



Residential Systems

When designing/building a multi-million dollar home, although not the most exciting aspect of project, the heating and cooling system should be looked at in great detail. The heating and cooling system will typically last 20 plus years and should be designed to meet the customer's expectations over its lifetime.

A home owner has many options for the heating and cooling systems and with the federal tax credits available many renewable technologies are also very attractive. Typical paybacks range in the 5-12 year range with significant Internal Rate of Returns.

The best system will not perform to its maximum efficiency if it is not designed correctly. Most systems are designed using supply house rules of thumb to size

equipment. Ducting, radiant floor tubing, and hydronic piping is ran based upon on site evaluation and again rules of thumb.

The problems with rules of thumb evaluations are they typically over size equipment and miss the finer points.

DMA Engineering has experience in designing and commissioning several million dollar residences in the in the Cherry Hills Village market. Our designs typically incorporate ground source heat pumps as the primary heating and cooling system along with solar thermal, and solar photovoltaic systems.

By giving the general contractor a completed design with a full set of construction documents competitive bidding ensures the customer receives the best value.

Residential Services

DMA Engineering is a Mechanical, Electrical and Plumbing engineering firm. Our main cliental is in the million dollar residential and commercial markets. We have designed ground source heat pump systems, solar thermal and solar photo voltaic systems along with conventional systems. Our residential design process is:

- **Energy Analysis.** We perform an energy analysis using Trane's TRACE 700 software and in house programs. The model is based upon the buildings construction including insulation, windows, building orientation, appliance and lighting loads. The purpose of the energy analysis is to determine the house's heating and cooling requirements, and equipment size. Based upon the heating and cooling loads we compare the overall energy usage of different systems. Our analysis follows the procedures and requirements of the International Conservation Code and the ACCA Manual J.

Schematic Design: After the energy analysis we do a schematic design were we evaluate each system modeled in the energy analysis and develop general costing of each system, payback schedules, and the intrinsic value of each system.

Meeting with the Builder/Architect and homeowner. At this point we meet with all the parties involved to discuss the results of the schematic design. At this meeting we develop a system that fits with the customer's values, budget and long term goals.

To view a Net Zero Residence case study visit us at:
www.dma-eng.com

System Design. Based upon the outcome of the meeting we design the heating and cooling systems for the home. Our designs include:

- Radiant floor tubing designs
- Duct designs to ACCA manual D standards
- Ground loop heat exchanger
- Solar thermal system
- Solar photo voltaic system
- Boiler system
- Energy Recovery Ventilators
- Controls systems
- 3D mechanical room drawings
- Stamped engineering drawings

Our finished product is full set of construction documents including radiant tubing layouts, duct designs, equipment schedules, and specifications.

Construction Administration. We assist the general contractor in equipment substitutions; RFI's and changes to documents necessary to complete the project.

- **Commissioning.** System commissioning ensures the system functions as it was designed and meets the customer expectations. We make several site visits at significant milestones to check contractor's work and report any deficiency's to the general contractor to rectify. We participate in the final system balancing, controls programming and system sign off.
- **Additional Services.** We offer additional services for customers who would like to obtain a LEED or Energy Star Certification. The basis for these certifications is the HERS rating which we can perform. Sustainable design services evaluating construction practices and material selections. We also offer advanced 3D drawings of the entire house showing all duct and piping runs.

