

Safeguarding the Pamirs

Early Warning System
at HPP Sebzor



Building Safety
Powering Resilience
Protecting Communities

The Challenge

High in the spectacular Pamir Mountains of Tajikistan, **Pamir Energy** is building the **HPP Sebzor Hydropower Plant**, a key project to deliver clean and reliable electricity to local communities.

Yet this breathtaking region faces an invisible danger — **glacial outburst floods (GLOFs)**.

When water trapped inside glaciers suddenly bursts out, it can unleash **massive flash floods** that race down narrow valleys, threatening lives, infrastructure, and progress.

Pamir Energy needed a **fast, reliable, and autonomous early warning system** to protect its workers and nearby residents — even in one of the world's most remote locations.

The Solution: A Smart, Autonomous Early Warning System

To meet this challenge, Pamir Energy implemented a **cutting-edge flood and flash flood early warning system**, combining advanced monitoring, smart communications, and automated alarms.

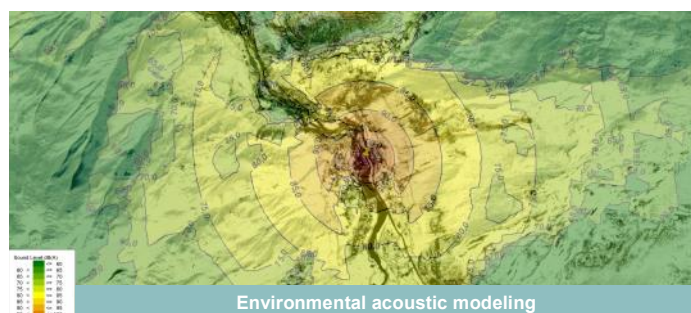
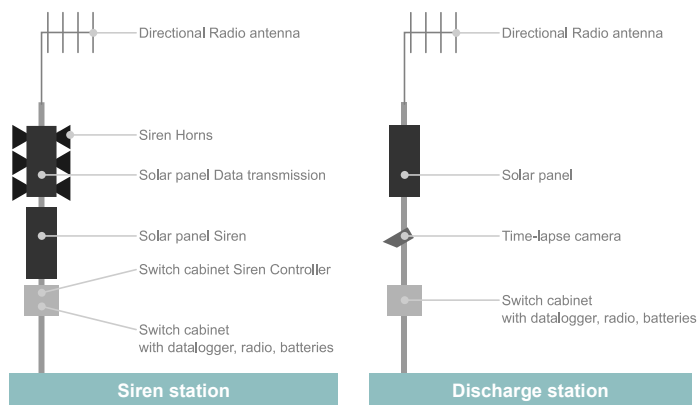
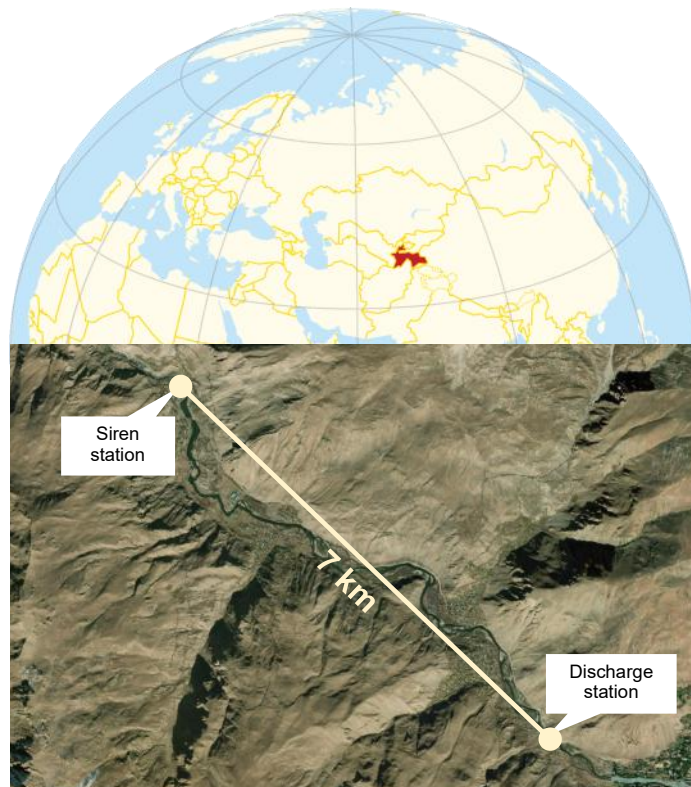
Two-Station Design

