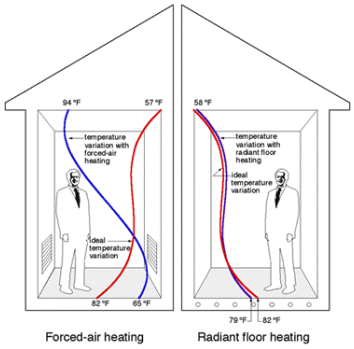
Radiant Slab Floor - *Getting to know Radiant Heating* - **Southern Energy Expo** Workshop
Sunday 11:30 Presenter: Tomas Koenig

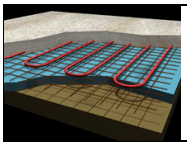
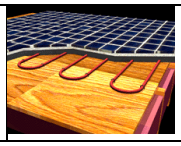


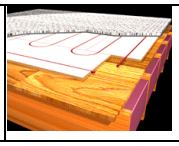
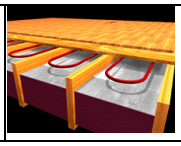
Forced-air heating Radiant floor heating

Studies that compared several hundred homes, some with central forced-air systems, others with baseboard convectors, found air leakage rates averaged 26% higher and energy usage averaged 40% greater in the homes with forced-air heating.

A factor in this is air temperature stratification; the tendency of warm air to rise toward the ceiling while cool air settles to the floor. In extreme situations the difference in air temperature from floor to ceiling can exceed 20 ºF. Stratification tends to be worsened by high ceilings, poor air circulation, and heating systems that supply air into rooms at high temperatures.

construction	Heatloss	Other BTU/sq.ft.
unusually tight	10 – 15 Btu / sq.ft.	De icing 350 up
usually tight	15 – 25 Btu / sq.ft.	Snow melt 150 –
not tight:	20 – 30 Btu / sq.ft.	Pool heat 50 –100

Overview most common radiant heating uses

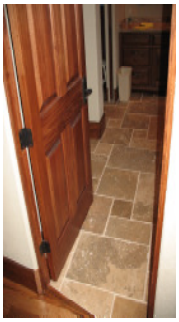
Radiant heating - warm floor	Living space heating. Comfort level bathroom versus bedroom
Radiant heating - warm surfaces	Warm areas such as benches, counters
Radiant heating for point of use	Heating towels and bathrooms, kitchen kick-space
Radiant – Hydronic – point of use Radiator	Built-in, free standing, sunk-in, joist cavities
Snow melt	Drive ways, Porches, Patios other
De- icing	Walkway
Pool heating	Pool itself perimeter walkway

A) passive heat loss prevention measures
Polystyrene foam boards 1" inch to 2" inch underneath slab R4 –R8 around perimeter - basement slabs
Concrete barrier foil equivalent to R8 – slab on slab - retrofit – behind radiators –others
Poly Urethane expanding foam around openings
Anti -Crack membrane below tiles

Floor preparations: Construction Phase
SLAB – Perimeter insulation: Heatloss – 6 –10% downward – up to 25 % outward (perimeter – face of slab)
FLOOR - joist and Ceiling Truss system: Heatloss 6- 10 % downward (conditioned space) 10 – 20% unconditioned space (crawlspace) plus perimeter losses
CEILING - truss system: Heatloss 10 % - 20% upward (conditioned space) 20% - 30 % unconditioned space (attic space)
WINDOWS -DOOR: unsealed caps – up 10% of total heatloss

Floor coverings:
Typical floor coverings - stamped, tiled, wood, floating wood, cork, floating cork, carpet, plastic composite other.





Typical surface temperature: Residential
Indoor comfort levels : 3 - 4 deg F per 4 ft of the floor surface
- bedrooms – air temperature 68F – surface floor temperature 72F (Out door temperature 10 F)
- bathrooms – air temperature 72F- 78F – surface floor temperature 76F
- living room – air temperature 72F – surface temperature 76F

other areas - Recreation - varies - surface 72F – pool area – varies – surface 78F – work area – varies – surface 66F
Peds and animals - as per needs


Renewable Energy sources and Radiant heating: Typical radiant heating system: Heat transfer medium – water – solar collector preheats water before – entering back into the main heating unit. Savings potential – up to 30% year round. Including domestic hot water 70 % thermal solar fraction Heat transfer medium – air – solar collector preheat air before – entering back into the main heating unit. Savings potential – up to 20% year round. Hybrid – hot water to air - Savings potential – up to 15% year round. US department of Energy www.eere.energy.gov.NC solar center www.ncsc.ncsu.edu. Great resources Radiant Panel Association www.**radiantpanelassociation**.org/ Local member: Advanced Thermal Solutions, Inc. www.gotsun.com

Credentials: H1 NC licensed Contractor and co-founder of ***Advanced Thermal Solutions, Inc***.