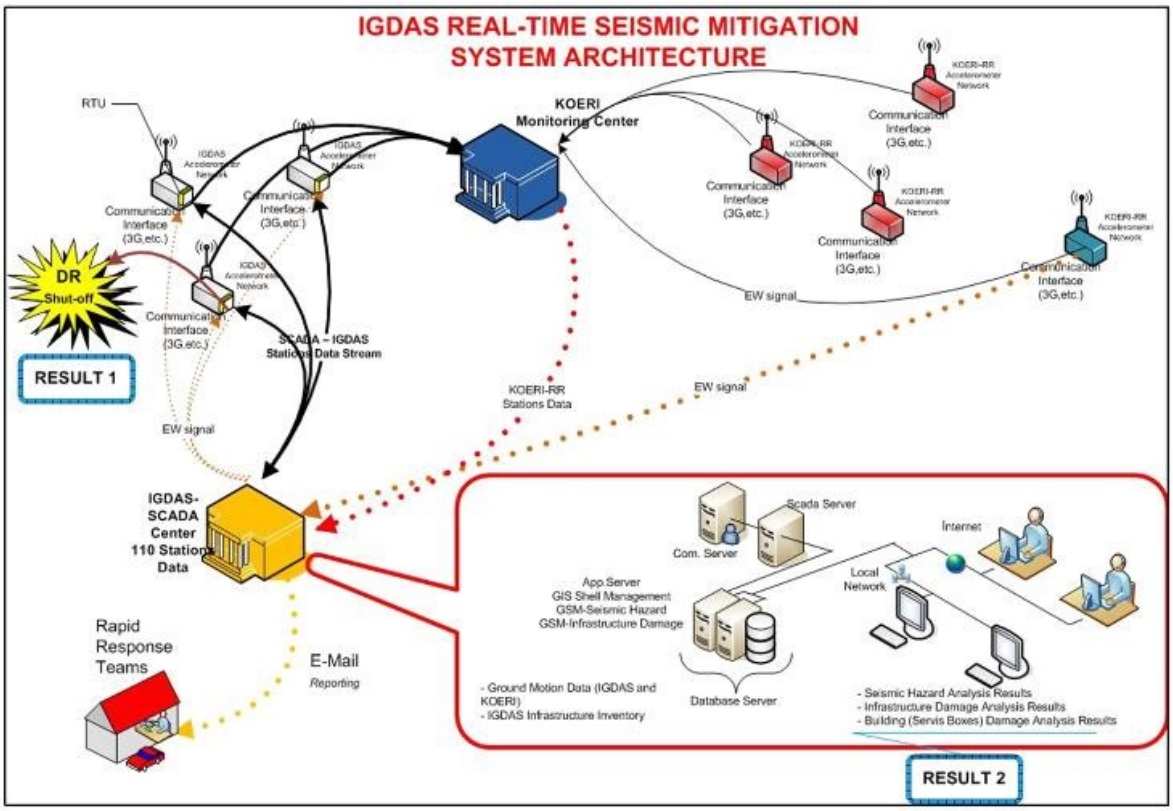
7.3 Istanbul Natural Gas Distribution Network Earthquake Risk Reduction System (Turkey)

OECD GP Activity	UN SF Activity	UN SD Goals / Targets
1. Natural hazards identification and communication, NH (early) warning systems	4. Enhancing disaster preparedness for effective response	3.D Strengthen the capacity of all countries … for early warning, risk reduction and management of national and global health risks

Classification according to OECD Guiding Principles, UN Sendai Framework Priorities/Activities, and UN SDGs and Targets

Figure 1: Sequence of actions in IGDAS earthquake risk mitigation system



Source: © Zulfikar et al., 2016

Short Facts:	Natural Hazard(s) Considered:
Governance approach: Risk communication **Source:** Gebze Technical University **Entry into force:** **Targeted Stakeholders:** Authorities in charge for the gas distribution networks **Scope of applicability:** Local, enterprises	• Earthquake **Climate change:** Not relevant

Description

The Istanbul Gas Distribution Company (IGDAS) was established in 1986 by the Istanbul Metropolitan Municipality. IGDAS established a city-wide distribution network with a service area of 5400km2, 2100 staff, 6.5 million subscribers and 24,000 km of infrastructure.

IGDAS' disaster response is a leading model in the gas industry. The company created a project known as the 'Earthquake Risk Mitigation System'. The system checks the earthquake information from 10 'Earthquake Early Warning' (EEW) stations based on real-time data transmitted by satellite to the IGDAS SCADA server. When amplitudes at 3 or more EEW stations exceed certain limits, the system identifies the phenomenon as an earthquake and initiates further actions automatically.

IGDAS has 750 accelerometers distributed in city-wide locations in the IGDAS district regulators. Once the EEW information reaches the district regulators, the ground-motion parameters are checked, and the shut-off decision takes place individually for each regulator and carried out by the solenoid valve automatically. This system provides mitigation of secondary disaster risks due to a potential earthquake.

The system generates city-wide, near real-time earthquake ground-motion distribution maps and infra-structure and building damage distribution maps by using the ground-motion data from stations as well as information based soil condition, infrastructure, and building inventories. This information is shared with the field teams automatically for the emergency response.

The ground-motion station accelerometers' hardware and software were developed specifically for the project. Including EEW information, automatic shut-off mechanisms, real-time ground-motion distribution maps, the near real-time damage distribution maps both for the infrastructure and for the buildings, the system is a unique earthquake-risk mitigation system and can be applied in other regions of the world exposed to seismic hazard.

Even though today's technology may allow for a quick estimation on the level of expected ground shaking, Istanbul's time is even more limited due to its usually very close distance to the epicentre. The algorithm of the threshold-based EEW system accounts for near-source events to activate the automatic shut-down mechanism. This means that the safety measure can help to mitigate greater damage with only a few seconds of early warning.

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https://link.springer.com/article/10.1007/s10518-016-9964-x
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Comments by the UN/OECD Natech-Steering Group:

This is an example of the combination of a warning system with an automatic shut-off system.

Imprint

Publisher

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Completion: September/2019

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