1. Discharge Measurement Station – 7 km Upstream

- Measures **water level, velocity, and discharge** with an RQ-30+ non contact radar sensor
- Powered **100% by solar energy**, ensuring continuous operation
- Sends real-time data via **GSM** to the **MDS Cloud Server**.
- Features a **direct radio link** to the siren station for instant communication, even when GSM is down
- Time lapse camera with picture transfer to MDS server
- Service switch to test system including radio and Alarm

2. Siren Station – HPP Sebzor Construction Site

- Receives live data from the upstream station every 30 seconds. Via Radio and GSM
- Activation can be triggered via radio or via GSM
- Automatically activates **six 115 dB sirens** (three facing upstream, three downstream) in under 30 seconds if flood thresholds are exceeded
- Siren placement was **acoustically modelled** to ensure maximum coverage in the valley.
- Allows customized **MP3 sound and voice alerts** for clear, localized evacuation instructions
- Stores all events in a **data logger** and reports automatically to the cloud



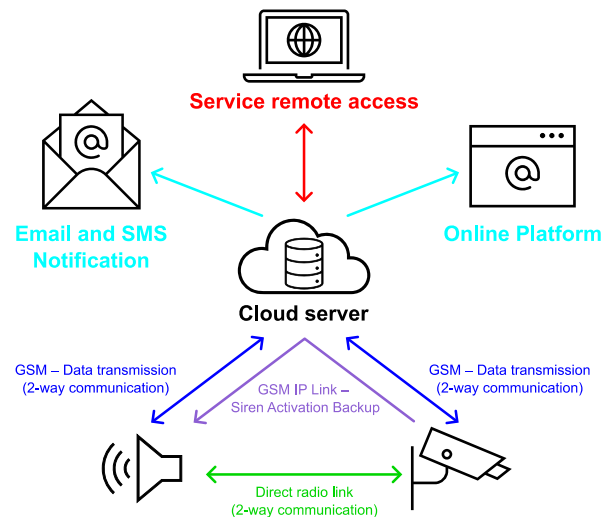
Smart Cloud Integration

All system components are connected to the **MDS Cloud Platform**, which acts as the digital command center.

It provides:

- Real-time data visualization of river conditions
 - Automated **SMS and email alerts** during abnormal readings or system faults or floods
 - Full **remote control and maintenance access** for operators of the Stations
 - Secure data storage and system health monitoring
- Even in extreme conditions, the system keeps communicating — keeping people informed, safe, and prepared.

The MDS cloud can be hosted by SOMMER or can also be installed locally at the customer server.



The Impact

The new system delivers powerful benefits for both safety and sustainability:

- **15-Minute Warning Time**
Enough to safely evacuate workers and warn residents downstream.
- **Full Autonomy**
Solar power and battery operation guarantee uninterrupted function, even during disasters
- **Dual Communication Paths**
Redundant GSM and radio connections ensure reliability in remote conditions
- **Community Protection**
Sirens are loud, clear, and precisely engineered to reach all areas at risk
- **Data-Driven Decision Making**
Real-time monitoring enables proactive maintenance and risk management



A Model for Climate-Resilient Infrastructure

Through the HPP Sebzor Early Warning System, **Pamir Energy** is proving that **technology and sustainability can coexist** — even in the most challenging environments.

This project not only safeguards lives and livelihoods in the Pamirs but also sets a **regional benchmark for climate adaptation and disaster risk reduction** in hydropower operations across Central Asia.

"Safety and sustainability go hand in hand. With this system, we ensure our people, our partners, and our communities are protected — every moment of every day." — Pamir Energy Project Team

In the Heart of the Pamirs – Innovation that Protects

The HPP Sebzor Early Warning System showcases Pamir Energy's **commitment to innovation, safety, and community well-being** — lighting up valleys not only with power, but with peace of mind.

