



SIGAR

Office of the Special Inspector General
for Afghanistan Reconstruction

June 10, 2014

The Honorable James B. Cunningham
U.S. Ambassador to Afghanistan

The Honorable Michael D. Lumpkin
Under Secretary of Defense for Policy (Acting)

General Joseph F. Dunford, Jr.
Commander, U.S. Forces–Afghanistan and
Commander, International Security Assistance Force

Mr. William Hammink
USAID Mission Director for Afghanistan

Dear Gentlemen:

I am writing to inquire about the U.S. government's plans to provide electric power in Kandahar after December 2014.

As you know, DOD's Kandahar "Bridging Solution" provides fuel for two 10-megawatt diesel generators in Kandahar as part of a combined counter-insurgency and development strategy. Because fuel for diesel generators is very expensive¹, DOD always intended the program to serve as a temporary solution until Kandahar could obtain power from more sustainable sources, primarily from the additional turbine being installed at the Kajaki Dam (Kajaki Dam Unit 2 Project) and through efforts to more effectively connect Kandahar to the country's two major electric grids – the Northeast Power System (NEPS) and the Southeast Power System (SEPS).

During my recent trip to Afghanistan, I met with a group of DOD, DOS, and USAID officials on this subject. A senior military official told me that DOD intends to stop purchasing fuel for the Kandahar diesel generators by the end of 2014. This loss in power could be offset by the completion of the third turbine at the Kajaki Dam. Yet, based on information provided to my office, Kandahar will not receive power from the Kajaki Dam Unit 2 Project² until its projected completion in late 2015. As noted in SIGAR's recent communication to USAID, the projected completion date for the Kajaki Dam Unit 2 Project has already slipped one year. While SIGAR and USAID disagree about the economic effect of the cost increases involved, both parties agree that additional costs for that project have occurred. The loss of power could also be offset by the NEPS/SEPS power grid. However, this project will not be completed until sometime in 2017 or 2018.³

¹ DOD reports \$100M in FY 13 funds dedicated to fuel, operations, and maintenance for power plants in Kandahar City.

² The Kajaki Dam is located on the Helmond River in Helmond Province.

³ U.S. Agency for International Development, Power Transmission Expansion & Connectivity (PTEC) Update, Power Point presentation, November 25, 2013, Provided to SIGAR.

In that same meeting, Da Afghanistan Breshna Sherkat (DABS) officials relayed to me that if DOD stops providing fuel for the Kandahar diesel generators at the close of this year, DABS may not have the financial resources to purchase the fuel needed to keep the generators running.⁴ Furthermore, these officials cautioned, it appears unlikely that DABS will obtain sufficient alternative energy sources to offset that lost power. Given the time it will take to complete the Kajaki Dam Unit 2 Project and connect NEPS and SEPS, it seems possible that thousands of homes and businesses in Kandahar will no longer have access to electricity beginning in early 2015.

I was further told that DOS, DOD, USAID, and DABS officials working in Kandahar are well aware of this potential problem. Their briefing to me included a Power Point presentation⁵ of a draft proposal by DABS and USAID officials to develop a “bridging solution to the bridging solution.” These officials are trying to create an Afghan-led, hybrid program that would provide Kandahar with power from a combination of the existing diesel generators, a new solar power plant, and a hydro-electric turbine to be installed at the nearby Dahla Dam.

However, legitimate concerns remain about the ability of the U.S. and Afghan governments to jointly develop, undertake, and complete two new and ambitious infrastructure projects before the end of the year. Security risks associated with starting new high-profile infrastructure projects pose a particular concern. In addition, I fear the initial cost estimates for the two projects may be overly optimistic. For example, the draft cost estimate for the Dahla Dam turbine project⁶ is only \$10 million, while the cost of the Kajaki Dam Unit 2 Project, which has already received substantial assistance, is at least \$75 million.

