SCE DRET Findings
SEPTEMBER 2016

DR13.06: Variable-Capacity Space Conditioning Systems for Residential

OPPORTUNITY

How do variable-capacity (VC) air conditioners perform, and what is their potential for energy efficiency and demand response?

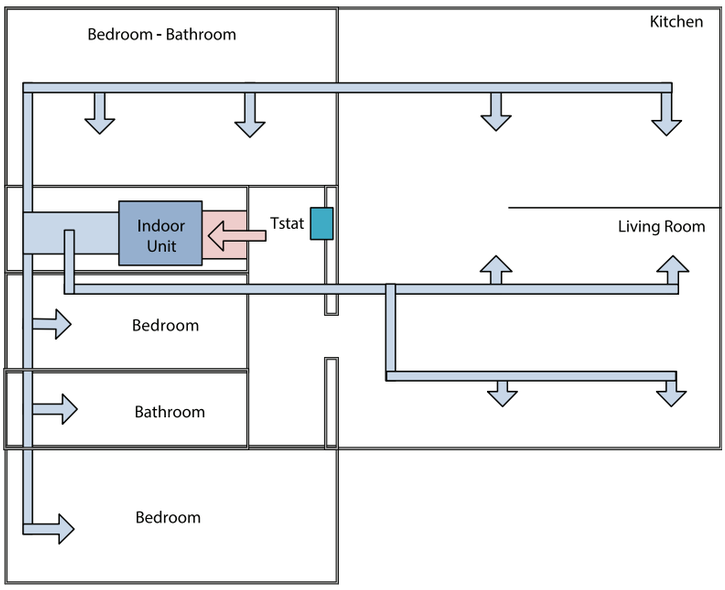
SAVINGS POTENTIAL

Study results demonstrate potential efficiency and demand response capability via survey, lab and field testing. Market availability of high-efficiency, variable-capacity space-conditioning equipment for residential applications was confirmed.

TECHNOLOGY

How do variable capacity air-conditioning systems work?

Variable capacity equipment can modulate cooling or heating output at infinite levels within rated capacity to meet real-time load conditions.



M&V

Where did Measurement and Verification occur?

Lab and field testing was performed for three 2-ton high-static ducted VC-A/C systems with varying SEER efficiency ratings. The focus was on the system response to demand control signals under different operating conditions.

RESULTS

How did residential VC-AC systems perform in M&V?

At the time of testing, none of the tested equipment was readily able to receive or respond to demand response signals.

Potential energy savings of residential VC equipment over baseline was higher in a lab setting (30-50%) vs. a field setting (18-30%).[1]

DEPLOYMENT

Where does M&V recommend deploying VC-air conditioning systems?

Marketability

As variable capacity air-conditioning systems become more commercialized, it is recommended to revisit the demand response capabilities via OpenADR protocols. Manufacturers are encouraged to reconsider demand response capabilities in the future and re-submit for demand response program participation.

[1] *Residential VC Space Conditioning – Buildings III: Sub-Project A, Emerging Products, September 2016, p.83*