

# *Afghanistan Energy Study – Progress Report*

*Afghanistan Energy Study – Fifth Technical  
Committee Meeting  
January, 2018*



**WORLD BANK GROUP**  
Energy & Extractives

# Background and Rationale

---

Develop an understanding of the energy sector that will inform investments that aim to increase accessibility to affordable and sustainable energy.

A 3 year, five part series of complementary assessments and surveys:

Activity 1: Transactions Advisory and Knowledge Sharing

Activity 2: Financial, Economic and Community modality assessment

Activity 3: Household and Enterprise Energy Diaries

Activity 4: Development of a Least-Cost Electrification Plan

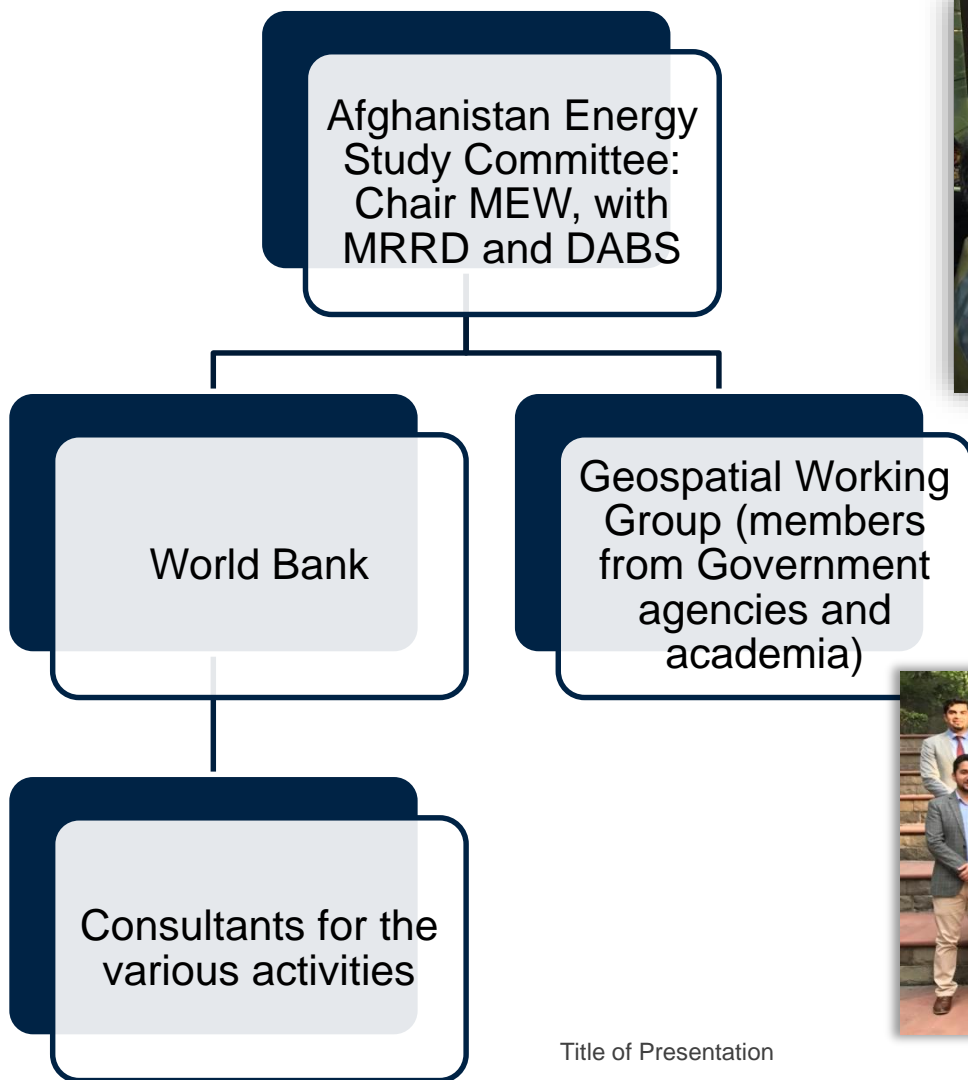
Activity 5: Institutional Assessment and Development

*Activity 6: Afghanistan Renewable Study*

End-goal: Develop Project Prospectus for On & Off Grid Electrification of Afghanistan against which donors, private sector and government can pledge.