I am concerned that if the relatively tight timelines and cost estimates for a new “bridging solution to the bridging solution” are inaccurate, and electrical service to the Kandahar area is compromised, the U.S. government may lose some of the hard-earned counter-insurgency and economic development gains made over the last few years.

More recently, my office was told by a Pentagon official that DOD plans to continue purchasing fuel for the generators in Kandahar until September, 2015, but that the amount of fuel bought would be “tapered” or reduced in some unspecified way over the months to come. While the total costs and amounts of fuel involved are unclear, this action may serve to mitigate the gaps identified in some small measure, or may provide some limited additional time for other sources of energy to come on-line. Nevertheless, I have a number of questions concerning how these uncertainties may be addressed.

⁴ DABS is the national power utility company of Afghanistan, operating and managing domestic power generation as well as power importation, transmission, and distribution.

⁵ U.S. Agency for International Development, Potential for Hybrid Solar Photovoltaic/Diesel System to Provide Reliable and Affordable Electricity to Business Parks, Power Point presentation, March 13, 2014, Provided to SIGAR. This document is included as an enclosure.

⁶ Dahla Dam is located in Kandahar Province on the Arghandab River.

To help SIGAR understand how the U.S. government intends to help provide electrical power to Kandahar, I'm requesting answers to the following questions:

1. Will DOD fund fuel for Kandahar's diesel generators after 2014? If not, what contingencies are in place to ensure power is maintained? Is there DOD-USAID coordination on this? If so, please explain.
2. If DOD intends to continue funding fuel for Kandahar's diesel generators after 2014, please provide a detailed description of those plans and include the amount (in terms of gallons and dollars by month) for the proposed duration of the program.
3. When do DOD and USAID expect to complete their joint effort on the NEPS and SEPS? When completed, is it expected that NEPS and SEPS will provide enough power to Kandahar to offset the power lost, if the two diesel generators supported by the U.S. military are shut down?
4. When does USAID expect the new turbine at Kajaki Dam to become operational? If and when it becomes operational, will it provide enough power to Kandahar to offset the power lost if the two diesel generators supported by the U.S. military are shut down? Are there contingency plans to make improvements or repairs to the two existing turbines at Kajaki dam once the Kajaki Dam Unit 2 Project is complete?
5. How will DABS be able to financially sustain the two Kandahar diesel generators when U.S. government fuel subsidies end?
6. How does the U.S. government intend to help the Afghan government develop a sustainable source of electricity for the period between the end of the Kandahar Bridging Solution and when the new turbine at Kajaki Dam comes online (at the earliest, in late 2015)? Please provide copies of any studies or assessments for possible bridging solutions, including those related to the solar and Dahla Dam power plants.

I am submitting this request pursuant to my authority under Public Law No. 110-181, as amended, and the Inspector General Act of 1978, as amended. Please provide the requested information within thirty (30) days of your receipt of this letter to my Director of Special Projects, Mr. Jack Mitchell, at [REDACTED] or at [REDACTED]. Please do not hesitate to contact him should you have any questions.

Thank you for your cooperation. I look forward to your response and working with you in support of our nation's critical mission in Afghanistan.


Sincerely,



John F. Sopko
Special Inspector General
for Afghanistan Reconstruction

Enclosure: I – USAID Draft Infrastructure Working Group Meeting Slides

ENCLOSURE I: USAID DRAFT INFRASTRUCTURE WORKING GROUP MEETING SLIDES



Potential for Hybrid Solar Photovoltaic/Diesel Systems to Provide Reliable and Affordable Electricity to Business Parks

