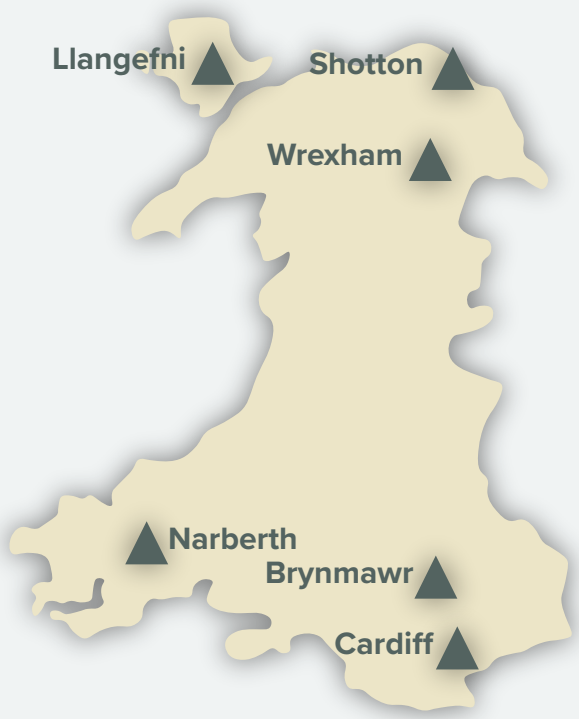


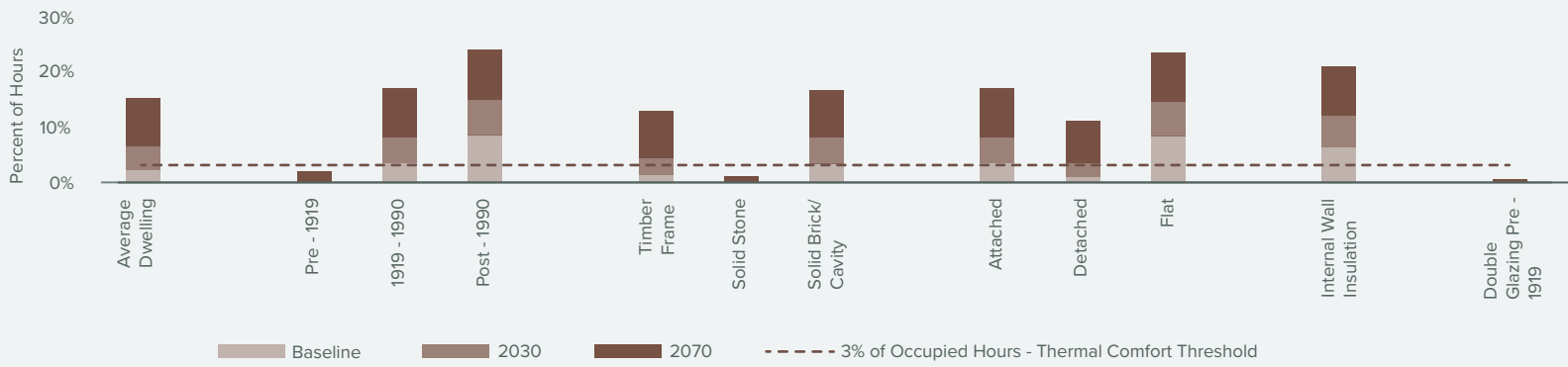
IMPACTS OF CLIMATE CHANGE ON THE HOUSING STOCK OF WALES



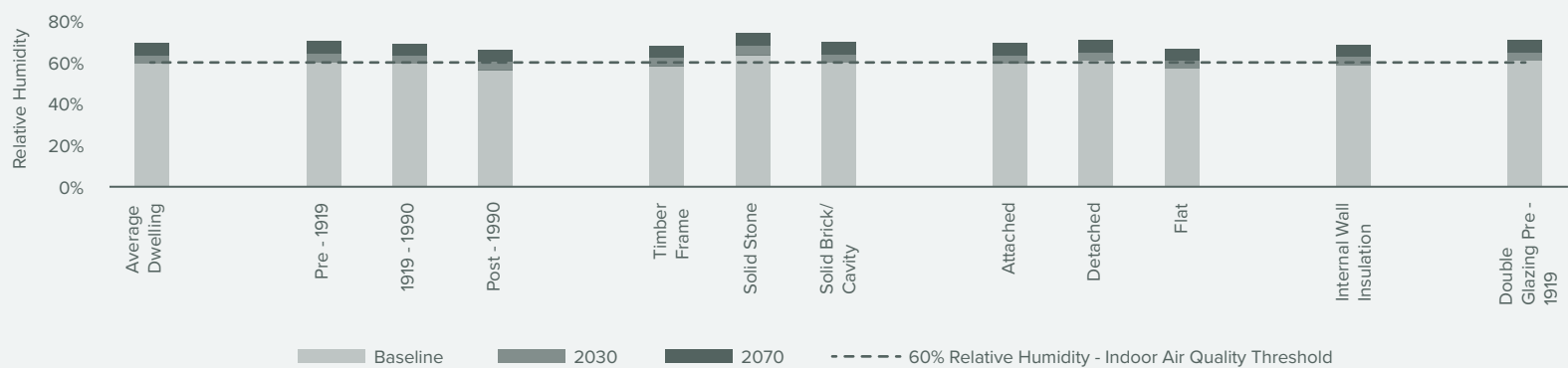
CLIMATE IMPACTS TO HOUSING

- Changes in outdoor temperature and humidity can drive changes in indoor conditions.
- Rising indoor temperatures can lead to overheating risk and decreased thermal comfort.
- Increased indoor relative humidity can result in diminished indoor air quality from contaminants like mold and fungus.

Percent of Hours Above 26°C for 11 Building Classes
Average Across 6 Locations
July 22nd- August 31st



Daily Maximum Relative Humidity for 11 Building Classes
Average Across 6 Locations
July 22nd- August 31st



Resilient Analytics Project Summaries

A Climate Change Impact Study of Welsh Housing

Residential buildings, no matter their location, are vital to the maintenance of a comfortable, safe and sheltered environment for occupants. However, climate change has the potential to jeopardize the ability of dwellings to meet such requirements as indoor conditions are impacted by changes in the outdoor environment.

In this study, which focused on the housing stock of Wales, Resilient Analytics, Inc (RA) investigated the impact of climate change on residences in the context of indoor temperature, indoor humidity levels, and exterior building fabric degradation rates: issues which are key to the wellbeing of residents and to the long-term resiliency of the structures.

Quantified results were presented to the Welsh Government for a spectrum of 11 residential property types in 6 locations across Wales for a baseline period and the 2030 and 2070 time periods under RCP 8.5. Using this information, government planners and economists will have the ability to develop resiliency and adaptation options for specific residential inventories across the country.

Study Results

First, indoor thermal comfort and air quality were quantified using modeled indoor temperature and humidity levels, respectively. This is especially pertinent since mechanical cooling is absent from much of the residential stock in Wales. Modeling was based on relationships between outdoor and indoor temperature and humidity developed for each building class from previously completed studies. When combined with projected temperature and humidity, a comprehensive picture of the impact from climate begins to take actionable shape.

In addition to the influence that climate has on indoor environmental conditions, so too does it impact the durability of the exterior building fabric. Relationships between service life and precipitation, relative humidity and solar radiation levels were developed for a variety of building fabric components based on previously completed studies. Associated changes in maintenance and repair cost were calculated and can help building agencies to determine approaches to counteract such costs before they are realized.

Across the board, this modeling has created an opportunity for decision makers to develop proactive resiliency plans that incorporate the latest technologies and approaches. Significant opportunity exists to expand on these findings in any geographic location. By modeling the local conditions and the specifics of the housing stock in a given area, the potential exists to make structures more resilient, enhance thermal comfort and indoor air quality, and establish standards that will reduce emissions as well as enhance living conditions.

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