PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE

Report No.: AB2983

Project Name	RY-RURAL ENERGY ACCESS
Region	MIDDLE EAST AND NORTH AFRICA
Sector	Power (50%); Renewable energy (30%);General energy sector (20%)
Project ID	P092211
Borrower(s)	GOVERNMENT OF YEMEN
Implementing Agency	
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Environment Category	[ ] A [X] B [ ] C [ ] FI [ ] TBD (to be determined)
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1. Country and Sector Background

Yemen represents a major development challenge in the Middle East. It is a country of deep rooted tradition endowed with limited resources, notably scarce water, limited arable land and declining oil output; a country that has experienced dramatic internal and external shocks in the last two decades; a low-income IDA country in a rich region; and a young country with nearly 50 percent of its population below 15 years and total population expected to double in the next 20 years.

Poverty is a nation-wide phenomenon in Yemen, with a per capita GNI of US$870 per year. An estimated 35 percent of the 22 million people live in poverty[1], with a higher concentration in rural areas (where 73 percent of Yemenis and 84 percent of the poor live). The lives of the rural people are characterized by lack of access to basic infrastructure facilities like energy, education, health, water supply and sanitation. Households consume about 80% of all energy which, for the rural population, is primarily restricted to lighting and cooking. While electricity/kerosene is used for lighting, Liquefied Petroleum Gas (LPG)/fuelwood are used for cooking purposes.

The country's economy is highly dependent on oil production, with oil accounting for approximately 65 percent of government revenues. Real gross domestic product (GDP) growth averaged close to 5 percent over the 2005 - 2007 period, and preliminary estimates for 2008 are

[1] World Bank, *Yemen Poverty Assessment*, November 2007

in the order of 4.7 percent, as declining oil revenues were partially offset by growth in non-oil sectors. However, final figures are expected to be lower once the continued fall in oil prices and economic slow-down in response to global recession late in the year are taken into account.[2] The continued low level of world oil prices is likely to further drive down GDP growth in 2009. Expenditure on food and fuel subsidies constitute a heavy burden on the country's budget. Fuel subsidies alone are estimated at US$ 4.7 billion in 2008, the equivalent of 17 percent of GDP.[3] However, further reform in this area requires that an adequate program of targeted income transfers and other social protection mechanisms are put in place.

Yemenis have the lowest access to electricity in the region with little over 40 percent of the total population having access, compared to a regional average of about 90 percent. Rural areas are particularly disadvantaged, with only 20 percent of the population having access to electricity as compared with 85 percent of the urban population that has access.

In its Power Sector Development Strategy Note of 1997, updated in 2006, the Government of Yemen (GOY) committed to a nationwide rural electrification (RE) program. The Poverty Reduction Strategy Paper also proposed expansion of RE coverage, preferably based on renewable energy resources, such as solar and wind energy. Previous efforts at RE have generally been unsatisfactory. Past RE schemes (few) and development of renewable energy have been uncoordinated. The absence of any strategic vision and necessary legal/regulatory support has led most of these to be unsustainable. In addition, rural electrification has been carried out by the Public Electricity Corporation (PEC) through expansion of its grid system or installation of isolated diesel powered plants. Lack of necessary institutional support, inadequate transparency in the subsidy mechanism and absence of any comprehensive rural electrification policy has rendered most of these schemes unsustainable and weakened the company's already inadequate finances.

In order to ensure that future investments in RE and renewable energy are sustainable, GOY requested IDA financing for the development of a comprehensive RE strategy and associated RE program. In response to GOY's request, necessary preparatory market assessment studies and capacity building measures were initiated through a GEF-funded Rural Electrification and Renewable Energy Development Project (REREDP) which was co-financed by other donors[4] and GOY. REREDP was designed, *inter alia* to: (i) articulate national strategies for rural electrification and renewable energy development; and (ii) help facilitate the formation of an appropriate legal and regulatory regime and necessary institutions. Of particular significance are the studies relating to the development of a national strategy for rural electrification and renewable energy development and the elaboration of a Pilot Project for the initial implementation of the proposed strategy in the Ibb Governorate.

