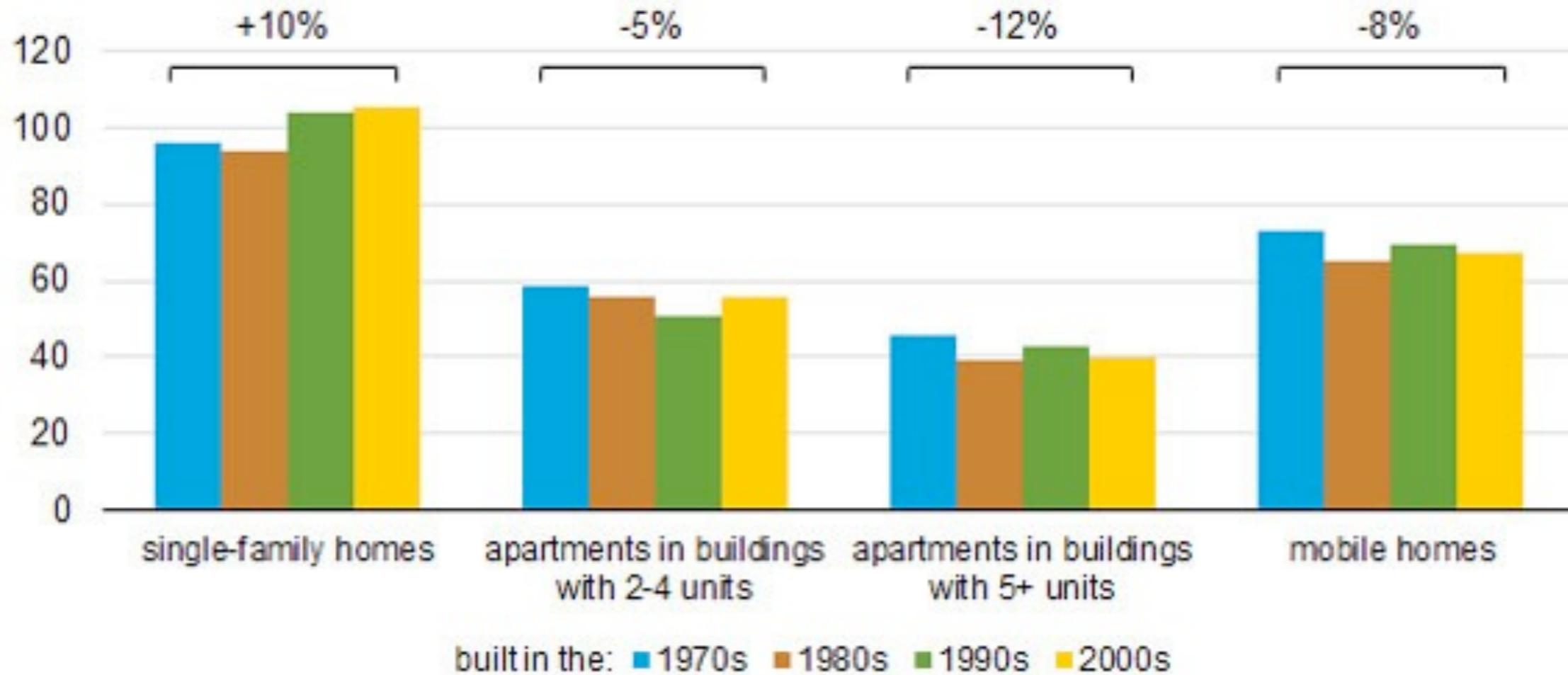


Site energy use per household in 2009 by year of construction

million btu

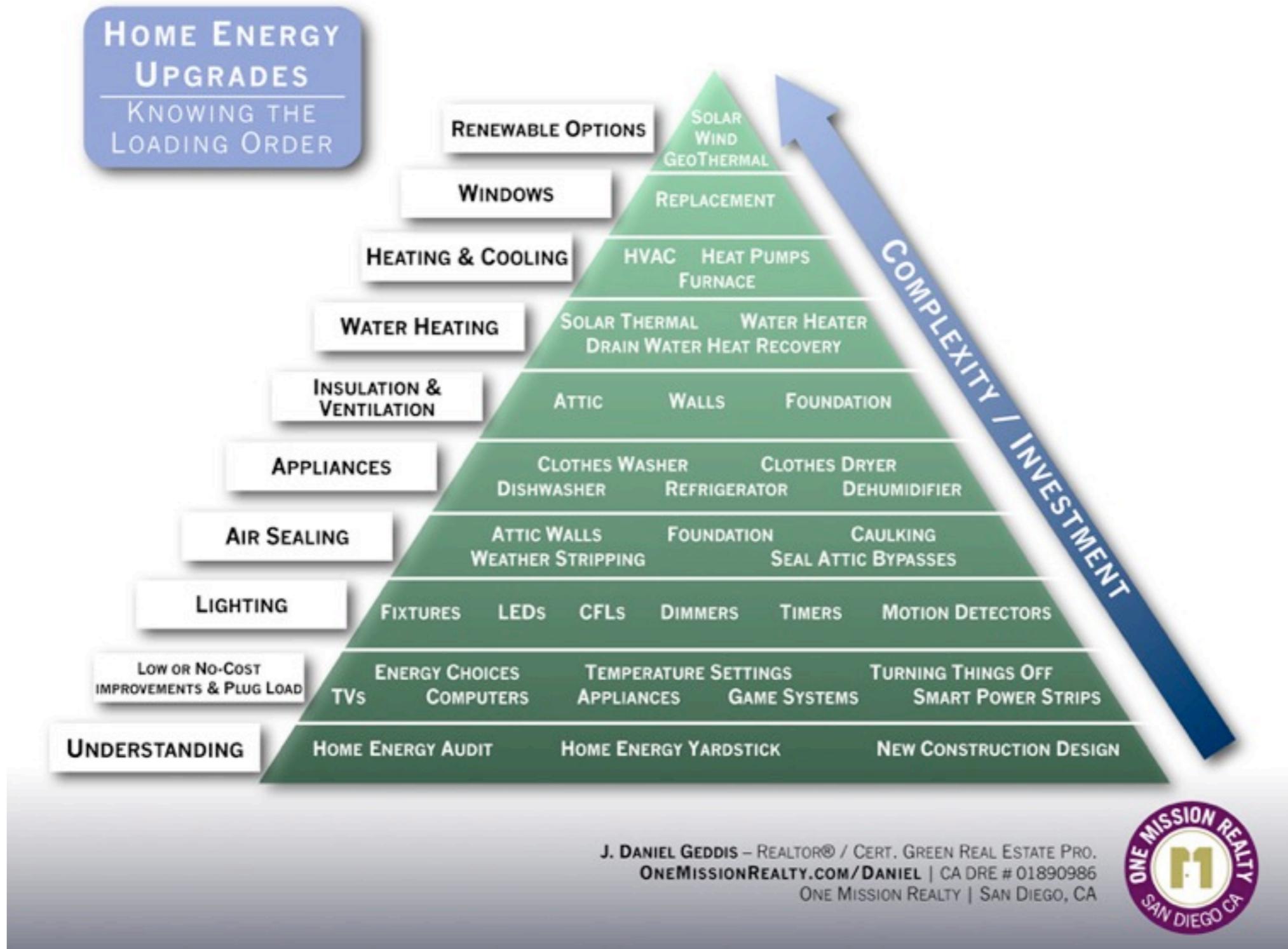


