

BREATHING NEW LIFE INTO HISTORIC HOMES A CASE STUDY IN INDOOR AIR QUALITY AND ENERGY EFFICIENCY

INTRODUCTION

This case study showcases the transformative impact of modern technology and expert craftsmanship on a 113-year-old home. By addressing key areas of energy consumption and indoor air quality, this project demonstrates that historic homes can surpass even the newest buildings in terms of comfort, health, and sustainability.

THE CHALLENGE

The owners of a historic Detroit home were facing high energy bills and uncomfortable living spaces. An initial energy audit and AirAdvice IAQ test revealed several concerning issues, including elevated levels of PM2.5, TVOCs, CO2, and relative humidity. These findings underscored the need for a comprehensive approach to improve both energy efficiency and indoor air quality.



THE SOLUTION

- Heating and Cooling: A high-efficiency, variable-capacity modulating gas furnace with a MERV 13 filtration system was installed to optimize energy use and improve air quality.
- Ventilation: An energy recovery ventilator (ERV) with a MERV 8 pre-filter was added to provide continuous fresh, filtered air throughout the home.



BUILDING FEATURES

Location: Detroit, MI

Year & Style: 1911 Single-family Craftsman

Square Footage: 1351 sq ft

No. of Occupants: 2

HVAC: Forced air gas

- Air Sealing and Insulation: Comprehensive air sealing and the addition of attic and wall insulation significantly reduced energy loss and improved overall comfort.
- Water Heating: A 50-gallon heat pump water heater further enhanced energy efficiency.
- Duct Cleaning: A thorough duct cleaning removed accumulated dust and debris, promoting a healthier indoor environment.



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THE RESULTS

The results of these upgrades were remarkable:

- Improved Indoor Air Quality: Post-retrofit measurements showed significant reductions in PM2.5, TVOCs, and CO2 levels, creating a healthier living environment for the homeowners.
- Enhanced Comfort: The combination of improved air quality, consistent temperatures, and reduced humidity levels greatly enhanced the overall comfort of the home.
- Lower Energy Bills: The energy-efficient upgrades resulted in substantial energy savings, reducing the homeowners' utility costs.
- Preservation of Historic Character: The project successfully addressed the home's energy and air quality challenges while preserving its unique historic character.









CONCLUSION

This case study demonstrates that investing in older homes can yield significant benefits in terms of health, comfort, energy savings, and historical preservation. By leveraging modern technology and expert knowledge, homeowners can transform their historic properties into healthy, comfortable, and sustainable living spaces for generations to come.