Based on the REREDP studies, a Rural Electrification Policy Statement (REPS) was approved by the Cabinet in July 2008. It defines the Government's vision for implementation of a rural electrification program, including consolidation of planning and implementation and a focus on

[2] World Bank, *Yemen Economic Update*, Winter 2008
[3] ibid
[4] Other donors include Bundesministerium Für Wirtschaftliche Zusammenarbeit (BMZ)/Gesellchauft Für Technische Zusammenarbeit GmbH (GTZ) and United States Trade Development Agency (USTDA)

the use of community/consumer - based service providers (Rural Electricity Service Providers or RESPs) which will own and operate the distribution assets and purchase power either from the grid or from isolated supply sources. An independent Rural Electrification Authority (REA) will have overall responsibility for the implementation of the Rural Electrification Policy, channeling available funds to qualifying projects and providing implementation support to participating communities. Decrees/legislation required for the new policy and institutional framework were drafted. The electricity law was ratified by the Parliament in February 2009 and will facilitate the ownership of the electricity assets and their commercial operation by the RESPs. An REA decree is expected to be issued soon leading to the formal establishment of the REA. In addition, a pilot RESP is being developed in Ibb Governorate.

As a part of establishing the legal and institutional framework, further program details such as role of the existing institutions, operational procedures and staffing details also need to be worked out. In particular, the role of some of the departments within the PEC, including the Rural Electrification Sector (RES), will need to be clarified. The USTDA is funding the development of an appropriate institutional framework.

An equally pressing sector issue in many parts of the country is the lack of a cohesive plan for the supply of Liquefied Petroleum Gas (LPG). Improved access to LPG, particularly for use in cooking, would provide significant environmental and social benefits. At present, little over 50 percent of the rural poor households have access to LPG and the GOY does not yet have a clear policy directive for increasing the availability of LPG in the rural areas, particularly in areas of high poverty.

2. Objectives

The development objectives of the proposed Project are to: (i) improve electricity access of rural populations in the selected project areas in a financially sustainable manner; and (ii) demonstrate the feasibility of increasing the access to electricity of RHH in off-grid areas through implementation of SHS.

3. Rationale for Bank Involvement

The Country Assistance Strategy for 2006 – 2009 proposes that the World Bank should help the Government to make progress on four pillars: increasing non-oil growth; improving human development outcomes; improving fiscal sustainability; and addressing the resource sustainability crisis. The CAS also includes, under each pillar, upfront actions to improve economic governance which need to be implemented immediately even though the outcomes may only be visible in the medium-term.

In the recent past, Bank's support to the Yemeni power sector was through the Sana'a Emergency Power Project (closed April 30, 2005) which mainly focused on meeting the emergency power needs for the Sana'a region. The ongoing Power Sector Project, which is being implemented by PEC, addresses issues related to strengthening of the transmission/distribution system and the implementation of the sector reforms initiated during the earlier project. The proposed Project is a natural outgrowth of the Power Sector Project,

aimed at extending the benefits of electrification beyond the major load centers, guided by the outcomes of the REREDP.

Past initiatives in rural electrification have provided only limited tangible results, largely owing to the lack of a clear strategic vision or of a coordinated legal and institutional framework. Because of its depth of knowledge in the sector, IDA is uniquely placed to initiate and provide necessary leadership for initiation and implementation of this program and strengthening of the institutional framework in a coordinated manner.

IDA involvement has already generated other donor interest in providing investment assistance to GOY to develop its RE program within the framework of the overall strategy. The RE program forms part of the Energy for the Poor Initiative, and this is expected to mobilize additional donor interest. That would allow rural electrification and reduction of poverty in Yemen to be addressed on a much larger scale.

4. Description

The proposed Project would encompass new public, private and community based delivery models for both grid and off-grid technologies and would consist of the following components:

Component 1: On-Grid Rural Electrification: The National Rural Electrification Strategy study has identified 27 service territories in rural areas of twelve governorates for rural electric service expansion and integration into the national grid. A priority ranking for the development of these service territories has been prepared based primarily on economic efficiency (cost per connection and required government subsidy), although geographic coverage was also considered. An overall program of about US$259 million has been defined which is expected to be implemented in three phases in a period of ten years and would provide access to electricity for over 520,000 new rural households that will increase access from the current level of about 20% to about 46% of rural households[5] and benefit more than 3.5 million people. Rural Electrification for the remaining seven[6] governorates is not currently viable through grid extension and, will therefore be based on development of renewable energy resources (SHS in the case of the proposed Project – see Component 2).

