

MANI PALANI P.E., M.Tech, C.E.M., CEP, LEED AP

14090 Southwest Freeway, Suite 310
Sugar Land TX 77478
Email: mani@TMCGreen.com

Phone (713) 294-4180

Career Experience

Superior Customer Service, Global Products and Solutions for High Performance Computing (AI), Mission Critical facilities, Food and OTC drug industry, Laboratory Buildings Design and Operations, Animal care and Biocontainment Lab Ventilation & Operations, Lab Controls and Building Automation, Energy Management, Utility Budget Forecasting and Infrastructure Development, Electricity Purchase, Indoor Air Quality, Life Cycle Cost and Sustainability.

Leadership Skills

- **High Performance Computing (Artificial Intelligence) Hardware and Solutions 2023**
- **Food and OTC Drug products and Solutions from 2018**
- **Global Minerals and Chemicals Supply chain from 2014**
- **International Supply chain Products and Solutions from 2007**
- **Energy and Ventilation Design Specialist, Hospitals, Biocontainment Laboratories, Oct 2003 - 2007**
- Director of Engineering, 1999 – Sep 2003
- Texas Medical Center Energy Cooperative (TECO) Board Member, 1996 – 2003
- Campus Energy Manager, 1996 – 2003
- HVAC and Utility Operations 1994 - 2003
- Facility Management Executive Team 1995 - 2003

Facility Operations, Engineering, and Projects

Member of the UTHSC-H facility management executive team which administered O&M and Capital Planning and Upgrade for a complex research and teaching higher education buildings campus, and directly supervised the HVAC and Utility Operations.

Developed *an innovative energy saving procedure for laboratory air conditioning based on temperature and humidity using energy management control system to reduce energy use without affecting the indoor environmental conditions. **The total energy saved in last eight years is approaching 2 trillion BTU's and 16 million dollars.***

From 1995 - 2003, responsible for developing a \$30 million master plan to systematically replace air distribution system for improving Indoor Air Quality. Analyzed HVAC system and developed scope, supervised a team of engineers in implementing the project with minimum inconvenience to the occupants and research activities in the building and presented this work in EPA Labs for 21st century conference. Made regular presentations to the faculty and research staff about ventilation requirements and comfort conditions.

Managed customer's expectations, built relationship with faculty and staff, performed mechanical systems condition monitoring, analyzed work orders and preventive maintenance calls for operational efficiency, and developed a Master Plan for HVAC Operations Schedule. Competed with top facility outsourcing firms to retain the University O&M team. The proposal was selected by the faculty as the best proposal based on ideas on energy savings, deferred maintenance, and customer service in 1995.

Presented capital upgrade plans, controlled budget and executed construction projects for several years, and successfully integrated the new projects with existing infrastructure. Thoroughly familiar with Job Order Contract, Project Management tools, deferred maintenance and facility condition assessment, and service contracting options.

Coordinated a team of University engineers in fulfilling the Owner's design review and acceptance process. The responsibilities include integrating new building design with campus utilities, conformance with campus standards, design review for energy efficiency, maintenance and commissioning.

- School of Nursing
- Institute of Molecular Medicine (IMM)
- UT-Brownsville
- IMM at Denton Cooley Building (Texas Heart Institute)
- Federal Emergency Management Agency recovery projects
- Federal Emergency Management mitigation infrastructure scope
- Campuswide Deferred Maintenance Capital Projects
- Life-Safety (Sprinkler) and Emergency Power projects

Coordinated design with multiple engineering consultants, evaluating design contract documents, feasibility of scope, approving engineering fee based on GSC guidelines, reviewed engineering design drawings, ensured energy efficiency and indoor air quality standards are met, analyzed testing and balancing reports and developed O&M procedures. Reviewed all applicable codes and standards governing teaching and research space, including lifesafety code, NFPA, uniform building code, Texas administrative code, ADA, ARI, ANSI, ASHRAE, ASME, SMACNA, OSHA 29CFR, NIOSH, NIH Guidelines for Vivarium and Research buildings, CDC/BMBL, NSF for lab equipment, and UL listing.