The Case for Public-Private Partnership under Independent Power Producer Business Model for Shorandam Industrial Park in Kandahar

presented to

Infrastructure Working Group Meeting
March 13, 2014
US Embassy Kabul

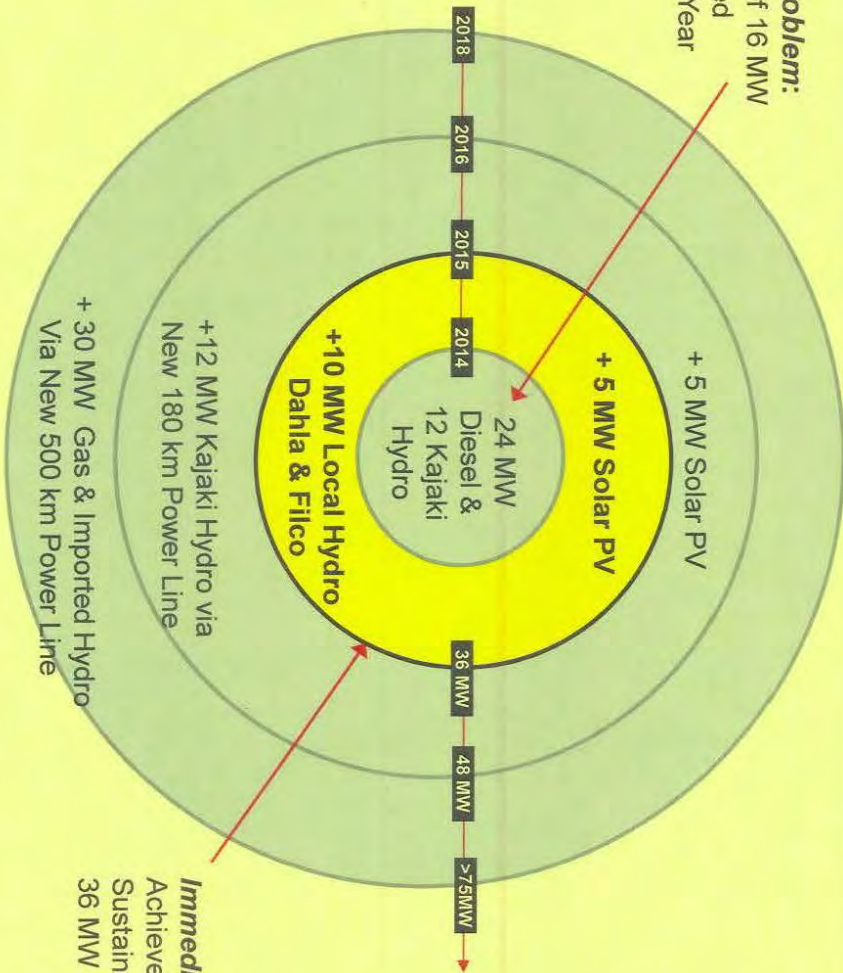
Ronald Enzweiler, P.E.
USAID Infrastructure Advisor
RP - South



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Power Situation in Kandahar

Immediate Problem:
Replace Loss of 16 MW
of DOD Supplied
Diesel Fuel < 1 Year



Immediate Solution:
Achieve
Sustainability as
36 MW system



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Potential for Hybrid Solar Photovoltaic/Diesel Systems to
Provide Reliable and Affordable Electricity to Business Parks

**The Case for Public-Private Partnership under
Independent Power Producer Business Model
for Shorandam Industrial Park in Kandahar**

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USAID Infrastructure Advisor
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Advantages of Solar PV in Kandahar

