

# 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.

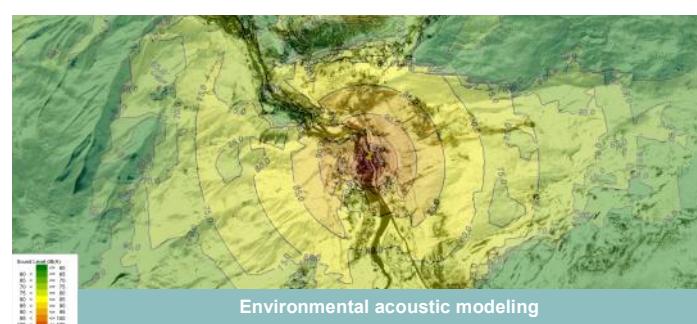
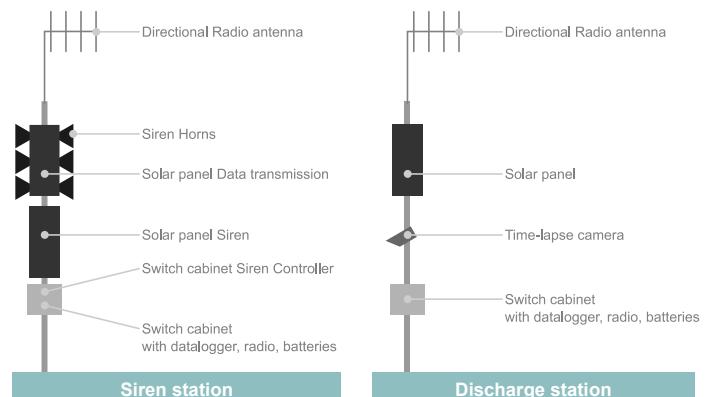
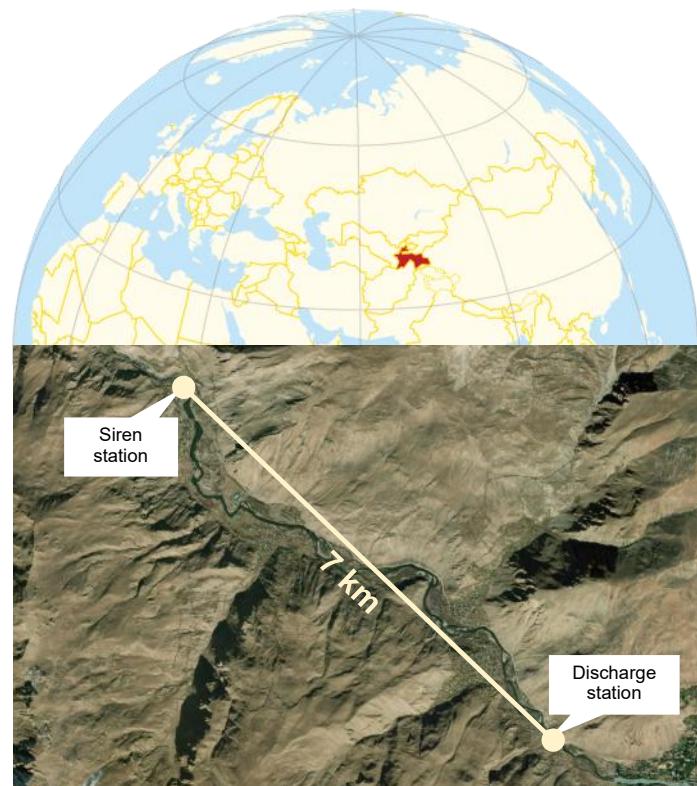
### Two-Station Design

#### 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

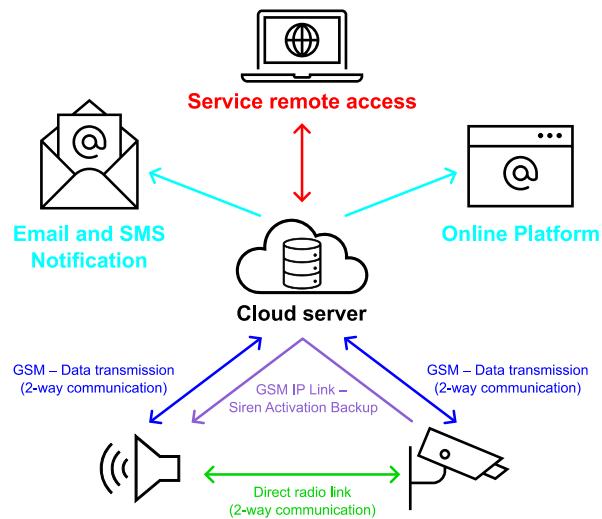
All system components are connected to the **MDS Cloud Platform**, which acts as the digital command center.

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



RQ-30+: Noncontact radar discharge measurement sensor

## 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



Siren station



Discharge station

## 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.