# Home Resilience and Health Checklist

## The Benefits of Making Your Home More Resilient

1

### Reduced risk from severe weather events.

There are often improvements you can make to your home to protect it against severe weather events.

2

### Improved durability.

Even mild weather and non-weather-related events can impact a home's durability. A range of strategies from basic maintenance to more complex renovations can be used to minimize these longer-term impacts.

3

### Improved sustainability.

A resilient home is generally more sustainable than a typical home. Severe or repeat mild events can result in early replacement of the materials and equipment in our homes. In general, the more resilient a home is, the more it can control and manage environmental extremes, avoiding the need to replace materials before the end of its useful life.

4

### Healthier indoor environment.

Managing factors like temperature, humidity, and indoor air pollutants will improve the health of the home's indoor environment. Some actions taken to make a home more resilient will also make it healthier and safer.

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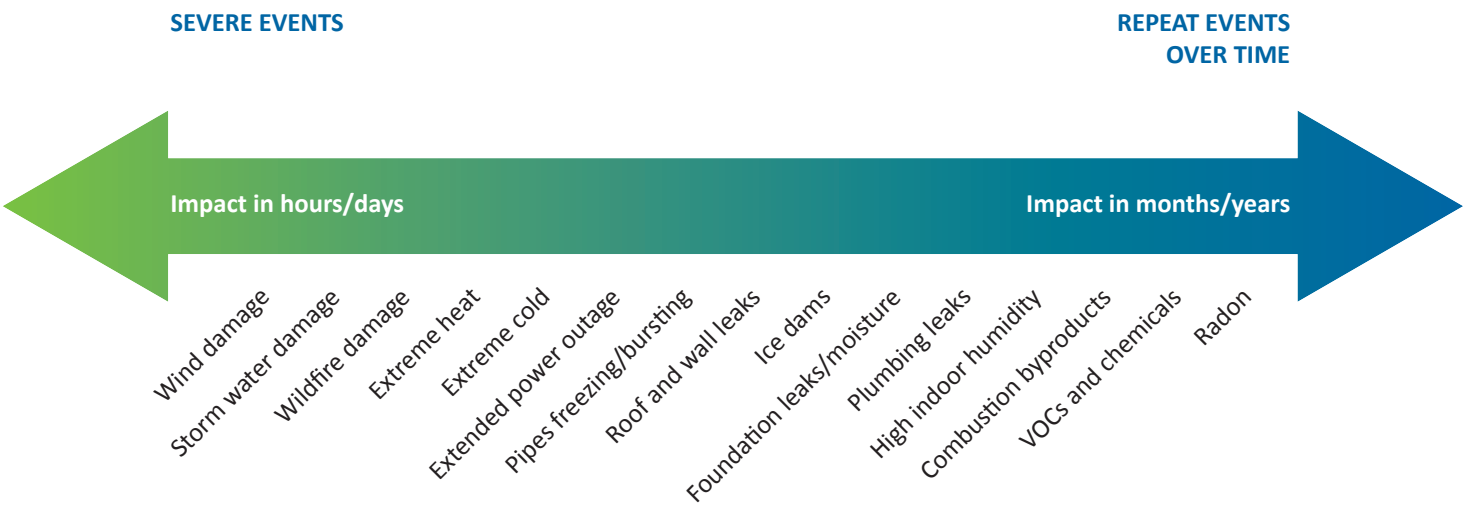
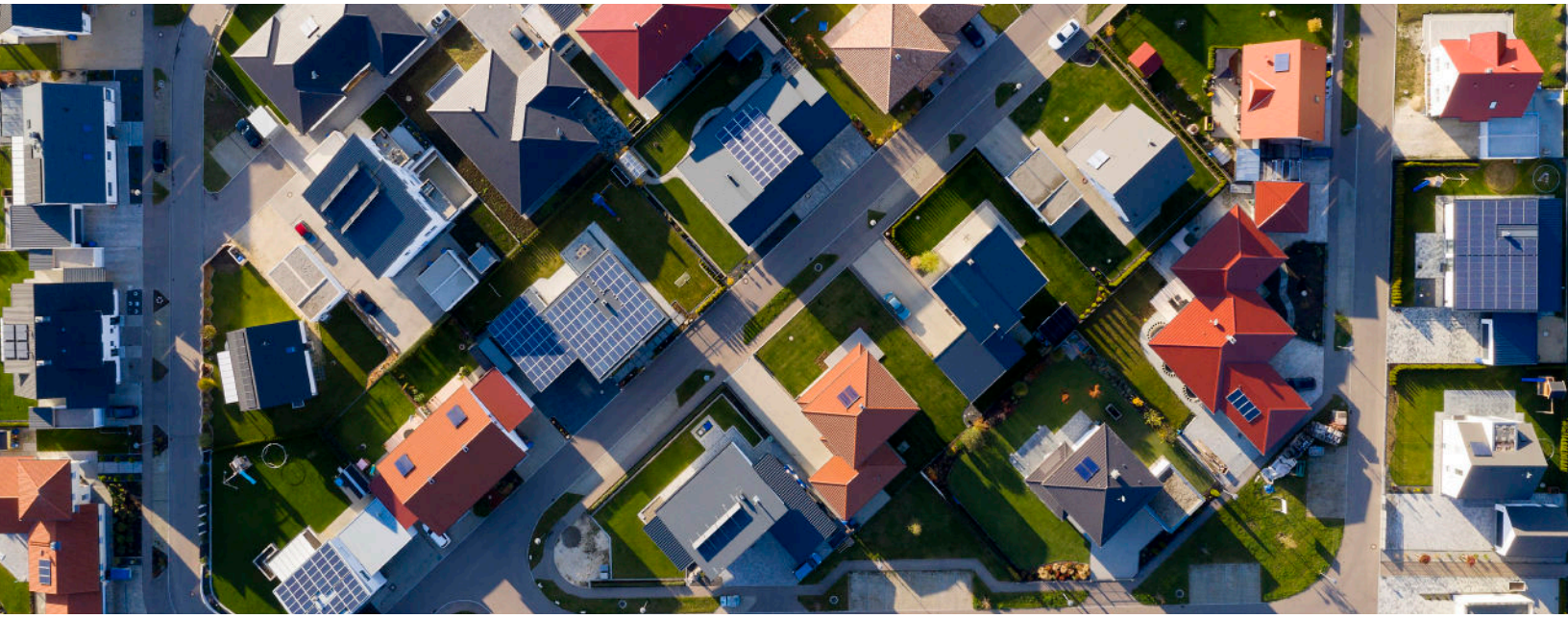
# What are the Risks to Consider?

