SOLUTIONS BRIEF

High power sirens for emergency warning in Huế City, Vietnam

Overview

To strengthen Huế City's disaster resilience through faster, more robust, and more inclusive early warning, ISET-International (ISET) supported the installation of two high-power warning sirens equipped with backup power systems for emergency communication. These sirens can be operated remotely, have a range of up to 5 km, and serve as a last-resort warning channel in emergency situations, particularly effective for reaching local communities especially hard-to-access groups during nighttime, early morning, or periods of power and internet outages. The system was activated and proved effective during major flood events in 2024 and 2025. Following the pilot installation, Huế City government directed the replication of this model across the city and has since installed two additional sirens. An official operating protocol was also approved and disseminated in training events and via the city-wide Hue-S app. This initiative promotes the rapidity, redundancy and inclusiveness of Huế's early warning system (EWS), ensuring critical alerts can reach all residents even under the most challenging conditions.

The gap

Natural hazards such as floods and storms in Huế have become increasingly more severe and unpredictable due to climate change, demanding faster and more robust early warning systems (EWS).

Despite having multiple communication channels, such as the DRM website, Hue-S and Vrain apps, Zalo group, and loudspeakers, the city's EWS still struggled to reach local community in emergencies or when electricity and internet were not available, as most channels depend on these connections

Facts and figures

Cost of a high power siren (including shipping and installation): US$3,000

Annual update/maintenance costs (covered by the city): <US$100/year

Time to implement
One to two months for approval procedures and site selection, one week for installation

Easy to replicate?
Yes, based on existing DRM system and transferrable technology.

Photo: *Installing the 143-kg high-power siren* © Photo: Huế City Division of Water Resources and Climate Change

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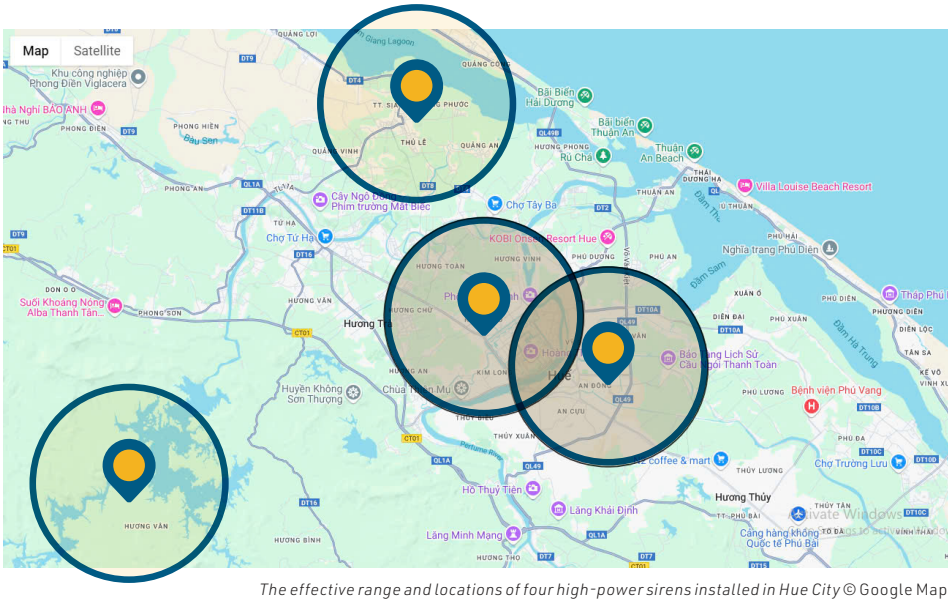
Climate Resilience Alliance



The effective range and locations of four high-power sirens installed in Hue City © Google Map

During nighttime, early morning, or power outages, authorities had limited means to send urgent alerts. Meanwhile, certain groups such as, remote communities, people without internet access, and those isolated areas, informal worker groups, faced persistent difficulties accessing warning information even under normal conditions, leaving them more vulnerable when disasters strike.

