

# Turning on Myanmar's Lights

## *Integrated Energy Development Study: Proposed Phase Two Fieldwork Initiative*

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Economic Research Institute of ASEAN and East Asia



**Fieldwork Team Meeting with Deputy Ministry of Energy and Director  
General of Ministry of Agriculture and Irrigation in Naypyitaw**

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## ***Background***

Following-up on initial Integrated Energy Development (“IED”) research conducted by University of Tokyo (“UT”) in cooperation with KWR International (Asia) Pte. Ltd. (“KWR”) in 2012 and early 2013, Phase One Fieldwork was conducted from May–August, 2013.

This work served as energy contribution for MCDV and included identification of data gaps & further evaluation of environment for IED in Myanmar.

A special emphasis was placed on evaluating prospects in different geographic areas around three themes:

- 1)Grid Extension,**
- 2)Regional Integration & International Cooperation, and**
- 3)Off-Grid Development.**

# Fieldwork included 50+ interviews during one or multiple visits to:

**Monywa**  
**Mandalay**  
**Bagan/Nyaung-Oo**  
**Patheingyi**

**Pyin Oo Lwin**  
**Kengtung**  
**Tachileik**

**Over 50+ additional meetings and interviews were held in Yangon, Naypyitaw, Bangkok, Singapore and other locations**



**Singapore**

*Over 50+ additional meetings and interviews were held in Yangon, Naypyitaw, Bangkok and Singapore and other locations, with entities including:*

- Myanmar Ministry of Energy;
- Myanmar Ministry of Electrical Power;
- Office of the President of the Union of Myanmar;
- Myanmar Ministry of Agriculture and Irrigation;
- Myanmar Ministry of Science and Technology;
- Myanmar Solar Energy company;
- Myanmar Engineering Society;
- Renewable Energy Association of Myanmar;
- Large and Mid-sized project developers and industrialists;
- Social Enterprises and Micro-Finance Institutions;
- World Bank, ADB and other donors;
- Fund managers and investors; commercial and trade officers; lawyers and accountants; analysts; journalists and other targeted individuals.

In addition, a **Second Integrated Energy Key Stakeholders Meeting was held in Naypyitaw on June 17-18** and **ERI-UT Joint Conference on Energy Integration in Myanmar: A view from abroad in Bangkok on June 24**. Initial efforts were also undertaken to encourage formation of Integrated Energy Experts Working Group, consisting of senior govt. officials and private sector representatives.

# ***Bagan/Nyaung-Oo: Accommodating Tourism Growth and Agricultural Viability***



**Bagan possesses dramatic potential for tourism development**



**Meeting with villagers and officials at pumping station**

- *Bagan is a burgeoning tourist destination in Upper Myanmar, and neighboring Nyaung-Oo, is populated mostly by farmers;*
- *This area underscores challenges as Myanmar opens to world and seeks to balance emerging industries such as tourism with agricultural sector.*
- *Area demonstrates importance of strong village-level leadership in organizing and financing electricity access, as national ministries prioritize township- over village-level grid connection and struggle to coordinate supply-demand policies.*

# ***Monywa: Examining the Potential for Off-Grid Alternatives including Solar***



**Solar US\$74 lighting kit for villagers in Sagaing Division**



**Meeting with village leaders in Monywa**

- *Nearly 75% of Myanmar's population does not receive electricity from national grid; Cost of extension is high, particularly in low-density areas, such as Sagaing where Monywa is located;*
- *Monywa region highlights potential for off-grid alternative energy;*
- *Solar in particular is important given high sun intensity and local govt. efforts to subsidize access and financial assistance; and*
- *This represents a potential model to help Myanmar meet needs of villages located far from the national grid.*

# ***Mandalay: Balancing the Needs of Urban Industry with Rural Agriculture***



**Aung Naing Thu Family Co. foundry in Mandalay**



**Hydropower Turbine being installed near Mandalay**

- *Mandalay highlights disparity between urban and rural populations.*
- *Moreover, income inequality, including between farmers & livestock/day laborers, appears to hinder communal payment structures.*
- *Industrial users are interested in helping government generate additional capacity, but regulatory framework has to be developed.*
- *Moving forward, Myanmar between expectations of urban centers, foreign and local industrialists and the 70% of citizens that live in rural areas – and who have rapidly rising expectations about their ability to improve their living conditions.*