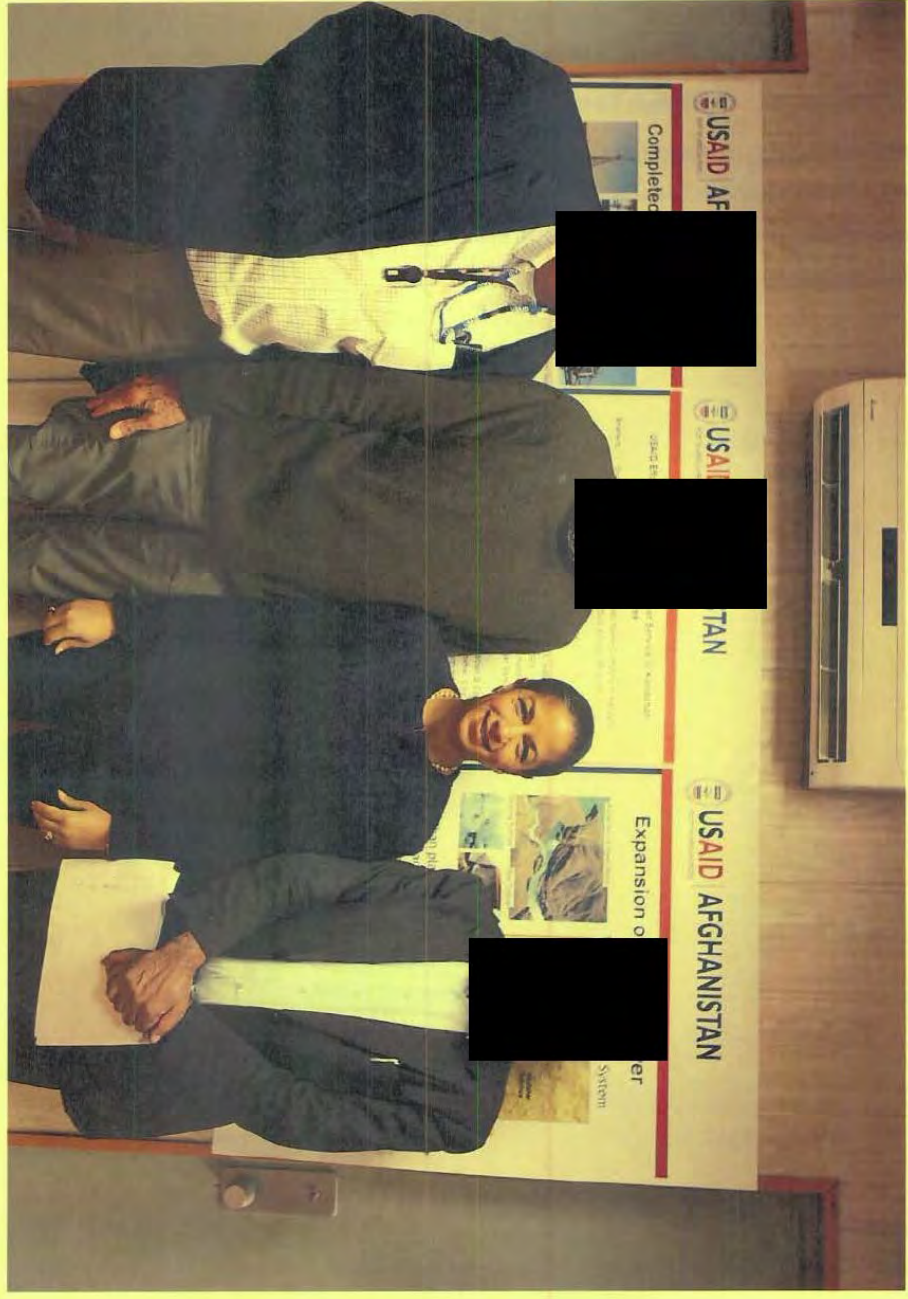
- Relatively Simple, Modular Technology, Low Maintenance
- Excellent Solar Insolation & Climatic Conditions in Kandahar
- Short Completion Time-Line (6 to 9 months) *provided suitable site is readily available*
- Low Skill Labor Can Be Used for Construction & Operation
- USAID Helped Start Solar Tech Program at Kandahar Univ
- Successful Application of Solar PV at District Centers under SIKA & Street Light Program in Kandahar City
- USAID & DOD Invested >\$300 million in Improving Kandahar City Grid System and Equipping & Training DABS since 2010

