Dr. Saim Memon

Dr. Saim Memon, Senior lecturer in Electrical Engineering at London South Bank University, London, UK. He studied BEng (hons) in Electrical Engineering (Mehran UET, Pk), MSc in Mechatronics (Staffordshire University, UK), PhD in Electrical and Electronic Engineering (Loughborough University, UK) and PGCert in Teaching Qualification FE (University of Aberdeen, UK). He is a Chartered Engineer and Fellow of Higher Education Academy having a Qualified Teacher status by General-Teaching-Council-for-Scotland (GTCS). Dr Saim has multi-disciplinary research/academic experiences in Electrical, Electronic, Solar-Thermal-Vacuum-Systems and Renewable-Energy Engineering. His research experiences are on energy-materials for vacuum-insulated-smart-windows, renewable energy technologies, thermoelectric-materials with vacuum-insulation and heat-storage for the improvement of electric-vehicles charging-efficiency. He has over 35 research publications in the form of high-impact-journals, book-chapter, conferences, book-editor, newsletters and vacuum science magazine. He secured funding worth of over £64k as a lead from H2020, Innovate-UK, The IET EEGS, DAIWA-Anglo-Japanese, RAEng participation and Newton-Fund participation grants. He is developing and presented his research findings in collaboration with leading scientists in the UK, Europe, Japan, Kenya, Thailand, Malaysia, Peru, USA, Russia and China.

RETROFITTING THE EXISTING DOMESTIC HOUSING STOCK WITH THE ENERGY-EFFICIENT SMART WINDOW TECHNOLOGIES

***Abstract*:** Carbon footprint and energy efficiency of buildings are deemed to be the global concerns due to links with fuel poverty and climate change. There is also a solemn prospect of balancing the energy supply and energy demand. Smart Vacuum Insulated Glazing (VIG) is a quintessential development in the move to energy-efficient buildings because of the solar thermal energy transmittance through conventional windows (such as double or triple glazed windows) in the hot-arid countries causing an increase to internal cooling energy requirement such as in Pakistan. The reason vacuum glazing is smart is as it maintains the transparency, regardless of tiny pillar dots (0.13 mm high and 0.3 mm wide made of stainless steel allow), and its slim due its narrow vacuum gap (0.13 mm height) when compared to the conventional glazing. A vacuum gap essentially is a space, between two glass sheets, of reduced mass of atmospheric-air, thus air-density defines the level of the vacuum pressure. This provides solar thermal vacuum insulation, because with a lower density of air the mean free path between air molecules can be increased to above 1000 m, ultimately reduces the solar thermal flow between air molecules in a space. The space between two glass sheets is usually evacuated to high-vacuum pressure (0.13 Pa to 1.33·10-4 Pa) in order to reduce conductive and convective thermal transmittance to marginal levels, however the solar energy transmittance through radiation can only be minimized using low-emittance coatings or with electrochromic films. In this keynote talk the results of the experimental and theoretical investigations into the development of smart vacuum glazing along with the scope of semi-transparent PV (Building Integrated PV) with electrochromic thin films will be presented. The experimental and theoretical results of the performance of smart windows and how they would be beneficial in reducing the solar heat gains and reducing the energy requirement will be presented with a further scope of joint research collaboration with Mehran UET and the development of joint-venture in enhancing our international research portfolio will be discussed.