- Installation of Lab and Office air handling units, pre-treat units, filtration, premium efficiency motors, and variable frequency drives, DDC dampers
- Chilled water fan coils for heat intensive Confocal Microscope, NMR, and MRI labs data centers and computer labs
- Redesign Animal Operating Suite based on AAALAC standards
- Provide ventilation information support for AAALAC Accreditation for Vivarium.
- Retrofit Steam Control Valves and control air piping system to minimize air leakage
- Install meters to measure domestic cold water flow and improve controls
- Installed reverse osmosis water supply system for laboratories
- Upgrading Vivarium suites to biohazard Suites for animals at BSL3 level labs
- Ventilation improvements for Kitchen Grease Duct System Hoods and replace kitchen exhaust fan with cafeteria ventilation improvements
- Wind modeling around buildings in a flow chamber to avoid re-entrainment

- Thirty R-12 Cold Environmental Rooms retrofitted as per EPA 40 CFR 82, subpart F regulatory guidelines, with non-CFC refrigerant and equipment replacement.
- Implemented continuous and direct supply of chilled water from a district chilled water system to cool Cyclotron equipment resulting in reduced pumping energy.

Coordinated and restored utilities and stabilized the indoor environment immediately after Houston Tropical Storm Allison (TSA) flooding. Produced a Request for Proposal document to obtain a best value for \$5.0 million scope of work, in mitigating mold and controlling humidity for the last 20 months using temporary air conditioning equipment.

Supervised and directed University engineers, consulting engineers and cost estimators in fulfilling all engineering requirements related to FEMA disaster recovery, loss quantity survey, as outlined in FEMA Handbook 321. Maximized the benefits to the University

Contributed towards scope and strategies associated in mitigating damaged elements including major utilities and Vivarium from a future disaster based on FEMA Handbook 322-Mitigation Alternatives for Flood Damaged Public Facilities.

Implemented a temporary Gross Anatomy teaching laboratory maximizing future flexibility and constructed in the design-build fashion within seventy five days, which received full accreditation from Texas Anatomical Board.

Assisted faculty in submitting a \$4.0 million Regional Biocontainment laboratory grant proposal for Regional Academic Health Center at UT-Brownsville.

Assisted faculty receiving \$6.0 million Vivarium facility grant from NIH, 2002.

Specialist in Biocontainment laboratory ventilation and infrastructure. Worked with EH&S in supporting issues related to engineering controls for CDC accreditation.

Thermal Energy Cooperative (TECO) alternate board member (1996 – 2003): Representing the University facilities operations. TECO is a non-profit cooperative partially owned by the University, which provide chilled water and steam for the Texas Medical Center buildings. The annual operation is \$40.0 million dollars. As part of the TECO team shared experience with Houston Industries NorthWind chilled water system planning team and Tulane Medical Center district chilled water system for Entergy Inc.

Coordinated with various entities TECO, UT System, A/E Consultants, Engineers and Project Managers in accomplishing chilled water infrastructure and laterals for several buildings, including metering and integration with building automation system.

Served in Texas Medical Center (TMC) Long Range Planning Committee on Utilities Infrastructure Group and Energy Group task committees, Summer 1998.

Skills, Technology and Knowledge development:

Built a team of digital control technicians and engineers, developed procedures and facilitated training to deliver the most energy efficient health campus in the UT System, and the most effective campus in the Texas Medical Center while providing safe, productive facilities that are in compliance with applicable safety and environmental codes. This team was built after exploring several options including Outsourcing.

Implemented several energy management control systems comprising OWS, data collection and monitoring software, distributed controllers, measurement devices, and upgraded campuswide building automation system to Ethernet. Implemented various utility and process instruments flow meters, electrical demand meters, temperature and humidity sensors, static pressure sensors, and developed a rigorous monitoring program.

Developed automatic processes to limit peak demand and load shedding without seriously affecting indoor environment. Developed a methodology to establish emergency chilled water requirements in hot and humid environment and presented it in the International District Energy Association technical conference.

