

Project Title	Mongolia Energy Sector Technical Assistance: SCADA Diagnosis and Upgrade Concept Preparation
Contracting Agency	International Bank for Reconstruction and Development (The World Bank)
Project Organization	Prime Contractor: Savu C. Savulescu from Energy Consulting International, Inc. as an Independent Consultant, with full responsibility for all the technical and project management aspects of the project
Summary	<p>The project encompassed an assessment of existing SCADA and system/data maintenance processes owned by National Dispatching Center (NDC) of Mongolia, and the design and delivery of training workshops to improve operational as well as system/data update skills on SCADA. The overall objective was to support the NDC and other stakeholders in improving power systems data management, as well as better integration and operation of renewable energy generation sources. The specific objectives included a detailed review to understand what SCADA functions and adequate processes at the NDC for SCADA data quality maintenance are necessary to have; and on-site training to build capacity to manage future SCADA operations and upgrades.</p>
Background	<p>A review by the World Bank of power system operations in Mongolia has revealed that there are many manual and potentially sub-optimal processes that could affect both the costs of operations and the reliability of the power system. The NDC has a competent SCADA/EMS supplied by Siemens in 2005 and an associated Dispatch Training Simulator (DTS). However, it appears that practically not all of the functionality offered by these systems is used or usable by NDC staff. It seems that at present the primary function of the control room facilities is to display SCADA values on a wall board display. All dispatch instructions are manual (by phone) and it appears that less on-line security analysis or dispatch functions are used.</p> <p>The review has highlighted a number of issues that should be addressed:</p> <ul style="list-style-type: none">- SCADA systems are inaccurate and inadequate in scope;- DTS, which represents a significant investment, is not operating as intended, mainly because of SCADA issues;- Manual dispatch will become less viable as new private investors build renewable energy generators and there will be an increasing reliance on market tools to manage and optimize dispatch
Objectives	<p>The project objectives were formulated by the World Bank in the <i>Terms of Reference Mongolia Energy Sector Technical Assistance : SCADA Diagnosis and Upgrade Concept Preparation</i> and encompassed:</p> <ul style="list-style-type: none">▪ Detailed review to understand the needs in terms of<ul style="list-style-type: none">▫ SCADA functions and adequate processes at the NDC▫ SCADA data quality maintenance

Scope of Work

- On-site training to build capacity to manage future SCADA operations and upgrades

The scope of work encompassed the following activities:

- Task 1: Background data preparation, including:
 - Subtask 1-1: draft preliminary questions, training program outline and on-site mission agenda
 - Subtask 1-2: prepare detailed questionnaire
 - Subtask 1-3: discuss questionnaire and training plans with WB
 - Subtask 1-4: develop initial draft of training materials to cover General SCADA fundamentals and International experience in SCADA upgrades
- Task 2: On-site Training and Capacity Building (field trip to Ulaanbaatar), including:
 - Subtask 2-1: conduct kick-off meeting, initial interviews with NDC personnel and on-site information gathering
 - Subtask 2-2: expand the initial draft of training materials prepared in the course of Task 1 to cover the talking points for interactively reviewing with NDC the existing SCADA situation in Mongolia, and the SCADA upgrade concepts suitable for Mongolia NDC
 - Subtask 2-3: perform formal training
 - Subtask 2-4: conduct a wrap-up meeting
- Task 3: SCADA Diagnosis and Upgrade Concept Preparation:
 - Subtask 3-1: assessment of the physical and operational conditions of the SCADA currently used in the NDC, including: a diagnosis of the existing SCADA/EMS and DTS, and the preliminary assessment of the RTUs and the supporting telecommunication system(s)
 - Subtask 3-2: develop and document the key characteristics of SCADA upgrade three concepts, encompassing: minimum update/upgrade; upgrade with recommendable additional functionality; total replacement
- Task 4: Preparation of Final Report

Both the project goals and the scope of work were fully met and exceeded. As specified in the ToR, the deliveries encompassed the:

- Field-trip agenda and training course program and outline
- Discussion of the field-trip agenda and draft training materials with the World Bank
- Preparation of training material slides for the General SCADA Fundamentals workshop, including:

- Early SCADA/EMS Developments
- The State-of-the-Art SCADA/EMS: System Platform
- The State-of-the-Art SCADA/EMS: Data, Applications and Design
- Special Topics: Integrated Information Architecture for Electricity Markets
- Special Topics: Backup Control Center Architecture
- Data Collection and Telecom Primer
- International Experience in SCADA/EMS Upgrades
- Meetings with NDC Project Team and face-to-face training
- Preparation of the Final Report

**Period of
Performance** July - November 2017