The proposed Project will finance the first phase of the on-grid program implementation that would include development of twelve service territories in rural areas of twelve governorates (**Taiz, Amran, Hajjah, Dhamar, Al-Mahweet, Ibb, Al-Baida, Lahj, Sanaa, Al-Hodeidah, Abyan and Al-Dhale)** to provide grid-based electricity to 174,000 new customers**.** Investments include financing of the medium voltage transmission lines (at 33-kV and 11-kV), sub-stations, transformers, other distribution materials including meters, and related civil works. The total investment cost (excluding contingencies) for this component is estimated at approximately **US$**

[5] Out of a total two million rural households (RHH), currently, number of RHH with access to electricity are estimated at 400,000, i.e., access is at 20%. The proposed Project is expected to increase access by 175,000 through on-grid extensions and an additional 18,000 through SHS; this will increase access to about 30%. If additional funds are available, the program for increasing access by 520,000 will imply increasing access to 46%.

[6] Out of 21 governorates, two are urban (Sana'a and Aden). Of the remaining 19 governorates, twelve are included under the proposed Project. This leaves seven governorates for purely renewable energy development.

82.2 million of which IDA's share is about **US$14.8 million**. Subsequent phases to substantially increase rural access could be brought forward if greater financing became available, including the Energy for the Poor Initiative (EFPI).

Component 2: Off-Grid Electrification Strategy: This component would provide electricity service to off-grid areas based on SHS. The areas of focus will be the fringe areas of the twelve selected service territories that are on-grid extensions and areas outside the service territories in the seven governorates which have been defined as off-grid areas. The grid and the off-grid programs will broadly follow common principles with respect to technical quality, service standards and organizational principles. However, the off-grid program will also test a range of different business models, replicating some of the business models being piloted in various parts of the country. Investments are currently expected to be in the range of **US$9.0 million** (excluding contingencies) of which IDA's share would be **US$4.3 million;** this is expected to result in about 18,000 new connections.

Component 3: Institutional Support and Technical Assistance: Key items to be addressed through this component are: (i) strengthening the institutional capacity of the agencies responsible for carrying out the grid-based rural electricity delivery services, viz., the RESPs and micro-finance institutions/private service providers in case of off-grid rural electrification; (ii) capacity building within the REA; (iii) designing and implementing a tariff framework that will ensure the financial sustainability of the RESPs; (iv) operating cost of the PMU; (v) incremental operating costs[7] of the REA and the RESPs; (vi) additional studies on rural energy with particular emphasis on renewable energy; and (vii) developing a LPG supply strategy to improve access to LPG among the rural population. The total cost of the Technical Assistance component including implementation support is estimated at **US$16.5 million** of which IDA's share would be **US$4.0 million.**

5. Financing

Source:	($m.)
BORROWER/RECIPIENT	11.10
International Development Association (IDA)	25.00
Islamic Development Bank	25.40
AFD	47.10
USAID	5.00
Government of Germany	3.50
Financing Gap	0.00
Total	117.10

6. Implementation

Development and implementation of the rural electrification program will be carried out by the newly-established REA. Selection of a single agency will help facilitate the planning, coordinating, and mobilizing financing for expansion of rural electrification in a sustained

[7] Expenses incurred on account of utility charges and rent for office space, maintenance and insurance of vehicles, fuel, office supplies, banking charges, communication services, local travel costs, salaries and labor costs for support staff excluding salaries of officials of the Government.

manner. A PMU with the necessary procurement, technical and financial expertise financed by the Donors has already been established. On behalf of REA, the PMU will manage all aspects of implementation. It will also manage the disbursement, financial management and auditing of funds received for implementation. The PMU will be accountable for the timely submission of all financial reporting and project accounts. Technical assistance under the proposed Project will be used to strengthen its implementation capacity.

7. Sustainability

The Government's commitment and ownership of the proposed Project is evidenced by the fact that it has: (i) ratified the electricity law at the Parliament; (ii) approved the REPS at the Cabinet; (iii) set-up an advisory committee (comprising representatives of the main stakeholders) at the Ministry of Electricity and Energy (MOE&E) to provide strategic directives to a sustainable development of the program; (iv) provided significant cofinancing for the REREDP that helped articulate the National Rural Electrification Strategy and a National Renewable Energy Development Strategy; (v) agreed to provide significant co-financing for the proposed Project; (vi) formally appointed the PMU comprising five core staff who have been selected competitively on a transparent basis; and (vii) approved the REA decree that has laid the foundation for the formal setting up of the REA and the RESPs.

