

The Future of Space Heating is a Very Efficient Water Heater

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How many days a year when you are home do you . . .

- Use hot water?
- Heat the house?
- Air condition the house?

What Percentage of Household Energy Use is

- Space Heating?
- Space Cooling?
- Water Heating?
- Percentage that is water heating grows as houses get more thermally efficient.
- Percentage is also large in mild climates:
 - Southern CA, 47-49% of household gas use is for water heating versus 37% for heating

Atmospheric Boiler with Side Arm Tank



Atmospheric Gas Water Heater



Atmospheric Gas Water Heater

- 50 Gallon
- 63,000 Btu
- Where does the make-up air come from?
- Does the air handler cause the water heater to down draft?



Condensing Gas Water Heater

- Water Heater
 - HTC Phoenix
 - 199,000 Btu
- Air Handler
 - First Company
 - 18-24,000 Btu



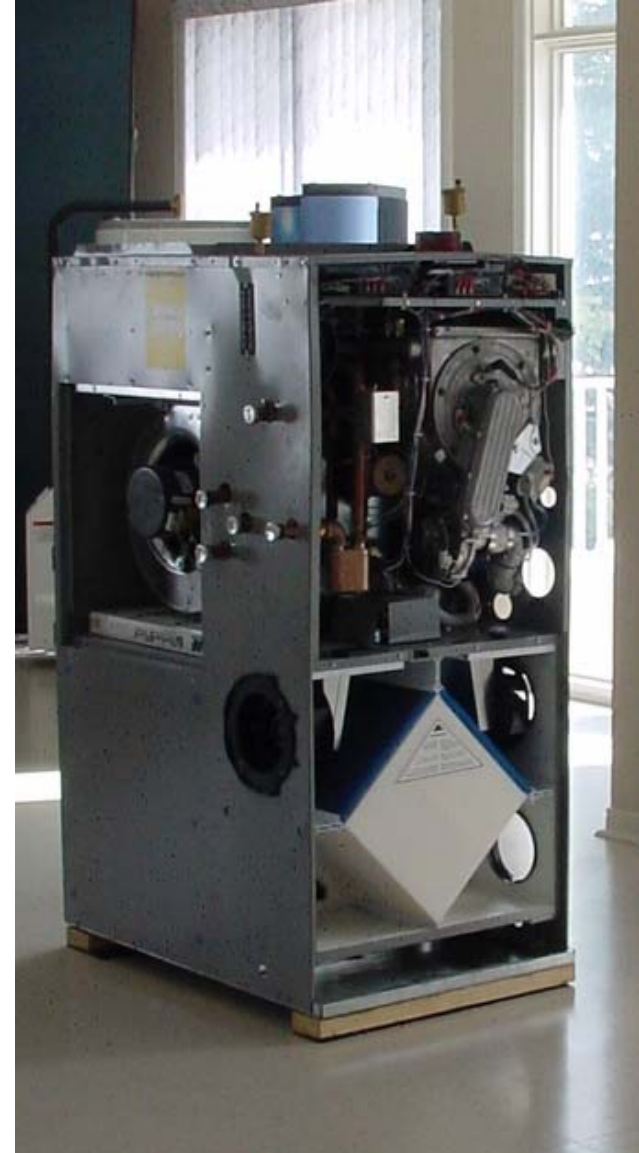
