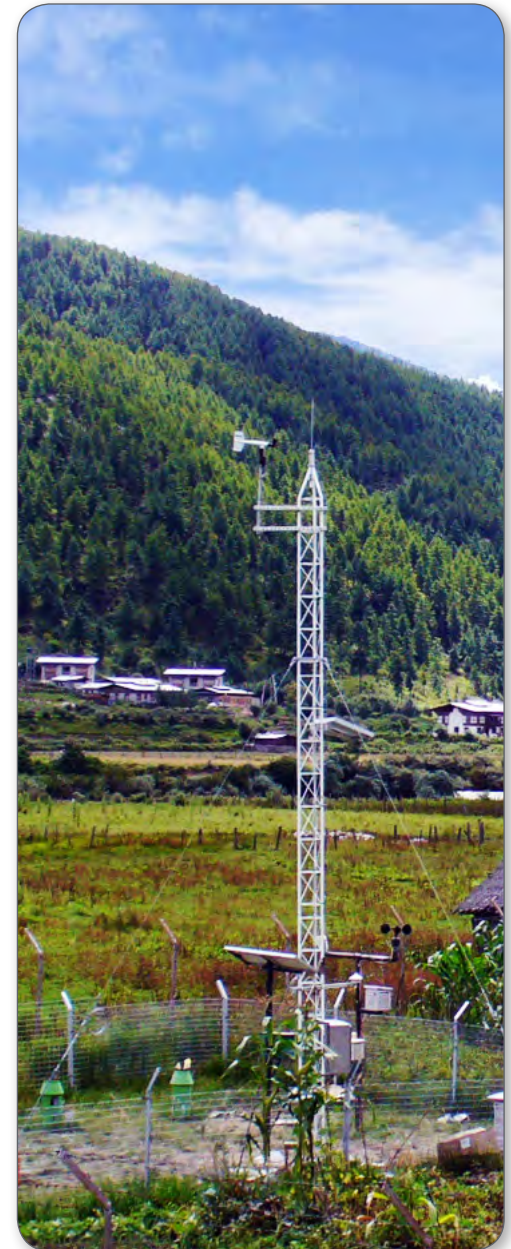


Bhutan - Automatic Weather Stations & Automatic Water Level Stations



Project Name Bhutan	AWS and AWLS
Project Location	Kingdom of Bhutan
Customer/Owner	Hydromet Services Division, Department of Energy, Ministry of Economic Affairs
Contact Information	Name: Karma Dupchu Title: Project Manager Email: kdupchu@gmail.com
	Name: Sangay Tenzin Title: Deputy Project Manager Email: sangaytenzin74@gmail.com
Contract Number	DOE/HMSD/Danida/2009-2010/208
Contract Value	\$112,700
Award Date	March 2010
Completion Date	August 2010
Equipment	<ul style="list-style-type: none"> ▶ Automatic Weather Stations (3) ▶ 5600-0200 Wind Speed / Wind Direction Sensor ▶ 5600-0120-1 Barometric Pressure Sensor ▶ 5600-0316-1 AT/RH Sensor ▶ 5600-0525-2 Tipping Bucket Rain Gauge ▶ 5600-0601 First Class Pyranometer ▶ MTCBA-G-F4 GSM Multi Tech Modem ▶ 9210-0000-2B XLite Data Logger ▶ Stainless Steel NEMA 4X enclosure with MS connectors ▶ Automatic Water Level Stations (2) ▶ 7005400 Universal Laser Sensor ▶ MTCBA-G-F4 GSM Multi Tech Modem ▶ 9210-0000-2B XLite Data Logger ▶ Stainless Steel NEMA 4X enclosure with MS connectors
Telemetry	Data is sent from the 5 remote stations to the National Weather Forecasting and Warning Center (NWFFWC) via SMS message through the GSM Multi Tech modem. A text message is built each hour based on data from the sensors and then sent to the Control Center. The interval for this delivery of data can be changed remotely via text message. Current data can also be requested via text message at any time.
Scope of Work	The 5 DCPs were built and integrated in our ISD Lab here in Virginia. The sensors and hardware were tested prior to shipping. Telemetry was also tested prior to shipping. Our local partner Tshomo Geo-Tech Enterprise worked with HMSD to finalize the locations of the stations and to design and manufacture the masts for the AWLS stations. HMSD was responsible for the civil works. There was no formal training provided as part of the project. Sutron provided informal training to HMSD and TGTE regarding installation and operation of the equipment. TGTE, with the help of Sutron installed all 5 stations.



Chamkar Automatic Weather Station (AWS)

<p>Problem Solved & Benefits of the Project</p>	<p>This System provided additional data to HMSD for their national data base. The major benefit to the customer was additional hydro-meteorological data for weather forecasting and flood warning. Both AWLS stations were added to locations where manual staff gauges were in operation. Automation will provide more timely access to the data. The three AWS stations were also added to existing manual weather stations. The AWS stations provide more up to date sensors as well as send the information automatically to the control center.</p>
<p>Project Challenges & Sutron's Solutions</p>	<p>The challenge for this project was designing the telemetry system to transmit the data via SMS to the control center in the correct format. We worked closely with the Asian Disaster Preparedness Center (ADPC) personnel to ensure that the data was calculated, logged and transmitted in the proper format</p>



AWS, Semtokha



Semtokha Weather Station



Tamchu Automatic Water Level Station (AWLS)



Yebessa AWLS Installation



AWS



AWLS



Semtokha Weather Station



Updated AWLS Laser Sensor