by valuing the electricity produced at the cost recovery tariff, which is estimated at TND 0.18 per kWh.
- **Heat/steam produced.** It includes the cost of fuel for the boiler that would have produced the thermal energy, if it were not cogenerated. It also includes operations and maintenance cost for the boiler and related auxiliary equipment. The cost of fuel itself is a function of the quantity of fuel and its relevant price. The capital cost of the boiler is not taken into consideration because it is assumed that a boiler would anyway be installed for backup.
- **Electricity revenue** from selling excess electricity, if any. Agreed STEG tariff (or the cost recovery tariff for the economic analysis) for resale of electricity to the grid multiplied by the quantity sold
- **Carbon credits.** The electricity and heat saved through cogeneration will save CO<sub>2</sub> emissions. The current market price is about TND 1.2 per tCO<sub>2</sub> reduced. The World Bank suggested social cost of CO<sub>2</sub> reduction is about US\$30 or about TND 60 per ton. This World Bank social cost of CO<sub>2</sub> is used in the economic analysis.
- **Cost of fuel.** Tunisia is a net importer of petroleum products. The supply cost of fuel is equal to international price + transportation margins + distribution margins. The economic supply cost is estimated at TND 0.04 per therm while the financial cost is currently TND 0.038 per therm.



- **Postponed investment by STEG.** Cogeneration reduces demand of electricity from the grid. This is analogous to an electricity loss reduction: A reduction in losses in the distribution system constitutes a reduction in demand and therefore the incremental investment in bulk supply facilities that would have been necessary to meet additional demand is avoided. Energy and peak capacity losses in the distribution system are valued at the long-term marginal cost to reflect the economic resource cost of additional bulk supply facilities required to meet the incremental energy and peak capacity. It is calculated as the NPV of costs of STEG’s preferred investment program adjusted for losses, divided by the NPV of the load.<sup>8</sup> The postponed investment by STEG as a result of cogeneration by Somocer and Nedjma Huiles is estimated at about 5 MW and 1 MW or about TND 5 million and TND 1 million, respectively.

6. **Results.** The results of the financial and economic analysis are given in table 3.1.

**Table 3.1. Financial and Economic Analysis of Cogeneration Investments (TND, millions)**

<b>Financial</b>	<b>Somocer</b>	<b>Nedjma Huiles</b>
NPV at 10%	30	1.23
IRR (%)	56	22
<b>Economic</b>		
NPV at 10%	46	9
IRR (%)	82	85

7. **Sensitivity analysis.** A sensitivity analysis was also carried out to quantify the impact of alternative assumptions on the NPV and the IRR. The switching values (or values at which the NPV becomes zero) for critical variables such as tariffs, price of natural gas, and the discount rate are given in Table 3.2.

**Table 3.2. Switching Values**

<b>Financial</b>	<b>Somocer (%)</b>	<b>Nedjma Huiles (%)</b>
STEG electricity tariff	-89	-18
Domestic price of natural gas	95	28
Discount rate	558	115
<b>Economic</b>		
Cost recovery tariff	-100	-84
Economic price of natural gas	137	37
Discount rate	760	850

8. The two subprojects examined show that the results would still be positive under a wide variation in critical variables but nevertheless show some sensitivity to variations in the price of natural gas, which is the main fuel for cogeneration.

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<sup>8</sup> Many cogeneration systems maintain their connection to the utility grid for supplemental power needs beyond their self-generation capacity and/or for standby and backup service during routine maintenance or unplanned outages. However, cogeneration allows the grid to function more efficiently by reducing baseload and peak demand, as well as reducing the need for transmission and distribution upgrades and construction.





