

E3T Residential Building TAG Emerging Technologies

Topic	Subtopic	ID	Title	Short Description
Envelope	Building Materials	570	Spray-on Vapor Barriers	Liquid spray-applied vapor barrier that forms a flexible membrane, resistant to moisture transmission.
Envelope	Building Materials	229	Phase-Change Drywall	Drywall impregnated with phase-change materials that increases thermal mass and thereby reduces temperature fluctuation during HVAC peak demand setbacks.
Envelope	Building Materials	463	Insulative Cement	Cement or concrete with lightweight and insulative aggregate to add insulative value to the concrete.
Envelope	Windows	571	Automated Residential Shades	Shades that automatically open and close at appropriate times to save energy, by maximizing or minimizing solar gain as needed.
Envelope	Windows	474	Insulated Cellular Blinds	Window shades that incorporate a "honeycombed" cross section with air-trapping pockets that add an insulating layer to help save energy.
HVAC	System Controls	321	Residential Occupancy Based HVAC Energy Management	Room by room zone control using sensors, thermostats, and intelligent programming.
HVAC	System Controls	337	Wireless Home Energy Automation Controls	A device that offers on-site and remote residential HVAC, lighting, and plug load control. These controls can be equipped with occupancy and temperature sensors in each room and registers with adjustable louvers to fine-tune comfort and lighting based on occupancy.
HVAC	Heat Recovery	8	Domestic Water Heating from Condensing Air Conditioning Units	Installation of waste heat recovery units on residential air conditioning condensing (outside) units to supplement domestic water heating.
HVAC	Heat Recovery	186	HRV for Common Spaces in Multi-Family Buildings	Heat recovery ventilators (HRV) can improve mechanical ventilation energy efficiency by capturing energy from exhaust airflows, and transferring 60 to 80 percent of the heat or cool to the incoming fresh air.
HVAC	Heat Recovery	197	Heat Home with Waste Heat from Dehumidifier	Use waste heat from compressor-based dehumidifiers to provide heat for homes.
HVAC	Heat Recovery	320	Spot Energy Recovery Ventilation - Residential	The Panasonic ceiling-mounted Spot Energy Recovery Ventilator (ERV) is energy efficient and provides fresh, ventilated air while maintaining indoor air quality.
HVAC	System Controls	181	Heat Pump Maximizer	Add-on heat pump control. Purported to be a control to optimize (minimize) the use of auxiliary strip heat, using the heat pump more effectively and economically.
HVAC	System Controls	333	Home Energy Automation with Utility Demand Response Controls	Systems capable of on-site or remote monitoring and control of home electrical energy use. These technologies are often used by utilities or their representatives to reduce or delay energy consumption of connected appliances and devices during peak pricing or peak load periods.
HVAC	System Controls	460	Utility Programs Using Smart Thermostats (e.g., Opower)	Services provided by third-party vendors such as home monitoring and energy reports based on smart thermostat data for utilities to use in residential behavior-based energy-saving programs.
HVAC	System Improvements	59	Hybrid Direct Expansion With Evaporative Cooling	Hybrid cooling that couples conventional high-efficiency mechanical cooling with one or more evaporative cooling techniques to minimize compressor electricity demand and consumption.