Only Near Term Deficiency is lack of affordable generation



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USG Success story on SEPPS Explained to Amb Rice





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Recent 10 MW Solar PV Project in India

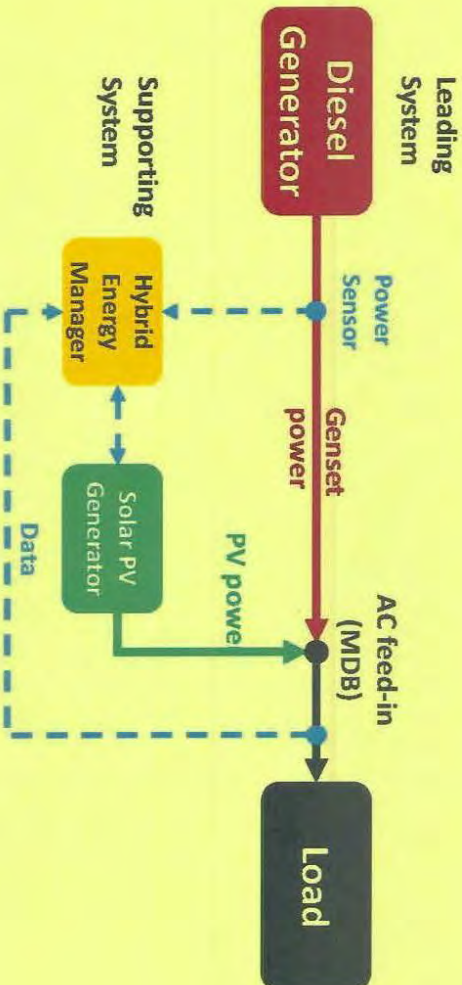




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Solar PV/Diesel Hybrid System Concept

The solar system reduces the load on the diesel generator during the day, acting as fuel saver



- The diesel generator forms the basic electrical grid, supplying the loads as usual
- Solar electricity reduces the load on the generator, thereby saving fuel

6





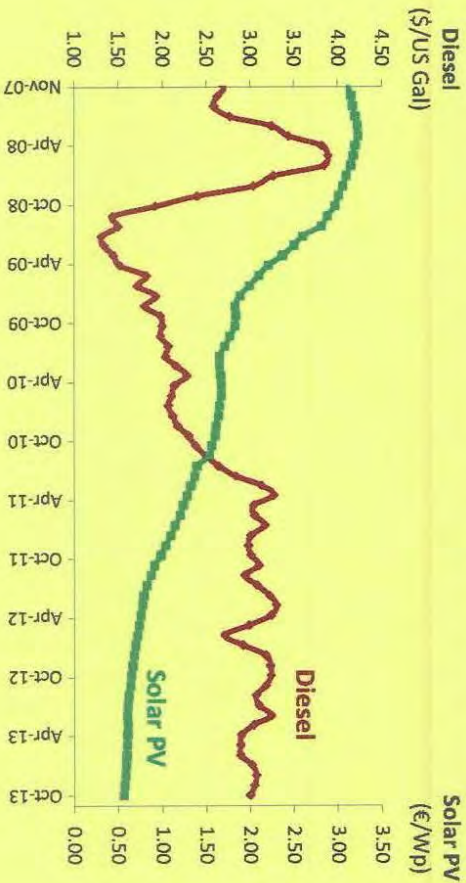
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Economic Advantage of Hybrid System

Why hybridize diesel with solar? Because solar is rapidly getting more competitive...