## Annex 4. Bank Lending and Implementation Support/Supervision Processes

### (a) Task Team Members

Names	Title	Unit	Responsibility/Specialty
<b>Lending</b>			
Noureddine Berrah	Consultant	GEE04	
Khalid Boukantar	Program assistant	GTI05	
Michael Hamaide	Senior country officer	MNC01	
<b>Supervision/ICR</b>			
Anas Abou El Mikias	Consultant	GGODR	Energy
Ferhat Esen	Senior energy specialist	GEE05	Energy
Gael Gregoire	Sr policy officer	CRKSK	Environment
Moez Makhoulouf	HQ consultant	GED05	Financial management
Angeline Mani	Language program assistant	GEE05	
Philippe R. Roos	Consultant	MNSEG-HIS	Energy
Shirley Foronda	Financial management specialist	GG023	Financial management
Mehdi El Batti	Financial management specialist	GG023	Financial management
Africa Eshogba Olojoba	Safeguards specialist	GEN05	Safeguards

### (b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of Staff Weeks	US\$, thousands (including Travel and Consultant Costs)
<b>Lending</b>		
FY07	3.82	27.81
FY08	11.23	111.37
FY09	46.8	308.5
<b>Total:</b>	<b>61.85</b>	<b>447.68</b>
<b>Supervision/ICR</b>		
<b>FY10</b>	17.10	92.33
<b>FY 11</b>	12.95	75.11
<b>FY12</b>	14.00	100.05
<b>FY13</b>	26.98	134.82
<b>FY14</b>	15.73	111.99
<b>FY15</b>	7.27	61.82
<b>FY16</b>	8.48	100.66
<b>FY17</b>	0.00	5.96
<b>Total:</b>	<b>102.51</b>	<b>682.73</b>
<b>Grand Total:</b>	<b>164.36</b>	<b>1130.41</b>

## **Annex 5. Beneficiary Survey Results**

**Annex 6. Stakeholder Workshop Report and Results**

## **Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR**

### **Summary of the ANME and BH Report**

1. On July 18, 2016, ANME provided the World Bank with its own evaluation of the implementation of the Energy Efficiency Project. This evaluation included input from BH, one of the two commercial banks that were beneficiaries of the LOC (AB has provided a separate contribution [see section III Contribution of Amen Bank].)

- The project performance was judged Satisfactory overall, despite delays in disbursements, several flaws in the design of the project, and two successive extensions of the closing date. In its second phase (that is, after 2013), the project has experienced a surge in demand by investors due to a better investment climate in the country. It achieved its objectives. This success is a reflection of the good management of the project after the restructuring of the LOC.
- The project went through two phases essentially:
  - First phase. 2010–2013 with little disbursement due mostly to lack of stability in the country and lack of proactivity of commercial banks beneficiary of the LOC
  - Second phase. A success phase with high disbursements and a backlog of unsatisfied demand due to lack of resources

### **Lessons Learned**

- Technical and financial studies as well as banking procedures to secure collateral are slow.
- Despite efforts to train the financial sector, one should not underestimate the fact that institutions are conservative in analyzing funding requests.
- It is possible to find a remedy to design flaws as long as managers show flexibility and project managers are capable of facing reality.
- One should not underestimate the initial phase of a project, especially if a project has design flaws (which is often the case). The contribution of international experts is essential here.
- A suitable incentive framework and a communication plan are essential to the success of this type of project.

### **Recommendations for a Future Operation**

- Give more flexibility and leeway to the manager of the LOC as well as at the level of the World Bank.

- Allow banks to take better advantage of the funds available and not limit them to their own allocations.
- Put in place a TA component to train stakeholders.

### **Original ANME and BH Report (in French)**

## **“RESUME ANALYTIQUE DU PROJET LIGNE DE CREDIT EFFICACITE ENERGETIQUE DANS L’INDUSTRIE ET COGENERATION**

### **BREVE DESCRIPTION DU PROJET**

L’objectif global du projet est d’accélérer le développement du marché de la maîtrise de l’énergie en Tunisie dans le secteur industriel en mettant en place un mécanisme intégré de financement qui permet d’éliminer la barrière principale aujourd’hui rencontrée par les porteurs de sous-projets, à savoir la contrainte d’accès au financement. Sur le plan environnemental, le projet vise à réduire les émissions de GES générées par le secteur industriel tunisien et contribuera ainsi à la lutte contre le phénomène des changements climatiques. Sur le plan économique, le projet devrait contribuer à terme à améliorer la compétitivité des industriels tunisiens et les outiller ainsi à mieux faire face aux effets de la crise économique mondiale actuelle.