The table below shows a wide range of events and conditions that could occur, although not all apply to every home. When thinking about resilience and health for existing homes, there are simple practical strategies that every homeowner can apply.



# How Does Decarbonization Relate to Resilience and Health?

An ideal time to think about building resilience and health is when a home is being decarbonized or energy efficiency improvements are being made. In some cases, the improvement itself will have a positive impact without any added effort, and, in other cases, thoughtful material selection and design choices for decarbonization projects can the materials selected and design choices made on the project can result in positive resilience and health impacts. Air sealing and insulating for example can help with extreme heat and cold, extended power outages, pipes freezing, and indoor humidity. By comparison, decarbonizing a home's heating and hot water equipment can have added resilience benefits related to flooding, extreme weather, and power outages, if the equipment is moved out of low-lying basement areas, and if redundancy and backup power are built into the design.

**FAST FACT**

**A homeowner's highest priority should be to have an emergency and evacuation plan for your home. Ready.Gov provides some excellent tools and resources for this purpose.**

**Evacuation | Ready.gov**

# Recommended Strategies to Build Resilience and Improve Health

## BUILDING ENVELOPE

Improving and maintaining your home's envelope will help better control and manage environmental extremes outside, and occupant risks inside. Air sealing and insulating can help with extreme heat and cold, extended power outages, pipes freezing, and indoor humidity. Maintaining and improving roofing, siding, windows, and doors can help with wind damage, fire damage, water damage, ice dams, leaks, etc.

- ☐ Air Seal
- ☐ Insulate
- ☐ Maintain/replace the roof
- ☐ Maintain/replace siding
- ☐ Maintain/replace windows and doors

### FAST FACT

**For Massachusetts to reach its 2050 climate goals more than 2/3 of all existing buildings will need additional deeper weatherization improvements.**

## BULK WATER MANAGEMENT

Whether or not you live in a flood-prone zone, employing bulk water management strategies to keep your home dry, and to get water away from your foundation protects against unexpected stormwater and coastal flooding damage, as well as damage over time due to leaks and indoor humidity.

- ☐ Install gutters
- ☐ Drain downspouts and slope grade away from the house
- ☐ Install a smart sump pump
- ☐ Install a smart alarm for the existing sump pump
- ☐ Install a sewer backflow preventer
- ☐ Protect vents and window wells that could allow water into the basement

### FAST FACT

**Gutters are easy to take for granted, but they shoulder an important responsibility on a house: They collect rainfall and direct it away from the house, reducing the moisture load on siding and windows and protecting the basement from moisture intrusion[1].**

## MECHANICAL, ELECTRICAL AND APPLIANCES

Resilience strategies in this category can have a wide variety of positive impacts. Back-up power, redundant heating and cooling systems, and keeping critical appliances and equipment out of flood risk can be very beneficial in more severe events. Decarbonizing a cooktop, or adding proper ventilation for cooking, bathing, and even radon can help improve long term health and safety in your home.

- ☐ Add backup power (PV + Battery, or Generator)
- ☐ Add redundancy to heating/cooling system design
- ☐ Elevate or wall mount mechanical equipment and appliances
- ☐ Decarbonize oven/cooktop
- ☐ Add kitchen and bathroom exhaust fan(s)
- ☐ Add Radon mitigation system

### FAST FACT

**Whole home ventilation strategies using heat or energy recovery ventilators (HRVs or ERVs) can reduce asthma and respiratory symptoms in children with pre-existing risks.[2]**

## MONITORING EQUIPMENT

Monitoring equipment has become more affordable and with the help of text and email notifications, can easily identify risks in your home before they become costly, damaging, or health risks. Smart water meters and sump pumps identify leaks and flooding. CO detectors and air quality monitors can identify health risks and even let you know if your heating system stopped working while you're away.