Diesel world market price vs. cost of solar PV



- Solar prices have dropped dramatically since 2008, due to increase in industry-scale driven by expansion of manufacturing capacity in China
- Diesel prices are volatile and follow the general upward trend of global oil prices

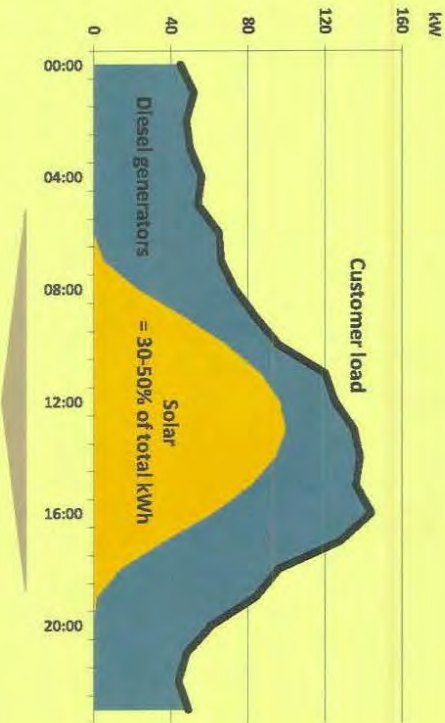


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Economic Advantage of Hybrid System

Solar-diesel hybrid systems can generate fuel savings of 30-50%¹⁾

Solar-diesel hybrid system overview



Battery storage could raise the solar share further but is not cost effective at current prices²⁾

Notes

- Depending on the shape of the customer load curve, solar can cover 30-50% of energy needs, without expensive battery storage
- Diesel generators (DG) make up the remainder
- Without battery storage, usable solar capacity is limited by the customer's load close to noon (when solar produces the most output)
- Demand side management can increase the solar share further

¹⁾ Even without battery storage

7

²⁾ Batteries roughly double the effective cost per kWh





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Need to Replace Loss of DOD Fuel

Hybrid Solar PV/Diesel as Feasible Short-Term Solution

- Existing Idle USAID-built 6-MW Cummins Diesel Power Plant at Shorandam Power Station I (SPS) ideally suited for use in Innovative Hybrid Solar PV /Diesel Power System for USAID-expanded Shorandan Industrial Park (SIP)
- Afghan-American Businessman with Solar PV Expertise Owns 750-acre Site Near SPS Suitable for up to 50 MW Solar PV Array
- Medium Voltage (20 kV) distribution system at SPS can supply 200 businesses in SIP (plus commercial airport and new ag university) on isolated basis by 6-MW diesel plant