Pour atteindre ces objectifs, le projet proposé prévoit la mise à disposition des intermédiaires financiers de prêts dédiés à la maîtrise de l’énergie au profit des industriels et des projets de cogénération avec la participation de deux banques, l’Amen Bank et la Banque de l’Habitat (au départ 3 banques) pour un montant de 40 avec la participation de deux banques, l’Amen Bank et la Banque de l’Habitat pour un montant de 55 millions de USD au départ et restructuré à 40 millions de USD.

### **PERFORMANCE DE PROJET**

*Dans l’ensemble, la performance du projet a été jugée **très satisfaisante**, malgré des retards au démarrage de certaines activités, plusieurs lacunes relevées dans la conception du projet et surtout, le fait que deux prorogations aient été demandées, ce qui a sensiblement fait baisser la note attribuée par les évaluateurs sur le plan de l’efficacité de l’exécution du projet. Cela dit, il faut noter que le projet, dans sa 2<sup>ème</sup> phase, a connu une demande croissante et importante de financement de la part des investisseurs et ce suite à l’amélioration du climat d’investissement dans le pays, et par conséquent le projet a très largement atteint les objectifs fixés. Ce succès traduit aussi l’excellence de la gestion du projet pendant la période qui a suivi la restructuration du la ligne de crédit.*

Le projet est passé essentiellement par deux phases à savoir :

#### **I- Phase de stagnation allant de 2010 jusqu’au début 2013 :**

Cette **phase** s’est caractérisé par un faible décaissement pour la banque de l’habitat voir même réduire le montant accordé à moitié, cette situation est due aux facteurs suivants:



- Non stabilité du pays ce qui a provoqué une réticence des industriels pour tout investissement.
- Une situation critique caractérisée par la non visibilité des banques et une mission de full audit ordonné par le ministère des finances pour les banques publiques.

## **II- Phase de relance et de réussite :**

Cette période coïncide avec l'amélioration des indicateurs financiers avec une parfaite conformité aux normes prudentielle, ainsi que le renouement avec les bénéficiaires et le regain de notoriété des banques, ce qui a justifié et motivé une confiance sans précédent de la part des investisseurs et des bailleurs de fonds, cause qui a poussé à décaisser presque le montant global de la ligne accordée voir même le dépasser pour le cas de la Banque de l'Habitat, et à donner des accord de financement pour de nouveaux projets de cogénération et d'efficacités énergétiques, d'où un pipe très important qui attend des ressources adéquates mis à dispositions pour ce genre d'investissement.

## **ENSEIGNEMENTS TIRES**

- Les procédures relatives aux études techniques et financières ainsi que les formalités de garantie pour les contrats de prêts sont assez lentes.
- Malgré les efforts déployés pour sensibiliser et former le secteur financier, il ne faut pas sous-estimer le conservatisme dont les institutions de ce secteur font preuve dans l'analyse des dossiers de demande de crédit.
- Il est possible de remédier aux lacunes de conception, à condition que les décideurs fassent preuve de souplesse et que les gestionnaires du projet soient capables de faire face à la réalité.
- On ne saurait surestimer l'importance de la phase de démarrage, surtout si un projet présente des lacunes au niveau de la conception (ce qui est souvent le cas). La contribution d'experts internationaux est cruciale à ce stade.
- Une réglementation d'incitation adaptée ainsi qu'un plan de communication sont indispensables pour la réussite de ce type de projet.

## **Recommandations pour la prochaine expérience**

- Accorder plus de souplesse et de marge d'action aussi bien au niveau du gestionnaire de la ligne qu'au niveau de la Banque Mondiale
- La réussite de projet doit être vue dans sa globalité dès le début de l'expérience et permettre aux banques de mieux bénéficier des fonds alloués et ne plus les limiter si ils dépassent les montants accordés.