**Extended from June 30, 2018 to June 30 2019.**

# Institutional Structure for the Study



Title of Presentation

# Activity 1: Transactions Advisory and Knowledge Sharing

## Activity Summary

The objective of this assignment was to lay the groundwork for Activities 2 through 5 in terms of on-boarding the key officials of the responsible ministries (MEW and MRRD); preparation of Terms of References and undertake stakeholder consultations. A gender-energy linkages report was also drafted.

## Current Status

The timeline envisaged for this Activity at the Concept stage was one year and key initiatives planned under this activity has been completed. The main outputs from this activity has been:

- Formation of Technical Committee
- ToRs for main components ready
- Gender Energy Note disseminated extensively and finalized
- Draft Energy Access and Consumption Note prepared.

## Next Steps and Key Timeline

Activities under this component are complete. However, gender-energy linkages report is being updated ahead of publication.

- Need more information on energy efficiency to close the information gap

## *Gender-Energy Linkages Report – More Information on Energy Efficiency Is Needed*

### **Energy efficiency initiatives aim to:**

- Reduce high initial cost of energy efficiency interventions
- Improve institutional capacity regarding energy efficiency interventions
- Drive behavioural change

**Gender aspects should be included** into financing mechanisms, awareness campaigns (demonstrating cost savings and co-benefits), consumer behavioural change initiatives, and institutional capacity

### **To finalize this section, any information on the following aspects is welcome:**

- Energy efficiency issues/challenges in Afghanistan
- Energy efficiency data in Afghanistan (e.g. initial cost, technologies available, etc.)
- Institutional capacity (e.g. policies, departments, etc.)
- Past, current or planned energy efficiency interventions in Afghanistan (including financing mechanisms, awareness campaigns, etc.)

# Activity 2: Financial, Economic & Community Modality Assessment

## Activity Summary

This Activity will be focusing on a sample of around 8000 ongoing and completed electricity sub-projects under the National Solidarity Program (NSP)/MRRD and use the same to carry out a financial and economic analysis to understand the (i) cost-efficiency in delivering electricity sub-projects through a community driven development type approach such as NSP; (ii) economic impact of micro-hydro power MHP, solar and mini and on-grid sub-projects; (iii) functionality, O&M needs, cost recovery and other factors that affect sustainability of these schemes. The analysis will also include an assessment of the community modalities necessary for modern energy service delivery, including to understand the (iv) effectiveness and sustainability of using a community led implementation modality for energy delivery and Operations & Maintenance; and (v) exploring community buy in for large scale infrastructure investments. The Activity is expected to be completed by December 2018.

## Current Status

Evaluation complete, and contracting underway.

## Next Steps and Key Timeline

Inception report and selection of key projects/provinces where the analysis is to be conducted

March 2018

## *How to Target Site Visits?*

Expected review effort –

- 8,000 projects for typology;
- 100 - 200 projects for phone interview;
- 15 - 25 projects for site visits.

# Activity 3: Household and Enterprise Energy Diaries

## Activity Summary

This Activity will comprise of a household and enterprise survey, whose main objective would be to assess energy consumption patterns of various fuels by rural and peri-urban households, community institutions and small scale enterprises and the financial implications and opportunities for scaling up energy services provision to the same. The survey tools to be used for collecting information from households, community institutions and small enterprises will be different – while traditional surveys will be used to gather information on community institutions and enterprises as well as demographic and socio-economic characteristics of households, a diary method will be used to gather energy consumption and expenditure related information from households. The Activity will be completed by mid 2019.

