

Jonathan Coulter, Advanced Energy Corporation

Poster Title: Field Performance of Mini-Split Heat Pumps in Low-Load Homes: Southeastern U.S.

Abstract: Recent energy efficiency practices have led to greater airtightness and insulation levels in houses, prompting concerns about interior moisture levels and comfort. At the same time there is growing industry interest in peak load management of large energy consuming home components. Constructing low-energy/ low-load homes and conditioning them with mini-split heat pumps (MSHP) have been common options in these overlapping conversations. But very little data exists comparing the desired outcomes of these paired technologies with the real-world results in the mixed-humid climate of the Southeast. Advanced Energy has been studying these systems in nine low-load houses in mixed-humid climates by sub-metering MSPHs and monitoring temperature and relative humidity measurements. Advanced Energy's research indicate both desirable and undesirable outcomes from this field research. Some desirable benefits from these paired technologies include increased operational energy savings, coincident peak savings and low installation costs. Some undesirable outcomes include high indoor dew points, MSHP fans running when the coil is not below dew point, and design- and occupant-related issues. If ignored, these concerns could reduce durability, indoor air quality and comfort. This presentation offers insights into the interconnections low-energy/ low-load homes and mini-split heat pumps have on homeowner comfort, coincident peak load and building durability. These initial results can benefit home builders, home buyers, realtors, utilities, manufacturers and program managers. Additional recommendations include optimizing system performance and developing standards or best practices to inform how these systems are used. It is clear, though, that additional research is needed to learn more about MSHPs, as well as to examine standard systems in mixed-humid climates.