- Mettre à disposition un programme de formation et de training et d'une assistance techniques pour les parties prenantes afin de faciliter le travail et contribuer à la réussite du projet.

### **III – Contribution of Amen Bank**

#### **PERFORMANCE DU PROJET**

Entre 2010 et 2013, le marché de l'efficacité énergétique et de la cogénération a été moins porteur que prévu. Cette situation résulte en grande partie de la crise économique et financière internationale et nationale, dont l'impact a certes été modéré sur la Tunisie, et surtout aux événements particuliers vécus en Tunisie pendant la phase de lancement du projet, mais qui a conduit les industriels, et notamment les exportateurs, à davantage de prudence, à réviser leurs plans d'investissement et à essayer de modérer leur endettement. Les investissements d'efficacité énergétique et de la cogénération n'étant en général pas prioritaires, le décollage de la ligne de crédit en a été gêné.

Depuis 2014 jusqu'à ce jour, nous avons retrouvé un regain d'intérêt remarquable de la part des porteurs de projet surtout énergivores, intérêt accentué par la diminution de la subvention (destinée à être supprimée progressivement) ce qui a fait le succès du projet à sa fin de vie et le niveau élevé des déblocages réalisés de la part d'Amen Bank consommant ainsi presque la totalité de l'enveloppe qui lui a été consacrée,

#### **RECOMMANDATIONS:**

- Mieux prospecter le marché de l'efficacité énergétique, qui avait été un peu été négligé au profit de la cogénération;
- Meilleur partage des "pipelines" avec l'ANME. Les efforts de sensibilisation du marché seront également intensifiés, avec le soutien du service de communication de la Banque Mondiale.
- Mettre en place un programme d'assistance technique. Celle-ci constitue à la fois un argument de vente pour les banques et un facteur de confort et donc d'incitation pour les emprunteurs.
- La banque mondiale pourrait revoir la procédure de tirage : en effet, la technique du déblocage des fonds via le site web de la BM est très rigide, condamnant ainsi la banque à ne bénéficier que d'un seul tirage (en faveur d'une seule relation) tant que les justificatifs du dernier en date n'ont pas été avancées et téléchargées, et le plafonnement du montant des avances eu égard à la taille des projets constitue un frein à l'utilisation des fonds au profit de plus d'un bénéficiaire.

## **Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders**

1. The ICR mission met with several project stakeholders in June 2016, such as the PFIs, ANME, industrial beneficiaries, and AFD. One interview was conducted with one of the project beneficiaries, the company Somocer, which invested in cogeneration capacity. The main issues raised by its representative (deputy managing director) were the following:

- The Energy Efficiency Project and investment in cogeneration enabled the company to reduce its energy costs and become more competitive. It is now targeting export markets that were not considered previously in the Middle East and North Africa Region and Sub-Saharan Africa. The investment also encouraged it to expand into other lines of business (for example, wooden pallets and packaging, with high energy intensity) as spare energy from cogeneration was put to more productive use instead of selling it to the national utility, STEG.
- There were various impediments to the sale of excess electricity available from cogeneration to the grid: (a) STEG's purchase tariff for excess production of electricity from cogenerators was lower than the cost of production, thus forcing them to find alternative uses for the excess electricity generated (that is, negative incentive to sell electricity to the grid), and (b) even when selling to the grid at a lower cost than the cost of production, there are bureaucratic delays in having the power purchase agreement promptly signed and the seller remunerated on time for the excess electricity sold.

## **Annex 9. List of Supporting Documents**

- ICR Guidelines (August 2006, last updated on October 5, 2011)
- Guidelines for Reviewing World Bank Implementation Completion and Results Reports. A Manual for Evaluators (Independent Evaluation Group, November 12, 2013)
- PAD: Tunisia: Energy Efficiency Project, (June 3, 2009)
- Loan Agreements
- Disbursement Letters and Amendments
- Aide memoires
- Restructuring reports
- ISRs (12 sequences)

# MAP