Developed a combined temperature humidity sensor integrated with laboratory control system. Reviewed specifications and selected the laboratory control system and pressure-independent valves based on operating characteristics; speed of response, reliability, stability, turn-down ratio, communication protocol, and cost.

Energy and Utilities

More than eight years of experience in campus utility forecasting, consumption and budget monitoring, realized savings, analyzed utility rates and procured electricity under deregulated environment, implement renewable energy systems, evaluated energy efficiency projects and established campuswide energy and comfort standards.

Proposed and received an \$8.5 million Texas LoanSTAR energy saving loan for completing an Indoor Air Quality and Variable air Volume Conversion project. The loan will be paid back from energy savings of \$1.0 million per year. Drafted an M&V plan to verify energy savings.

Completed a three year fixed price electricity rate agreement with GLO-Reliant Energy. Further saved \$175,000 during FY 02 by judiciously switching to different rate options.

Completed an Energy Management Plan for the University, which was selected by the Texas State Energy Conservation Office as the model plan for other State Agencies.

Initiated the *efforts to secure between \$600,000 to \$1,000,000 from CenterPoint Energy, based on measured and verified energy and demand savings.*

Performed and presented several Life Cycle Cost Analyses based on NIST/FEMP Handbook 135 for selecting alternative HVAC systems and energy systems (fuel cells, emergency generators, distributed generation, solar photovoltaic).

Implemented four solar photovoltaic projects using the energy savings dollars, expanding the system to become the largest installed on state facilities. Shared the performance data, cost, operating characteristics with facility designers and professionals nationwide. Obtained several grants for Solar photovoltaic systems between 1998 and 2002.

Analyzed the use of combined heat and power (cogeneration and distributed generation) system for buildings, and communicated emission issues with EPA and TCEQ. Thoroughly familiar with distributed generation emissions, grid connections, life cycle cost, economic analysis, fuel availability, O&M issues.

Assisted procurement in selecting "Energy STAR", energy efficient laboratory and research equipment as feasible and available, and conducted several utility audits.

Skills and Education

Highly competent in presentation software, spreadsheets, word processing, and email with strong planning, forecasting and analytical skills. Possess strong leadership skills to influence at various levels of organization.

(Ph.D.) Graduate Research Student in Mechanical Engineering, Texas A&M University.

M. Tech., Mechanical Engineering, Indian Institute of Technology, Madras, India, 1989.

A.M.I.E., Mechanical Engineering, Institution of Engineers, Calcutta, India, June 1986.

Licensed in State of Texas as Professional Engineer

Certified Energy Manager (**CEM**), and Certified Energy Procurement Specialist (**CEP**) from the Association of Energy Engineers, Atlanta.

Certified **LEED** Accredited Professional from U.S. Green Building Council

Professional Development

Continuous leadership and professional development: Covey Training, Peter Sengey, Tom Peters, Peter Block, Goldratt Institute.

ASHRAE, AEE, Higher Education Officers (APPA) Educational Conferences

DDC Open Protocol: BACNET, Building Automation System, AEE, Jan, 1998

Measuring and Verification, and Electrical Monitoring, July 1998

Utility Photovoltaic Conference 1998, several TREIA Solar PV workshops

Fuel Cell Conferences, October 1998, and 2001

Combined Heat and Power Turbine Forum, EPA, San Diego, March 2003

IAQ and HVAC in Hot & Humid Indoor Environments Workshops

Several Research buildings, Vivarium and Biocontainment laboratories workshops

IFMA Facilities Strategic Planning course, October 17-19, 1998.

Honors

Received the Government of India Scholarship for Master of Technology.

The State of Texas Honors for “University of Texas Houston – Health Science Center” for taking care of Texas through outstanding efforts in environmental protection and pollution prevention. 1999 Texas Natural Resource Conversation Commission Program.

Featured as a Tropical Storm Allison Hero, July 2001. A Model employee in the University Development Board brochure, 2003.