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HVAC	System Improvements	88	Residential Water-Cooled Condenser	Residential sized water cooled condenser air conditioning technology has been available for several years. Laboratory and field testing of several generations documented the efficiency potential of this technology. Water Cooled condenser technology offers significant electric demand reduction potent...
HVAC	System Improvements	572	Integrated Night Ventilation Cooling	Systems that automatically ventilate houses and buildings with outside air using the air handler or furnace fan and its supply duct system, and store cooling in building mass to reduce or eliminate the need for compressor-based cooling.
HVAC	System Improvements	154	Ducts in the Conditioned Space	Designing buildings with ducts in conditioned space to eliminate the heat loss associated with duct leakage.
HVAC	System Improvements	191	Low Cost Operational Strategies for Increasing Cooling Efficiency	By employing low cost methods of increasing cooling efficiency synergistically, a building can benefit from an increase in energy efficiency as well as an increase in comfort.
HVAC	System Improvements	193	ECPM Motor for Residential Forced Air Units	Replace permanent split capacitor (PSC) furnace blower motors with high-efficiency variable speed electronically commutated permanent magnet (ECPM) motors.
HVAC	System Improvements	194	Low Pressure Residential Duct Design with ECPM Motors as a Package	Residential duct design with low external static pressure (ESP) to take full advantage of energy savings from using electronically commutated permanent magnet (ECPM) Motors. See also ET #17.
HVAC	System Improvements	195	Low Static-Pressure Air Filters	Filters with lower static pressure drop to decrease fan energy requirements.
HVAC	System Improvements	332	Variable-Speed Compressor Single-Zone Ducted Heat Pump	A ducted residential heat pump leveraging the successful inverter-driven technology found in ductless heat pumps.
HVAC	System Improvements	285	Super Energy Saver Heat Pump	A broad class of dynamic hybrid phase change materials coupled with residential heat pumps resulted in a super energy saver heat pump. This invention significantly improves heating/cooling efficiency in existing pumps and decreases greenhouse gases. due to reduced energy consumption.
HVAC	System Improvements	151	Water-Cooled Air Conditioner for Residential Application	In air conditioning systems such as Aqua Chill, the outdoor condensing unit is cooled with water in addition to air, which saves energy.
HVAC	System Improvements	156	3-Function Heat Pump: Hot Water, Radiant Floors, and Cooling	Daikin Altherma is an air source air-to-water heat pump system, providing residential heating, cooling and domestic water heating.
HVAC	System Improvements	190	Air to Water and Water to Water Heat Pump, Turbo Loop	Use water-source/ground-source heat pumps or air source heat pumps for water heating applications such as domestic hot water and hydronic radiant floor heating.
HVAC	System Improvements	14	Passive Options for Heating and Ventilation	Provide heating and ventilation by passive means. Unlike active systems, passive design doesn't involve the use of mechanical and electrical devices, such as pumps, fans, or electric controls to move solar heat.
Lighting	Lamps/Fixtures	150	LED Under-Cabinet Lighting	LED lighting for mounting under cabinets, typically in office cubicles and kitchen applications.

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Lighting	Lamps/Fixtures	67	Scotopic Lighting	Spectrum-adjusted lighting that limits non-visible wavelengths and emphasizes effective wavelengths to make lighting more effective visually for the same power output.
Lighting	Lamps/Fixtures	104	Electron Stimulated Luminescence Lighting	New application of cathode-ray tube technology applied to general lighting. Replacement lamp targeted to compete with residential compact fluorescent lamps in price and performance, but dimmable on any household dimmer. The R30 flood won an Innovation award at the 2012 LightFair International.
Lighting	Lamps/Fixtures	289	Hybrid Halogen-CFL Light Bulb	A unique, new incandescent-shaped lamp that combines the instant brightness of halogen technology with the energy efficiency and longer lifespan of compact fluorescent (CFL) technology.
Lighting	Lighting Controls	112	Color Tunable General Lighting	Adjusting the level and color temperature of lighting at different times of the day to avoid disrupting circadian rhythms, the biological cycles that can impact productivity and sleep.
Lighting	Lighting Controls	137	Dimmable Fluorescent Lighting	Controlling light for architectural ambience or activity-specific needs may require dimming down to 1% of full output, and continuous dimming can provide smooth light-level reductions
Other	Design	566	Use NREL's BEopt Program to Help Optimize Design for New Homes	Utilize NREL's BEopt software to provide builders, designers and architects with the most cost-effective energy efficiency options during the design process.
Other	Energy Management	567	Low-Energy Home Districts	Developments or neighborhoods set aside to require all new construction or renovation to meet specific energy efficiency targets as a community.
Other	Purchasing	318	High Volume Purchasing	Encouraging and facilitating buyer aggregation for purchases of larger volumes of more efficient equipment and materials to reduce cost premiums.
Other	Purchasing	367	High-Performance Window Value Purchase Program	An initiative sponsored by US DOE encourages the purchase of U-value .20 and .24 windows, with the goal of high volume of purchases in order to reduce product costs
Other	Financing	408	On-Bill Financing of Energy Efficiency Projects	Financing by electric utilities of energy efficiency projects for customers by adding payments to their monthly bills, providing energy efficiency for no upfront costs and no increase in monthly bills.
Plug Load	Appliances	336	Master Control for Residential Electrical Appliances	This technology uses radio frequency to communicate to all connected switches and wall receptacles so that all associated lights and electronic devices can be turned off with the flip of one master switch. Turning the master switch "off" would also set the thermostat to economy mode.
Plug Load	Appliances	568	Size Residential Appliances for Efficiency	Guidelines for builders and consumers to choose appliances correctly sized for their needs.
Plug Load	Appliances	148	Energy-Efficient Office Equipment	A strategy that encompasses opportunities to save plug load energy by purchasing high efficiency office equipment (Energy Star or better-than-Energy-Star when available).
Plug Load	Appliances	198	Condensing Residential Clothes Dryers	A clothes dryer that recovers the waste latent and sensible heat to preheat domestic hot water.
Plug Load	Appliances	421	Auto-Off Switch for Appliances	A switch that automatically turns off standby power completely off when the appliance is not in use.