## Current Status

Samuel Hall has been recruited to undertake the survey. They have finalized the questionnaire to start the trial test for the survey in Kabul Province before the end of this year.

## Next Steps and Key Timeline

Pilot surveys to be conducted/underway.

Completion expected by end of February 2018.



# Activity 4: Development of a Least-Cost Electrification Plan

## Activity Summary

Based on a sound economic analysis of the different technology options, forecasted energy demand and energy resources' potentials, the proposed activity will use proven methodologies to spatially identify and prioritize areas that should be electrified either (i) by extension of the national grid, based on the national government's generation and transmission development plans (including plans for imports) or (ii) through the provision of decentralized energy systems such as mini grids (diesel, hybrid diesel-renewables or renewables -especially small hydro-) and individual systems (i.e. Solar Home Systems). This assignment is being carried out in two phases.

## Current Status

The Phase 1 of the assignment was completed with a last geospatial working group meeting held in July 2017 in Dubai. Phase 2 terms of reference have been completed. The Geo-spatial working group – consisting of nominated representatives from MEW, MRRD, KPU, AGCHO, CRIDA and DABS – met in December, 2016, February, 2017, and July 2017. The Working Group has been trained on the ONSSET software in New Delhi in February, 2017, and in Dubai in July, 2017.

## Next Steps and Key Timeline

- |  |               |
|--|---------------|
| <ul style="list-style-type: none"><li>- The launch of procurement of Phase 2 is linked to the availability of funds. Once these have been mobilized, Phase 2 can commence.</li><li>- Operationalizing the geospatial committee to advise government on Kajaki electrification.</li></ul> | February 2018 |
|--|---------------|

# From Phase 1 first publications getting ready...

**AFGHANISTAN ENERGY STUDY**

**A GIS APPROACH TO PLANNING ELECTRIFICATION IN AFGHANISTAN**

Alexandros Korkovelos, Morgan Bazilian, Dimitrios Mentis, and Mark Howells

Logos at the bottom: WORLD BANK GROUP, ESMAP, Australian Aid, KTH, and a circular logo.

WORLD BANK GROUP  
Supported by ESMAP  
2017/85

**liveWire**  
A KNOWLEDGE NOTE SERIES FOR THE ENERGY & EXTRACTIVES GLOBAL PRACTICE

**THE BOTTOM LINE**

A new database of geospatial information and a related model allow Afghani planners to estimate, analyze, and visualize the most cost-effective electrification options for the achievement of electricity access goals. The tool is focused on the assessment and deployment of primarily renewable technologies to “ensure access to affordable, reliable, sustainable and modern energy for all” (Sustainable Development Goal 7).

**Alexandros Korkovelos** is a research engineer in the Division of Energy Systems Analysis (dESA) of Sweden’s KTH Royal Institute of Technology.

**Morgan Bazilian** is a lead energy specialist in the World Bank’s Energy and Extractives Global Practice.

**Dimitrios Mentis** is a lead researcher in dESA.

**Mark Howells** directs dESA and holds the chair of energy systems analysis at KTH.

**A GIS approach to planning electrification in Afghanistan**

**Why is this issue important?**

**Electrification promises significant social and economic returns in Afghanistan**

Access to affordable and reliable electricity is essential to the success of any economic growth strategy. Yet the percentage of the population with access to grid electricity in Afghanistan is among the lowest in the world. Per capita consumption averages 186 kilowatt-hours (kWh) per year, significantly less than the South Asia average of 707 kWh and far below the global average of 3,126 kWh (based on authors’ calculations and 2014 World Bank data). Accessing the electricity grid remains a serious challenge in rural areas, where three-quarters of Afghans live and only 11 percent are connected to the grid (CSO 2016).

On a national level, one significant barrier to Afghanistan’s electrification is the lack of a “bankable” investment plan. While a least-cost expansion plan exists, it has not yet been translated into actionable targets and timetables.

