

Public Utility Commission of Texas:  
Katie Rich, Director, Infrastructure Policy Section  
1701 N. Congress Avenue, Austin, TX 78701  
[Katie.Rich@puc.texas.gov](mailto:Katie.Rich@puc.texas.gov)

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**Mitsubishi Electric Cooling and Heating - Public Comment**

Randall Towb – Strategic Accounts and Utilities, Mitsubishi Electric Cooling and Heating  
Steve Jones – Southwest Business Unit Commercial Sales Manager, Mitsubishi Electric Cooling and Heating  
Nick Conklin – Application Engineering Manager, Mitsubishi Electric Cooling and Heating

Texas Public Utility Commission – Energy Efficiency Implement Project (EEIP) meeting to present Energy Efficiency Conservation Measures (EECM) for SOP and or MTP Utility Programs for VRF HVAC equipment.

Mitsubishi Electric manufactures highly energy efficient cooling and heating HVAC systems, commonly known as ductless heat pumps and variable refrigerant flow for the residential and commercial markets. These systems are often referred to as ductless technologies, because rather than move a fixed volume of air through ductwork like traditional unitary equipment, these systems utilize *refrigerant* to move energy, resulting in much less in terms of energy loss that is experienced through duct work.

Testimony today concentrates upon VRF – Variable Refrigerant Flow systems – which are the commercial version of this type of heat pump technology.

VRF (variable refrigerant flow) systems utilize very similar heat pump technology to heat and cool commercial buildings. By utilizing inverter compressors and other advanced features, VRF systems vary their energy delivery, and are better suited to match the HVAC systems energy delivery to the buildings energy demand.

VRF system installations are growing in Texas. It is important that we develop appropriate programs that will properly capture the incredible energy savings that we are seeing from this innovative technology – in many cases in excess of 30% savings. Today's metrics that measure the energy efficiency level of unitary equipment are the closest thing that exists for VRF systems to qualify for energy efficiency incentives. Commercial unitary equipment is measured in terms of EER – Energy Efficiency Ratio – which is a measure of the full load efficiency of the HVAC system. However, buildings spend the majority of the time in *part load* conditions, in fact nearly 98% of the time. It is in this part load condition that inverter based VRF systems shine, varying their capacity to meet the buildings energy demand only, and no more. This, coupled with the fact that there are no duct losses, accounts for the majority of energy savings of this technology. The developed efficiency metric to measure the efficiency of VRF is called IEER – Integrated Energy Efficiency Ratio.

Additionally, these systems enable a consumer to have individual control over each zone in a building. Whether installed in a residential or commercial building, these systems can be turned on or off easily with individual remote controls. Akin to turning the lights on or off as we enter each room in a building, VRF enables an individual to turn the HVAC system on or off based upon capacity of the room. Thus there is no need to heat or cool spaces that are not occupied, saving large amounts of energy.

The time is right to integrate VRF specifically into programs. HVAC industry organizations including manufacturers, EPA, AHRI, and others have been hard at work developing Standards and Specifications for VRF that are aimed at supporting this program development.

- AHRI 1230 is the developed testing standard for VRF, utilizing the IEER metric [[http://www.ahrinet.org/App\\_Content/ahri/files/standards%20pdfs/AHRI%20standards%20pdfs/1230.pdf](http://www.ahrinet.org/App_Content/ahri/files/standards%20pdfs/AHRI%20standards%20pdfs/1230.pdf) ].
- CEE (Consortium for Energy Efficiency) in January just issued the VRF specification [ [http://www.cee1.org/files/CEE\\_CommHVAC\\_UnitarySpec2012.pdf](http://www.cee1.org/files/CEE_CommHVAC_UnitarySpec2012.pdf) ].
- EPA has developed Energy Star ratings for VRF [[http://www.energystar.gov/index.cfm?c=lchvac.pr\\_crit\\_lchvac](http://www.energystar.gov/index.cfm?c=lchvac.pr_crit_lchvac)]

In closing, I would like to ask the board to please support the development of programs in the state that appropriately incentivize VRF systems. By adding a VRF category to the Texas 25.181 – 18 Energy Efficiency Goal for Standard Offer Programs and Market Transformation Programs utilizing the appropriate energy efficiency metric IEER, utilities will accurately capture the associated energy savings and properly incentivize the technology.

We are available to the Board for future presentations, and offer support from our staff of engineering professionals.

Best Regards,

Randall Towb

Mitsubishi Electric Cooling and Heating  
Manager of Strategic Accounts and Utilities