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Plug Load	Energy Management	176	Youlet Glowing Wall Outlet	An outlet cover that has an LED that glows when it is supplying power, signaling you that a device was left on.
Plug Load	Energy Management	468	Plug Load Energy Management	Smart plugs save energy by employing occupancy sensors, load sensors, remote controls, or USB interfaces to automatically power down unnecessary plug loads when connected equipment is not in use. Some devices can also generate detailed reports on appliance energy consumption, demand, and operating costs.
Plug Load	Appliances	84	High-Efficiency Set-Top Boxes	Electronic devices that convert incoming data signals to a format usable by a TV or computer monitor. Conventional devices constantly draw power, even when in sleep or standby mode, so replacing these with high-efficiency models will help curb overall power usage.
Plug Load	Appliances	189	Energy-Efficient Computer Power Supplies and Adapters	Power supplies and adapters running at efficiencies greater than 80%. The industry average is 75%.
Plug Load	Appliances	280	Smart Circuit Controllers	A web-enabled electricity controller that provides users real time data and actionable rules for remotely controlling electricity via the internet.
Plug Loads	Appliances	149	Insulated Heat Tape for Freeze Protection with Advanced Controls	Electric heat tape for water pipe heat protection that includes insulation and thermostatic control.
Plug Loads	Appliances	224	Heat Pump Clothes Dryer, Residential	Laundry dryers for residential application that use heat pump technology to supply the required heat.
Plug Loads	Energy Management	569	Auto-Off Controls for Electric Blankets and Heated Mattress Pads	Controls to automatically shut off electric blankets and mattress pads to save energy, while providing desired comfort for the user.
Plug Loads	Transportation	282	Smart Charger Controller	A device to manage peak demands in the electric grid as more electric vehicles hit the road. The Controller tells the car's battery when to start and stop re-charging based upon existing stress in the grid.
Renewable Energy	Systems	326	Hybrid Solar Electric/Thermal System	This is a new system that uses air as the working fluid instead of water.
Whole Bldg/ Meter Level	CHP Systems	73	Residential Scale Combined Heat and Power (CHP)	Residential scale fuel-based generators that recover excess heat so it can be used to produce hot water, space or pool heating.
Whole Bldg/ Meter Level	System Improvements	349	Vacancy Sensors	Lighting or equipment controls that users manually turn on but that automatically turn off when the space is vacated.
Whole Bldg/ Meter Level	System Improvements	363	Hand-Held Audit Devices	Energy-auditing applications on electronic tablets, smart phones or other hand-held devices.
Whole Bldg/ Meter Level	System Improvements	60	Flower Pod	The flowerpot power meter is a digital plant who's health responds to your household electrical usage--if usage is above average, the digital flower withers and dies; if below average, the flower blooms.
Whole Bldg/ Meter Level	System Improvements	72	Utility-to-Building Connection	Smart grid technologies able to control equipment remotely from utilities
Whole Bldg/ Meter Level	System Improvements	76	Smart Garage	The concept of utilizing hybrid vehicle batteries for personal and grid energy storage, reducing peak energy demand and facilitating more use of renewable resources.

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Whole Bldg/ Meter Level	System Improvements	94	Residential Electricity Usage Monitoring Device	A device that displays the electricity consumption within a building in aggregate, by circuit, or by receptacle, depending on the model.
Whole Bldg/ Meter Level	System Improvements	294	Non-Intrusive Load Monitoring	A method of disaggregating facility loads into individual components by non-intrusive methods without the need for submetering.
Whole Bldg/ Meter Level	System Improvements	344	Infrared Drive-by Building Envelope Assessments	Conducting "drive-by" infrared camera (thermal imager) scans of homes provides a fast, easy, and low-cost "snapshot" indication of building shell thermal performance.
Whole Bldg/ Meter Level	System Improvements	362	In-Home Energy Use Displays	Devices that encourage energy conserving behavior changes through providing home occupants with information about their current energy usage, goals, trends and utility price signals.
Whole Bldg/ Meter Level	System Improvements	422	Green Button Initiative	A utility-led effort that responds to a White House call-to-action to provide electricity customers with easy access to their energy usage data in a consumer-friendly and computer-friendly format via a "Green Button" on electric utilities' website.
Whole Bldg/ Meter Level	System Improvements	387	Innovative Behavior Change Techniques	Techniques to motivate end users, energy managers, or facility managers to change their behavior in order to achieve energy savings.