The study summarized here (Korkovelos and others 2017) offers an initial, “quick pass” analysis of the technological options and investment requirements necessary to boost electricity access levels in Afghanistan. It is part of the World Bank’s wider effort to provide an updated assessment of the energy sector so as to enable the national government to make energy investments that will widen access to affordable and sustainable energy. This effort—called the Afghanistan Energy Study—is a five-part series of complementary assessments and surveys being conducted over a period of four years (from June 2015 to June 2019). Its five parts are as follows:

- Transactional advice and knowledge sharing
- Financial, economic, and community assessment
- Collection of household and enterprise energy diaries
- Development of a least-cost electrification plan and investment prospectus
- Institutional assessment

The study on which this Live Wire is based corresponds to the fourth of these five parts. It aims to provide a sense of the scale of the investments needed to electrify the country and to inform a more detailed analysis.

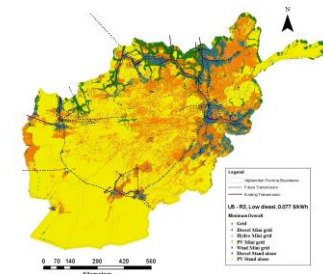
**How can access be improved?**

**Through careful planning and solutions that take into account “spatial diversity”**

The recent experience of electricity utilities in many developing countries has shown that spatial diversity—that is, diversity in demographic attributes, terrain types, wealth levels, access to infrastructure, resource availability, and other factors—affects the planning of electrification. These factors need to be captured quantitatively and with local specificity using a data-modeling platform that will allow users to view, share, and modify underlying data and assumptions.

The widespread availability of new and low-cost geospatial information and tools greatly reduces the costs of mapping resources and compiling geospatial datasets, which, in turn, permit the rapid creation of electrification plans with quantitative and spatial specificity and accuracy.

## Activity 4: Phase 2



- Take results from GIS planning Phase 1 and provide detailed plans and focus for next 5-10 years at the distribution level.
- It will also build on the 2013 Power Sector Plan, while updating or refining some of the assumptions and analysis in that work.
  - A focus on 5-7 Provinces
  - Include detailed power flow modelling
  - Include detailed infrastructure modelling
  - Include detailed investment planning
  - Develop an Afghan “in-house” updateable, least-cost electrification model and associated data platform.

# Activity 5: Institutional Assessment and Development

## Activity Summary

The key objective of this Activity is to do a thorough institutional assessment of MEW and MRRD in order to understand their ability to expand energy supply to rural areas either via on or off grid endeavors and the institutional ability to technically support, finance as well as maintain such schemes. It will involve among other activities a technical skills assessment for future investment operations, develop a capacity building plan and associated roadmap for the medium to long term and the provision of trainings and knowledge sharing events across ministries and other relevant entities both locally and internationally and development of a capacity building roadmap for the sector. This activity is intrinsically linked with the outputs of Activities 2 – 4. The Activity will be completed by December 2018.

## Current Status

The scope of work needs to be discussed with the Afghanistan Energy Study Committee. The study should benefit from the findings of earlier studies conducted under the overall program.

## Next Steps and Key Timeline

|  |             |
|--|-------------|
| <i>Finalize ToR and REoI</i>                     | March 2018  |
| <i>Advertize EoI</i>                             | April 2018  |
| <i>Selection of Firm and Signing of Contract</i> | August 2019 |

## *Institutional Analysis*

What areas to focus on?

- MEW and MRRD only, or also DABS?
- Divide on-grid and off-grid electrification?
- Should regulation be discussed?

What format to choose?

- A single consulting firm to do the assignment?
- A working group of government with input from individual consultants?

# Next Steps

- AES to be extended to June 2019 to complete;
- Next Afghanistan Committee Meeting to be scheduled for 10 April 2018;
- Micro/mini hydro learning tour to Nepal October 2018;
- Visit to India to Learn About Roof-top Solar Program – to be scheduled;
- Raise further funds to complete activities and complete procurement.

**THANK YOU**

تشكر