# ***Pathein: Powering Economic Development through Grid Extension & Gasification***



**Agricultural Ministry Gasifier near Pathein**



**Grid Extension in  
Taungyargon village**



**MOEP Substation Installation near Pathein**

- *Pathein reflects Myanmar's challenge of meeting growing industrial demand for electricity, without compromising local agriculture and fisheries, supply will need to be increased drastically and rapidly.*
- *Pathein is situated in Delta, a rainy area so solar is less an option, however, agricultural production is high, and gasification seen as viable energy source.*
- *One village recently established connection to national grid and has seen marked improvements in living standards as a result of affordable electricity access.*
- *This includes a reported ten-fold increase in land values.*



# ***Pyin Oo Lwin: Examining the Feasibility of Off-Grid Mini-Hydroelectric Schemes***



Mini-hydro installation in waterfall



Restaurant w/Refrigerator, Lights and TV powered by mini-hydro on left



Hydro facility w/ equipment dating back to 1932

- *A former colonial outpost, Pyin Oo Lwin, exemplifies potential for hydropower, in particular for off-grid and small-scale use where population density and conditions allow it. Nonetheless, challenges to hydroelectricity were also visible, from a lack of surge protection to variations in supply due to weather and other factors.*
- *Certain consumers, however, expressed a desire for solar panels over hydroelectric turbines, underscoring the importance of in-depth and region-specific price comparisons for various energy sources.*

# ***Tachileik: Obtaining Electrical Capacity Through Cross-Border Arrangements***



**View of Tachileik**



**Rice Mill Powered by Gasifier Outside Tachileik**



**Meeting with Tachileik MOEP Rep and Town Committee**

- *Bordering Thailand, Tachileik is one of a few areas in Myanmar that purchases electricity from a neighboring country. Similar activity been reported in Kachin and No. Shan State with China and Kayin State further south along Thai border.*
- *Tachileik illustrates utility of cross-border integration.*
- *Such cross-border understandings, which have underpinned relatively strong growth of region, can help guide Myanmar's policies on FDI in electricity sector.*
- *These arrangements may grow in prominence and importance as ASEAN moves toward regional integration by 2015.*

# ***Kengtung: Powering Off-Grid Locations Beyond the Micro-Level***



**Kengtung from Lakeside**



**Solar Panel in Use in  
Downtown Kengtung**



**Hydropower Facility in Kengtung**

- *A relatively large but isolated township in Eastern Shan State, Kengtung highlights potential for hydropower to provide electricity to off-grid locations on a scale beyond that of the village level.*
- *MOEP-run projects here differ from those in other areas, as they do not supplement grid or small-scale generators, nor are they designed to supply small, isolated and geographically challenging villages, where grid connection is not feasible.*
- *While Myanmar has plans to extend its grid to all corners of the country, in the interim, off-grid Ministry-run projects, like those in Kengtung, play an important role in filling gaps in the nation's ability to supply expanded electricity distribution*

## ***Proposed Phase Two Fieldwork***

To promote Integrated Energy Development in Myanmar, and to provide depth and substance to the three core themes of: *grid development, cross-border/regional integration and off-grid* identified in earlier research, proposed Phase Two fieldwork includes:

- Fieldwork: Cost Evaluation/Exploratory/Analysis-Integration
- Fieldwork: Exploratory Site Visits
- Fieldwork: Examination of Myanmar-Thailand Energy Relationship
- Fieldwork: Myanmar Integrated Energy Report
- Fieldwork: Conference/Seminars/Training
- Fieldwork: Planning / Preparation / Administration

## ***Fieldwork: Cost Evaluation***

- Development of model, to identify and evaluate the cost factors that help determine viability of different electrification options in Myanmar.
- The model will help assess demographic and geographic factors, distance from grid, income, demand, capital and variable inputs, as well as intangible factors such as approvals or licenses that cannot be evaluated strictly on quantitative basis.
- The Fieldwork Team to travel to targeted locations and enter data allowing approximate cost estimate of comparative options. This will be supplemented with interviews and data to give further insight into regional resources, competitiveness and economic base, future prospects, per capita income and other economic data, as well as prospects for future growth and development.
- Five site visits will be conducted to locations within Myanmar that face different geographic, economic and social issues that influence electrification strategies.
- Options include: Pathein, Pyin Oo Lwin, Monywa, Lashio & Kengtung.