USAID Built Diesel Plant at SPS





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Property Proximity to SPS

Aerial View of Site for Hybrid Solar PV/Diesel Power System & SIP Businesses



Date of Aerial Shot: May 25, 2010

*Image redacted based on request by USAID for security purposes

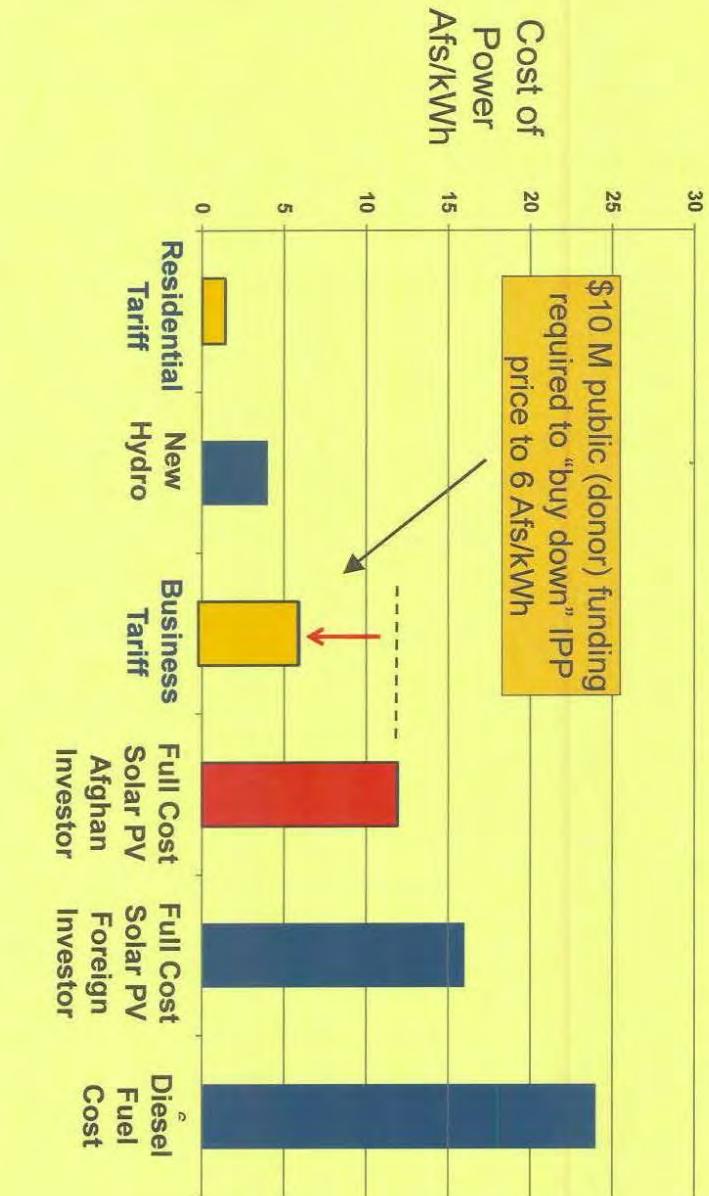


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Power Costs in Kandahar

Need for Public-Private Partnership Financing Approach

Cost of Solar PV in Afghanistan \$3-4/wp; 5 MW plant = \$15-20 M





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Independent Power Producer (IPP) Business Model

- Many electric power utilities around the world use IPPs to out source power generation to private investors
- IPP business model allows public utility to focus on transmission, distribution and customer service
- IPPs invest their own funds in a generation source this is connected to grid and sell power to utility under 10 to 15 year contract
- IPP is responsible for construction and O&M and only gets paid for power produced and delivered to grid





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Way Forward as IPP & PPP Project

1. Solar PV proponent applies for IPP license from MEW [REDACTED]
2. Load test performed to determine time-of-day use of SIP businesses
3. DABS , PGOV & Local Officials formally request reprogramming of FY'14 AIF funds to support "next ring" for "bridging" Solar PV & Dahla hydro projects
4. If USG funds become available, they would be transferred to DABS
5. DABS issues "program interest notice" soliciting RFPs for IPP project(s) in Kandahar
6. If USG fund received, DABS issues RFP for purchase of solar panels & hardware from US solar PV manufacturer to support the competitively selected IPP project
7. DABS executes Power Purchase Agreement (PPA) with selected IPP venture under this person's IPP license with MEW
8. IPP agrees to 6 Afs/kwh selling price in exchange for DABS providing solar panels & other hardware for 5 MW solar PV project [REDACTED]
9. Selected IPP performs at his cost all work to construct, operate, maintain and provide security for 5 MW solar PV array on his land; gets paid only for power delivered
10. DABS erects power line from SPS to IPP's property and supplies step-up transformer; DABS operates 6-MW diesel plant to supply supplemental power for 24/7 service

*Image redacted based on request by USAID for security purposes



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Positive Outcomes for All Parties

- 200 existing SLP businesses with 5,000 employees get 24/7 power at 6 to 12 Afs/kWh price (depending on how much diesel power they use) after DOD diesel subsidies end
- Idle USAID-funded diesel plant at SPS is placed in service under innovative & sustainable hybrid scheme
- US solar company gets reference hybrid solar PV/diesel plant in this part of world (this was big plus for SunEdison)
- DABS does its first solar PV, its first IPP, and its first PPP project and sets precedent for similar projects elsewhere where affordable and reliable grid power is not available
- USG make goods on its 4-year-old promise to the Kandahar PGOV and SLP business owners (who invested in new businesses based on this promise) to “bridge gap” from the end of the diesel subsidies until new imported power arrives