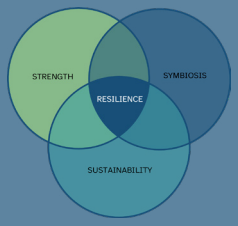
SMART HOME TECHNOLOGY

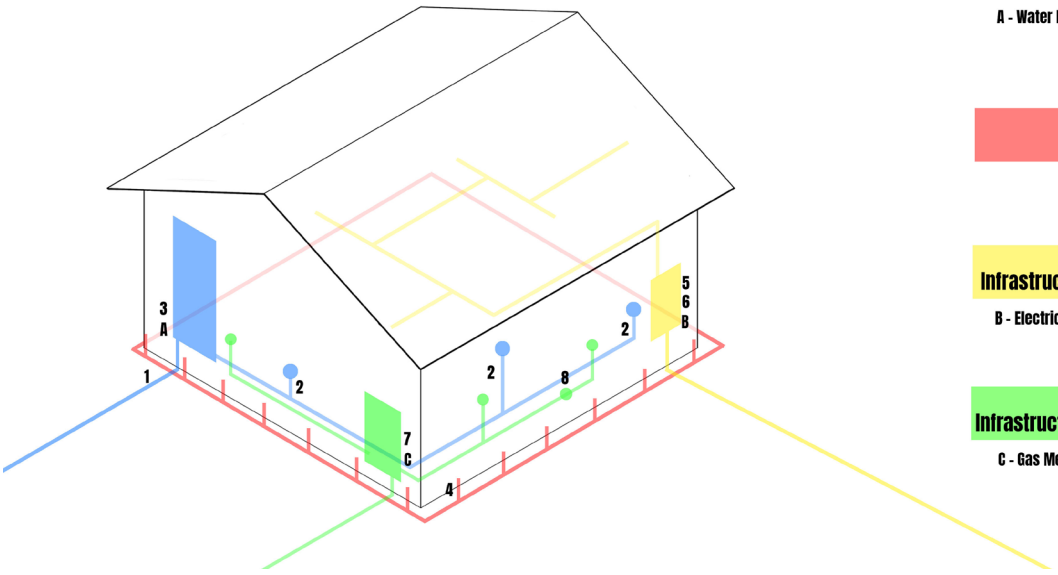
UF Florida Institute for Built Environment Resilience
UNIVERSITY of FLORIDA



Overview

In addition to constructing homes with a stronger focus on more adaptable and resilient materials, we can **integrate smart home technology** to prevent further damage to the constructed building. These devices are specifically designed to mitigate the **damage from utility failures** during harsh weather events or everyday accidents. Smart home systems have been designed to **work in tangent** with multiple different home utility systems such as electricity, natural gas, and water. These technologies come in many forms but most feature a **smart sensor** used for detecting leaks in the system as well as a **shut-off valve** that responds to the smart sensor. Additionally, some systems have an **integrated alert system** and **adjacent user interface** that connects to a homeowner's phone or computer allowing them to actively monitor all instances of leaks. While there is an upfront cost with all these systems, the alerting of leaks warns the homeowner before unseen and potentially disastrous damage to the home, ultimately **saving on repair costs over time**.

What Can Smart Home Technology Monitor?



Water

Infrastructure	Smart Home Tech
A - Water Heater/Cooler	1 - Water Shut Off Valves 2 - Leak Detection Sensor 3 - Water Tank Monitor

Foundation

	Smart Home Tech
	4 - Foundation Monitoring System

Electric

Infrastructure	Smart Home Tech
B - Electrical Box/Breaker	5 - Smart Electric Panel 6 - Automatic Breakers

Gas

Infrastructure	Smart Home Tech
C - Gas Meter	7 - Gas Meter Shutoff Valve 8 - Electromagnetic Solenoid with Gas Detection

Diagram of Various Utility Systems and Smart Home Technology

SMART HOME TECHNOLOGY

UF Florida Institute for Built Environment Resilience
UNIVERSITY of FLORIDA

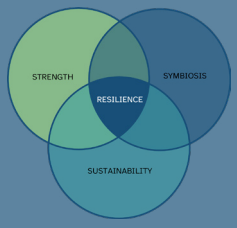
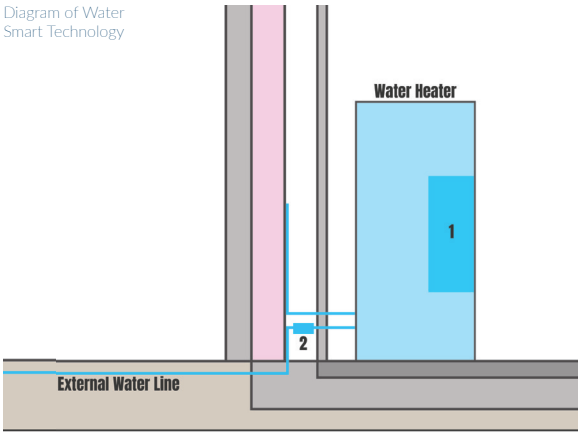