## ***Fieldwork: Exploratory Site Visits***

- KWR will conduct additional “exploratory” fieldwork as conducted during first phase, in which primary objective is broad understanding of respective location and economic base as well as “unique” characteristics in terms of energy/electrification.
- Project Director, Analysts, Advisors and/or Local Representatives will take short trips to visit villages, government offices, factories, and other locations as possible. This include villages industrial parks, tourism facilities, generation plants, pumping stations, government offices, factories, etc. It is envisioned three exploratory site visits will be made from locations potentially including:
  - Muse: border city with China in Northern Myanmar;
  - Chaungtha: site of non-functioning NEDO project in area south of Yangon;
  - Sadoway: emerging off-grid tourism area in Myanmar;
  - Mawlamyine: gateway to Thailand in SE Myanmar south of Thaton Gas Turbine Station (scheduled to be upgraded with \$140 million WB loan);
  - Dawei: visit to Dawei, site of planned SEZ project.

## ***Fieldwork: Integration & Analysis***

- As cost valuation and exploratory Fieldwork Site Visits are concluded, Project Team will focus on reviewing data generated as well as supplemental information generated through meetings in Yangon, Naypyitaw and other locations;
- This includes work to generate quantitative data and analysis to help determine average income of households in area and how they relate to energy/electricity demand/consumption as well as regional and national factors, resources, constraints, indicator and other important information;
- KWR will also work with UT to support its efforts to compare Myanmar to successful off/mini grid and renewable power generation in other areas of ASEAN and region; and
- The results will then be integrated into a final report, which will both make maximum use of the data generated as well as outline potential direction, conclusions and recommendations moving forward.

## ***FW: Exam of Myanmar-Thai Energy Relationship***

- Support and facilitate research effort UT will undertake with Chula to analyze Myanmar-Thai energy relationship from a Thai perspective, including:
  - Assistance in preparation of proposed tentative outline for research study;
  - Coordination with UT and Chula to determine optimal work plan and scheduling;
  - Supplementing UT/Chula research in Myanmar through interviews and identification of supporting data;
  - Conducting supplementary & interviews during planned site visits to generate data for UT/Chula study;
  - Facilitation/participation in scheduled interviews/site visits as schedules permit;
  - Reasonable advisory support as desirable to assist UT/Chula in Thai activities;
  - Support for UT/Chula's efforts to analyze/integrate Myanmar data/ interviews etc.;
  - Advisory support to facilitate editing and preparation of final report.



## ***Fieldwork: Myanmar Integ. Energy Dev. Report***

- KWR/UT/ERIA has produced a substantial amount of important information -- which until now has only been released to internal - rather than broader audiences;
- More effective/wider release of this material, will boost and deepen UT/ERIA's network in Myanmar, as well as its ability to source information/conduct research;
- Initial background review and work will be updated and integrated with Phase One as well as other fieldwork and info assembled as part of this initiative.
- Upon approval of draft, report will be distributed for comments and review. The issues presented will be discussed in Stakeholder and/or Expert meetings.
- The draft will then be revised and updated with any data available from Phase Two Fieldwork and formatted for broad release.

## ***Fieldwork: Conferences/Seminars/Training***

- KWR will coordinate with ERIA/UT to help plan and tentatively schedule a series of conferences, workshops and seminars from December – June, which will be organized by ERIA/UT and affiliated entities including Chula in Bangkok or in Myanmar in cooperation with UMFCCI, the Myanmar Industry Association or government entities in Naypyitaw or Yangon. This potentially includes:

December	ERI-PARI Joint Workshop in Bangkok
January	1st Private Meeting with MIA in Yangon
February	3rd SH Meeting/1st Energy Experts Meeting in NPT
March	2nd Milestone Meeting in Chula
April	2nd Workshop with MIA in Yangon
May	2nd Energy Experts Meeting in NPT
June	3rd Chula Meet - 4rd MIA WS in Tokyo, NPT or SIN