Our solution

To address the above gaps and ensure that urgent alerts can reach all residents even under extreme conditions, the project worked with the city Division of Water Resources and Climate change, supporting Huế City in installing two sets of high-power sirens in the north and south of its core urban area. Each siren has a range of about 5 km and serves as a robust, urgent warning channel for

Climate Resilience Measurement for Communities (CRMC)

The Climate Resilience Measurement for Communities (CRMC) is a data-driven process, complemented by a web-based tool and mobile app, which helps communities to evaluate and measure how resilient they are to climate hazards. Using the results, they can identify and implement resilience-building interventions and run additional measurements to track improvements.

Find out more:
ZCRAlliance.org/crmc

A high-power siren located on Hue City administrative building © Photo: Thanh Ngo, ISET Vietnam Office

emergency situations such as storms, major floods exceeding alert levels II or III, and tsunamis. Integrated with the city's IT system managed by Huế Intelligent Operation Centre, the sirens can be triggered remotely and automatically via wifi, or manually on-site in case of communication loss.

This technology is new to disaster risk management in Huế, demonstrating Huế's leadership in piloting innovative approaches to emergency communication. First activated during Storm Trami in 2024, they proved highly reliable and effective and were later used effectively during the 2025 floods. Building on these successes, the city plans to replicate the system across other high-risk areas and mobilized additional support to install two new sirens in Quảng Điền commune and Hương Trà ward.

To ensure consistent and proper use, an official operation protocol was developed, approved, and shared through training events and the city-wide Hue-S app, helping standardize siren patterns and strengthen coordination among agencies.

How it increases resilience

The installation of high-power sirens has strengthened Huế City's early warning system by providing a reliable backup channel for emergency situations. As a last-resort communication tool, the sirens ensures that critical alerts can still reach residents quickly when electricity or internet networks are disrupted, at night, or during severe storms and floods. This redundancy makes the overall system more robust and less dependent on any single communication channel, ensuring continuity of warnings under extreme conditions.

The sirens are particularly valuable for reaching the hardest-to-reach groups, such as informal workers, remote households, and those without regular access to the internet, helping ensure that no one is left unalerted in critical situations. Even when residents may not immediately understand the meaning of specific siren signals, the sound itself triggers awareness and prompts

Conditions for success

Q: Is this intervention appropriate for other communities?
A: Yes, the provincial government has recognized their value and approved their replication.

Q: What conditions are needed for the interventions?
A: Funding for operation and maintenance; connection to central system for remote operation; approved operation protocol.

Q: Was there anything special about the communities where interventions were effective?
A: Strong commitment and support of local governments.

LIVED EXPERIENCE

"Both our team and provincial leaders are highly satisfied with the outcomes. The solution strengthens Hue's resilience to extreme storms and floods by delivering fast and timely warnings to residents during emergencies – especially at night or when other communication channels, such as loudspeakers, television, and mobile networks, are disrupted."

– **Mr. Dang Van Hoa,** *Head of Division of Water Resources and Climate Change*

Huế Division of Water Resources and Climate Change staff explaining how to operate the high-power siren © Photo: Thanh Ngo, ISET Vietnam

A high-power siren located in the north of Hue City © Photo: Thanh Ngo, ISET Vietnam

them to seek further information through other communication channels, such as the Hue-S app or the DRM website. This combination of audible warning and follow-up information promotes timely preparedness actions, strengthens public awareness, and enhances both community readiness and resilience.

Lessons learnt

- Working at the city level allowed the project to generate impacts far beyond its target communities. The pilot siren system benefited a much wider population across Huế city. The project also highlights the value of testing innovative ideas at the right scale and the importance of early city leadership and commitment to sustain and expand successful models.
- This intervention is a great example of how sophisticated high-tech solutions and locally adapted low-tech measures can complement each other in strengthening early warning for communities.

Get in touch

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The Institute for Social and Environmental Transition – International (ISET) is a non-governmental organization committed to building inclusive and transformative resilience in the face of natural resource, environmental, and social challenges, especially related to climate change, natural hazards, and urbanization. Officially operating in Vietnam since 2010, ISET has an intimate understanding of Vietnam's institutional landscape and its strengths and challenges, and has proven expertise in working effectively across levels to bridge the still significant divide between science, policy, and implementation. ISET is working in Huế City and Gia Lai Province, both coastal areas in central Vietnam and Cần Thơ city in the Mekong Delta.