Diagram of Water Smart Technology

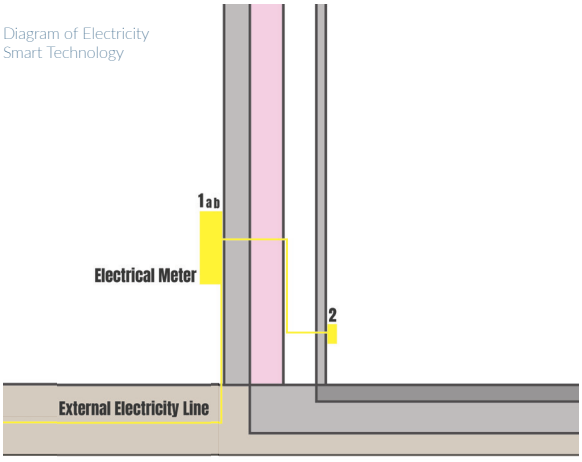


1 - Water Main Smart System 2 - Smart Shut-Off Pipe Valve

Water

Internal water damage from burst pipes or water intrusion serve as one of the **largest loss costs** for homeowners nationally. Simple inclusions of smart sensors and warning technology can prevent these larger costs from adding up and can minimize damage. Some instances of these technologies, such as the **Flo by Moen**, actively **monitor flow rates** and **potential leaks**. When abnormalities are detected, these smart systems are able to **quickly alert homeowners** through built-in applications as well as actively respond by **closing off pipes** and halting water flow to prevent further damage. Installations of these smart systems have **led to fewer and less severe claims**, saving homeowners thousands of dollars on damage claims.

Diagram of Electricity Smart Technology



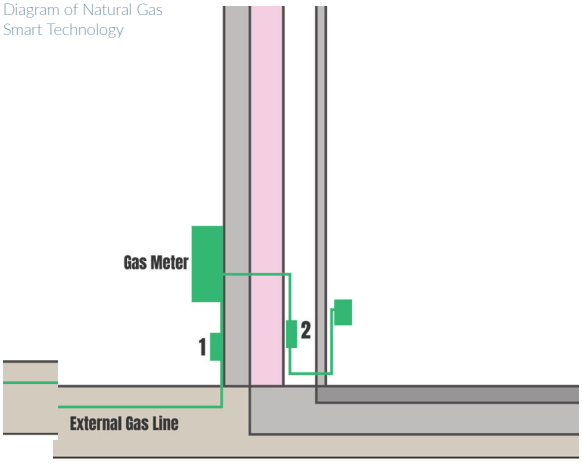
1 - Electrical Panel Sensor System
a - Smart Panel
b - Breaker Shutoff Sensor

2 - Timed Oulet Sensors

Electricity

Another source of insurance claims comes from home damage due to issues with electrical wiring. Problems such as **outdated wiring** or **consistent shorting of breakers** stress out the wiring of the house, potentially leading to shocks or fires being started. Some smart technology integrates directly with existing electrical panels to serve as **a monitoring system for the full house**, allowing homeowners to **remotely shut off circuits**. In addition to allowing homeowners to control circuits, these smart sensors can detect larger than regulated currents of electricity and **automatically shut off the circuit**. Beyond the possibility of just reducing insurance claims, these smart home systems can also optimize electricity usage. This could provide homeowners with **long-term savings on utility costs**.

Diagram of Natural Gas Smart Technology



1 - External Shut Valve Sensor 2 - Internal Solenoid Valve Sensor

Natural Gas

A common home utility, natural gas, can lead to some of the **more expensive insurance claims** and potentially dangerous accidents to homeowners. Gas leaks can not only impact the physical health of homeowners, but can also lead to fires or sudden combustion. As such, smart sensors have been tuned to **consistently monitor for potential leaks** or other interruptions in gas flow. These sensors are installed either **externally** (before the gas meter) or **internally** in the house system. When a leak is detected, these sensors act autonomously as they **close off the affected pipe** and alert the homeowner. These **active responses are crucial** with this system as wear and tear on this system leads to these accidents and normal wear and tear is not covered by the majority of insurances on this system.