Geothermal Heat Pump Basics

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Who is Southern Solar?

- ***Southern Solar (SS)*** is an alternative energy business serving the southeast.
- Providing solar thermal, solar photovoltaic and geothermal heat pump system design and installation.
- Founders have decades of experience in DOE and NASA renewable energy fields.
- Experienced the first energy crisis and remained poised for this one.
- ***SS*** has General Contractor (GC) licenses in Alabama, Tennessee, and Louisiana.

Geothermal Heat Pumps go by many different names

- Ground source heat pumps (GSHP)
- Ground coupled heat pumps (GCHP)
- GeoExchange (GX?)
- Earth energy systems
- Geothermal heat pumps (GHP)

Geothermal Heat Pumps

- Uses sun's energy trapped in the Earth through the use of a "ground loop".
- Ground loops can be vertical or horizontal; open or closed.
- Can save 50% or more on heating and cooling bills.
- Geothermal unit life expectancy is over 20 years.
- 30% federal tax credit.
- Runs silent. No outdoor unit.

Many aspects of GHP design are similar to the design of any conventional HVAC system

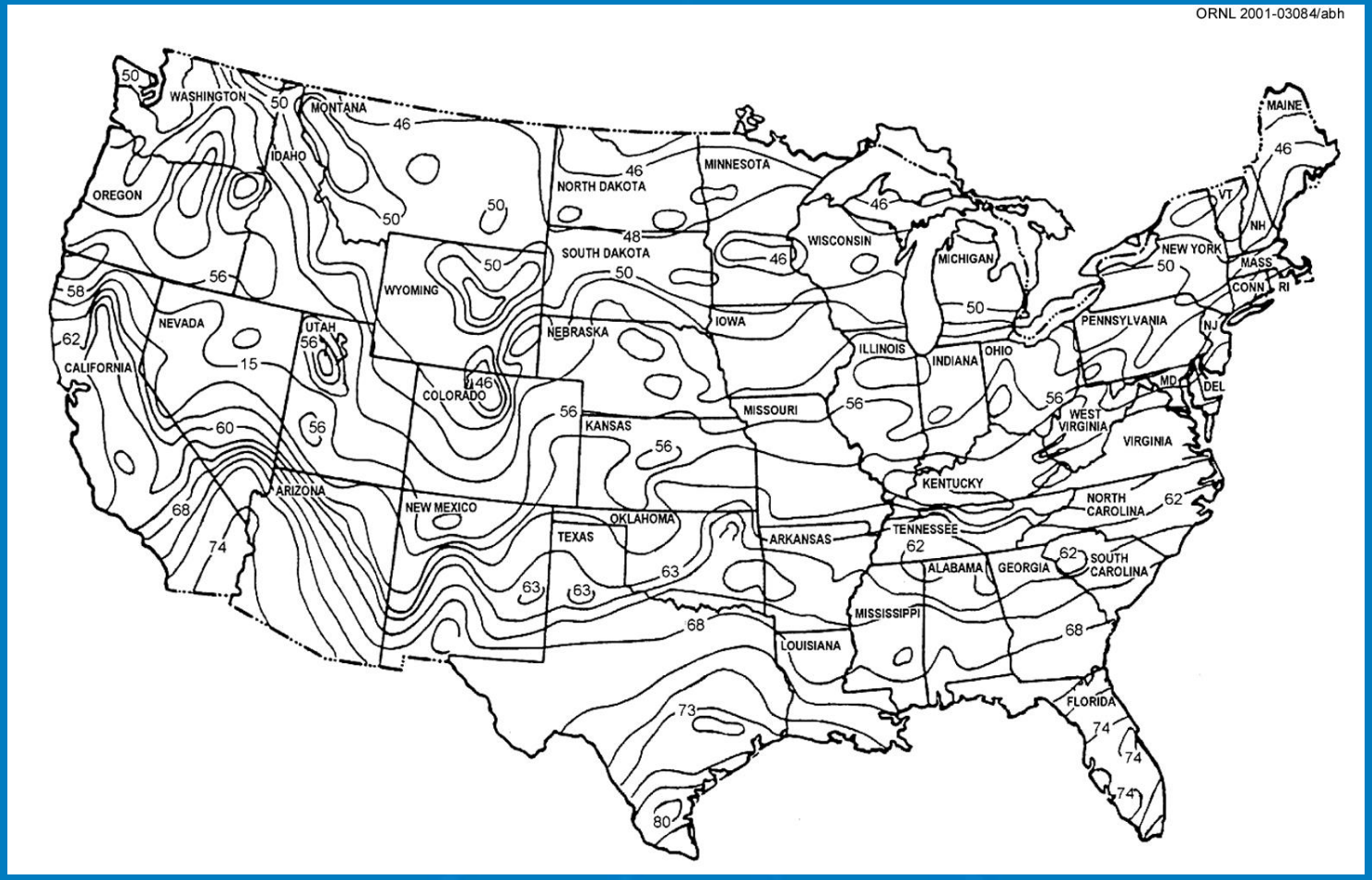
- Calculate peak heating and peak cooling load for each zone of the building
- Select heat pump(s) to meet design loads
- Heat pumps should be located with consideration for serviceability (split or packaged units)
- Size ventilation system components: ductwork, fans, zones, etc.

Why GHPs are more efficient than conventional HVAC equipment

- GHPs exchange heat with the earth, rather than with ambient air (ground water open loop or horizontal or vertical closed loop)
- Earth provides a much better heat exchange medium
  - Stable temperature year-round
  - Generally cooler than ambient air when cooling is needed, and warmer than ambient air when heating is needed

  Heat Pump "*thinks it is springtime year around*"

Deep earth (and groundwater) temperatures in the U.S.



GHPs should also be considered for domestic water heating (DHW)

- A heat pump is the most efficient technology for water heating
- Can use de-superheaters on some heat pumps supplementing conventional DHW
- In cooling-dominated applications, can increase system efficiency by reducing loop temperature by using “free” heat

SUMMARY

- Geothermal heat pumps (GHPs) use the constant temperature of the earth as the exchange medium instead of the outside air temperature.
  - Ground loops can be vertical (wells) or horizontal (placed in trenches or just buried and covered during building construction).
  - Hot water produced at the same high efficiencies as the heating/cooling cycles (free when cooling).
  - GHPs have the potential to offset about *35 to 40 percent* of the projected growth in building energy consumption between now and 2030.
- Cost effective today
  - 3 – 10 year payback.
  - Stimulus bill gives 30% Federal tax credit to residential and 10% to commercial users.

QUESTIONS?

- Thank You!

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