Sustainability of the on-grid component will depend primarily on whether the RESPs are able to earn adequate revenues to cover their costs. To this end, a tariff study financed under the Power Sector Project will provide guiding principles in addressing the issues of level and structure of tariffs. While capital subsidies will likely cover a significant part of the construction costs, the RESPs will need sufficient management and operational competence to maintain the system in a cost-effective manner, and also to manage cash flow and accounts receivable. For this reason, the Technical Assistance component of the project includes funding to partially support the establishment and initial operation of the REA and the RESPs. By the time the RESPs are established, the gas fired power stations at Marib will be generating power to the system and it is expected that the GOY through PEC will pass through this low cost of power generation to the rural consumers and attract rural population to get connected to the grid thereby developing the rural electrification program.

Sustainability of the off-grid component will depend primarily on consumer satisfaction which will not only be determined by the monthly fees to be paid by the end-user but on the long-term performance of the individual service providers operating in the off-grid areas as demarcated by the REA. The Technical Assistance component of the proposed Project will aim to create and strengthen the technical and managerial capacity within existing microfinance institutions and/or other service providers that will be established to ensure reliable service provision in the rural areas. At the same time the financial schemes based on consumer contributions and capital subsidies will allow profitable service delivery.

8. Lessons Learned from Past Operations in the Country/Sector

With respect to the general design of RE schemes (and indeed all rural infrastructure developments), there is growing consensus that state-owned, centralized utilities, particularly

those whose principle focus is on urban supply, are a poor choice as an agent for the implementation of rural programs. Much greater success has been had through the establishment of decentralized entities, usually community or investor based rural supply organizations for both based on grid-based supply and off-grid systems. Accordingly, under the proposed Project, such entities will be established as service providers to maintain the infrastructure, carry out improvements and extensions and provide supply to the consumers.

Barring possible capital subsidies, these schemes have been most successful when operated on a commercial basis. Operations should be based on cost recovery of the bulk supply tariff and of distribution costs. Assistance to low-income consumers should preferably be through direct targeted subsidies, and/or investment support to the service providers. It is also essential that the Government act to establish an appropriate regulatory framework, both to liberalize electricity supply (allowing private development of off-grid resources), and to ensure consistency in the implementation of the adopted RE strategy. The Government may also have a role in promoting renewable energy development, and in mobilizing financial support for initial investments.

The proposed Project aims to follow this model, by supporting pilot development of both grid-connected and off-grid schemes through technical assistance for capacity building as well as investment financing. Ongoing support would be provided to the government in the form of technical assistance to further support the development of necessary regulations as well as the central institutions which will be responsible for monitoring implementation of the RE strategy and coordinating and mobilizing donor funding.

9. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP/GP 4.01)	[X]	[ ]
Natural Habitats (OP/BP 4.04)	[ ]	[X]
Pest Management (OP 4.09)	[ ]	[X]
Cultural Property (OPN 11.03, being revised as OP 4.11)	[ ]	[X]
Involuntary Resettlement (OP/BP 4.12)	[X]	[ ]
Indigenous Peoples (OD 4.20, being revised as OP 4.10)	[ ]	[X]
Forests (OP/BP 4.36)	[ ]	[X]
Safety of Dams (OP/BP 4.37)	[ ]	[X]
Projects in Disputed Areas (OP/BP/GP 7.60)*	[ ]	[X]
Projects on International Waterways (OP/BP/GP 7.50)	[ ]	[X]

10. List of Factual Technical Documents

National Rural Electrification Strategy for Yemen (Phases I, II and III)

Renewable Energy Resource Assessment

Grid-Based Renewable Energy Strategy

* *By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas*

Off-Grid Renewable Energy Strategy

Renewable Energy Strategy and Action Plan

Wind Atlas for Yemen

Institutional set-up for the promotion of Decentralized Renewable Energy Technologies

Assessment of Photovoltaic Market

Final Awareness Raising Action Plan

Environmental and Social Impact Assessment

Resettlement Policy Framework

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