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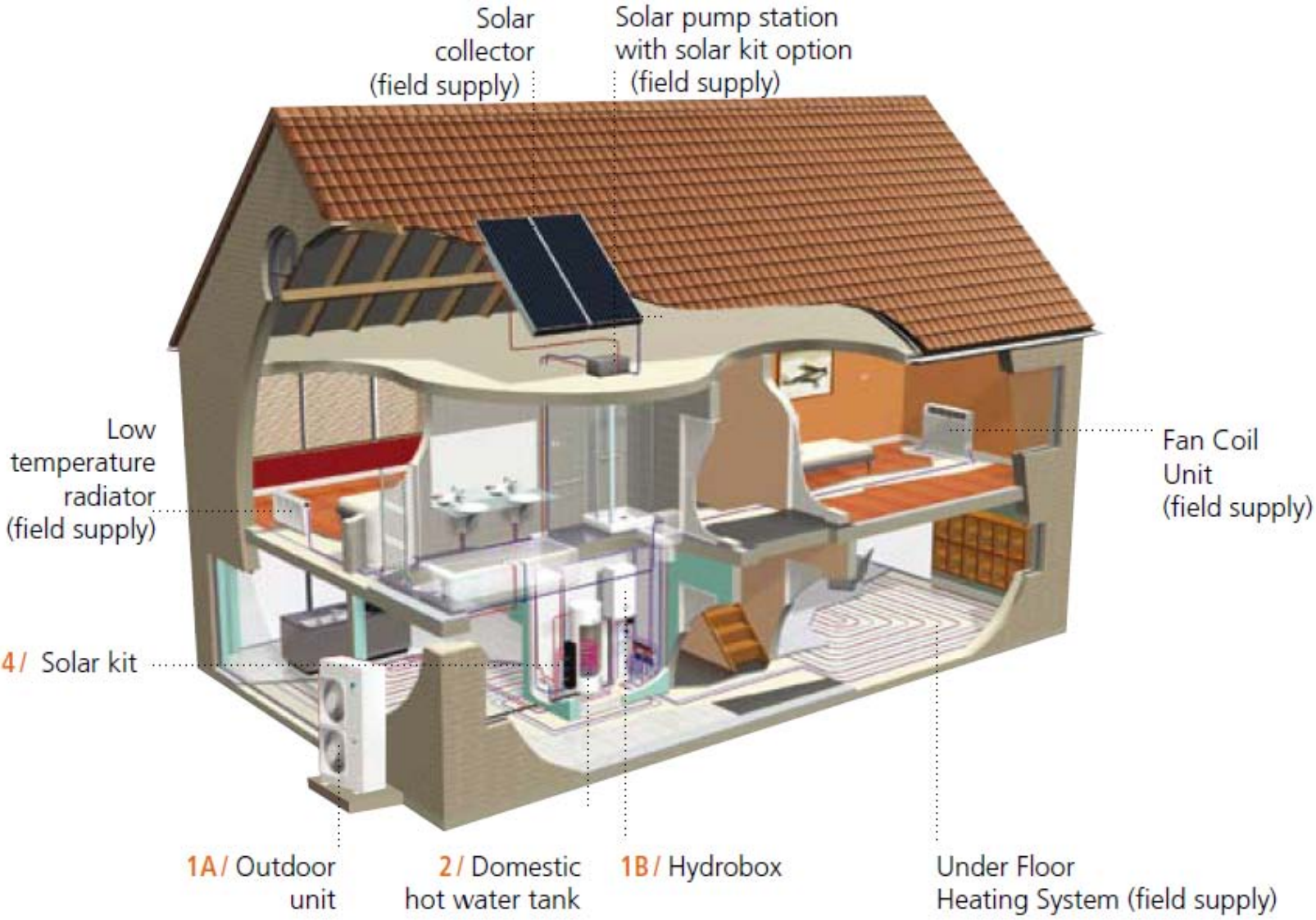


Condensing Gas: Matrix

- Integrated Design
 - Water heating
 - Space heating
 - Air-to-Air Heat Exchanger



Air-to-Water Heat Pump: Daikin



What are the Potential Benefits?

- One thermal engine
- Highest efficiency for the largest thermal peak and largest energy need
- High efficiency for small space conditioning loads
- Sealed combustion and indoor air quality

What are the Potential Problems?

- Sizing:
 - Capacity if heating both water and space?
 - What size air handlers?
- Will gas water heaters operate in condensing mode?
- How will efficiency be measured?
- Which trade(s) will do:
 - Installation
 - Maintenance

What are the Markets?

- High Performance Buildings
 - New Construction
 - Retrofits
- Energy Star for Homes
- Green Building Programs
- Low Income Weatherization

Questions