Presentations and Publications

- *“High Performance Campus Buildings: Reducing Costs Through Energy and Environmental Retrofits & New Construction,”* Daniel Sze, US Dept of Energy, Mani Palani, UTHSC-H, scheduled for presentation in APPA/NACUBO Joint Education Session in Nashville, July 2003.
- *“Lessons Learned from a Large Laboratory Building Indoor Air Quality Retrofit Project and Energy Savings from Variable Air Volume Approach”*, Mani Palani, Pek Y Lee, Jack B Esmond P.E., scheduled for presentation in EPA Labs for 21st Century, 2003 Annual Conference on October 21-23, 2003 in Denver, CO.
- *“Energy Efficiency Case Study at the University of Texas Health Science Center at Houston”*, Energy Planning for Texas' Future, A 21st Century Blueprint for State and Local Governments sponsored by USGSA, Texas GLO, Texas SECO, FEMP, and TCET, University of Texas at Austin, August 15, 2002
- *“Lessons Learned from HVAC Duct Cleaning and Coating Project in Higher Education Research Building”*, Mani Palani, Pek Y. Lee, at the Second International Conference on Indoor Air Health: Trends and Advances in Risk Assessment and Management, hosted by NSF International, January 2001, Miami, Florida.
- *“A methodology to establish the emergency chilled water requirements for a large medical center district cooling and heating system in hot and humid environment”*, presented the 14th Annual IDEA Cooling Conference, October 6-8, 1999, NJ.
- *“Indoor Air Quality Master Plan Guidelines”*, Laboratories for 21st Century conference, Sponsored by Environmental Protection Agency, Federal Energy Management Agency, Boston, MA, September 1999.
- *“Assessment and Utilities Savings at UT Houston”*, May 1998 Facilities Manager, The Association of Higher Education Officers. Brian Yeoman, Mani Palani, Chris Mckee.
- *“Predicting the performance of a residential air conditioner under reduced evaporator air flow”*, Improving Building Systems in Hot and Humid Climates, Dallas, TX, 1992.

Professional Societies

Member of Association of Energy Engineers, and Associate Member of American Society of Heating Refrigeration and Air conditioning Engineers.

References available upon request

Biocontainment Design and Mission Critical Facilities Design and Equipment Solutions

Experience

11 years of facilities operations, management, design and engineering

Projects

University of Texas Arlington Nano-Physics-Chemistry Teaching and Research Laboratory

Laboratory Ventilation, air distribution, fumehood controls, exhaust fans

Energy Simulation, ASHRAE Compliance

UTMB Fuel Cells Heat Recovery

Dell Children's Hospital Energy and Ventilation Analysis, LEED Compliance

Galveston National Laboratory

Basis of Design, MEP Schematic Design, Effluent Decontamination System, Breathing Air,

Supply and Exhaust HEPA Systems, Design Development, Energy Recovery Analysis,

Sterilizers

Lovelace Respiratory Research Institute

Weapon-Grade Agents, Enhanced BSL3, Redundant exhaust systems, Effluent Decon,

Sterilizers, Bioseal dampers, HEPA Casissons, working with Presidents, Products Divisions

Head

Animal Holding Rooms

Equipment

Exposure Chambers, Necropsy downdraft table, A2/B2 Biosafety cabinets, HEPA and ULPA

filters for air handling units, exhaust systems, supply terminal, exhaust systems, bioseal dampers

gas-tight and bubble-tight, Exhaust fans, Fermenter, Sterilizers,

Effluent Decon System, Digestor

University of Texas Austin Nano Technology Class 100, 1000, and 10,000 Laboratory

Ventilation Particle and HEPA filtration analysis

Skills

Laboratory ventilation design

Energy efficiency and Controls

Tools

NIH Design Guidelines

BMBL

Guide for Care and Use of Animals

WHO Biocontainment Guidelines

Canadian Biocontainment Guidelines

Energy Efficient Labs (Labs for 21st Centuries)

ASHRAE 90.1 Standard for Non-Residential Buildings, 1999, 2001, 2004

TRANE TRACE700, Carrier HAP

LEED 2.1 and Proposed LEED NC 2.2, LEED for Laboratories

ANSI Z9.5

NSF 49

Breathing Air Standard

IEST Standards