- ☐ Install smart water meter
- ☐ Add CO detector with battery backup
- ☐ Add an indoor air quality monitor
- ☐ Add a Radon monitor (which can be part of an indoor air quality monitor)

### FAST FACT

**Radon is a radioactive gas produced from decaying uranium found in nearly all soils. 1 in 15 homes in the US is thought to have elevated Radon levels.[3] The only way to know if your home has a radon problem is to perform an inexpensive test or get a monitoring device.**

## MATERIAL CONSIDERATIONS FOR RECOMMENDED PROJECTS

There is no perfect material for most home improvement projects that can be considered resilient, durable, sustainable, low embodied carbon, and healthy for you and the installer. With that said, material choices do fall on a spectrum in each category. It's important to make informed choices and ask your contractor for better alternatives when possible.

- ☐ Choose resilient and sustainable roofing materials (based on location)
- ☐ Choose resilient and sustainable siding materials (based on location)
- ☐ Choose resilient and sustainable basement finishing materials
- ☐ Install impact-resistant windows and doors (based on location)

# Recommended Solutions

| | Wind damage | Storm water damage | Wildfire damage | Extreme heat | Extreme cold | Extended power outage | Pipes freezing/bursting | Roof and wall leaks | Ice dams | Foundation leaks/moisture | Plumbing leaks | High indoor humidity | Combustion byproducts | VOCs and chemicals | Radon |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Building Envelope** | | | | | | | | | | | | | | | |
| ☐ Air seal | | | | ✓ | ✓ | ✓ | ✓ | | ✓ | | | ✓ | | | |
| ☐ Insulate | | | | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | | |
| ☐ Maintain/replace roof | ✓ | ✓ | ✓ | | | | | ✓ | ✓ | | | | | | |
| ☐ Maintain/replace siding | ✓ | ✓ | ✓ | | | | | ✓ | | | | | | | |
| **Bulk Water Management** | | | | | | | | | | | | | | | |
| ☐ Install gutters | | ✓ | | | | | | | | ✓ | | | | | |
| ☐ Drain downspouts and slope grade away from house | | ✓ | | | | | | | | ✓ | | | | | |
| ☐ Install a smart sump pump | | ✓ | | | | | | ✓ | | ✓ | ✓ | | ✓ | | |
| ☐ Install a smart alarm for existing sump pump | | ✓ | | | | | | | | ✓ | ✓ | | ✓ | | |
| ☐ Install swerer backflow preventer | | ✓ | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| ☐ Protect vents and window wells that could allow water into the basement | | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| **Mechanical, Electrical, and Appliances** | | | | | | | | | | | | | | | |
| ☐ Add backup power (PV + Battery, or Generator) | | | | | | ✓ | ✓ | | | | | ✓ | | | |
| ☐ Add redundancy to heathy/cooling system design | | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | |
| ☐ Elevate or wall mount mechanical equipment and appliances | | ✓ | | | | | | | | | | | | | |
| ☐ Decarbonize oven/cooktop | | | | | | | | | | | | | ✓ | | |
| ☐ Add/vent bathroom exhaust fan(s) | | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ |
| ☐ Add/vent kitchen exhaust fan(s) | | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ |
| ☐ Add Radon mitigation system | | | | | | | | | | | | | | | ✓ |
| **Monitoring Equipment** | | | | | | | | | | | | | | | |
| ☐ Install smart water meter | | | | | | | | | | ✓ | ✓ | | ✓ | | |
| ☐ Add CO detector with battery backup | | | | | ✓ | | | | | | | | ✓ | | |
| ☐ Add an indoor air quality monitor | | | | | ✓ | | | | | | | ✓ | ✓ | ✓ | |
| ☐ Add a Radon monitor (can be part of indoor air quality monitor) | | | | | | | | | | | | | | | ✓ |
| **Material Considerations for Recommended Projects** | | | | | | | | | | | | | | | |
| ☐ Choose resilient and sustainable roofing materials (based on location) | ✓ | ✓ | ✓ | | | | | | | | | | | | |
| ☐ Choose resilient and sustainable siding materials (based on location) | ✓ | ✓ | ✓ | | | | | | | | | | | | |
| ☐ Choose resilient and sustainable basement flooring and wall materials | | ✓ | | | | | | | | | | | | | |
| ☐ Install impact resistant windows and doors (based on location) | ✓ | | | | | | | ✓ | | | | | | | |

## OTHER RESOURCES

A Citizen's Guide to Radon

Asthma and Allergy Foundation of America

[1] https://www.finehomebuilding.com/project-guides/roofing/install-your-own-seamless-gutters

[2] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fe4thefuture.org%2Fwp-content%2Fuploads%2F2016%2F11%2FOccupant-Health-Benefits-Residential-EE.pdf&clen=1400851&chunk=true

[3] https://www.epa.gov/radtown/radon-homes-schools-and-buildings

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