<http://www.eia.gov/consumption/residential/index.cfm>

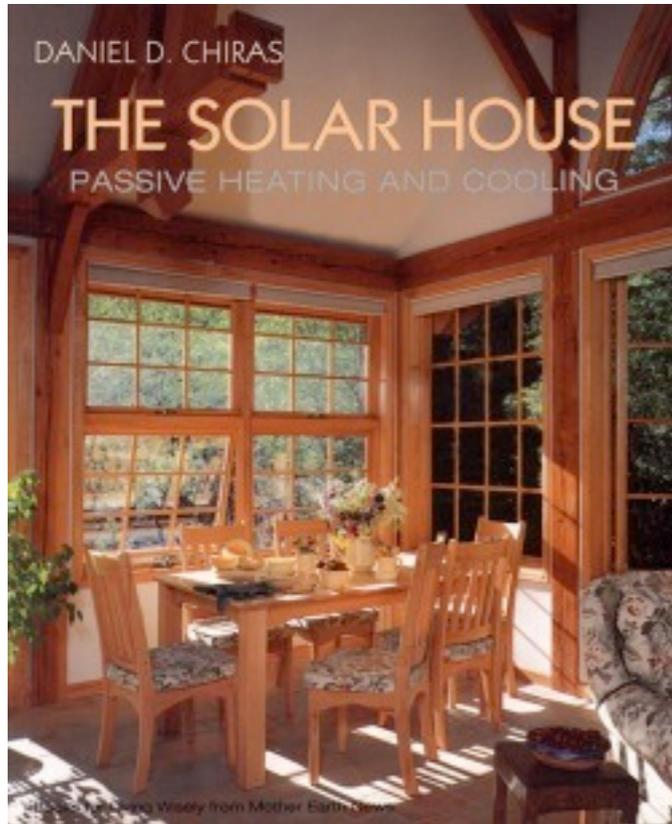
ENVS 132
Solar Home Design - #6

Benoit Delaveau, MS, BEAP

Optimizing EUI / ECI



TEXTBOOK GROUP NOTES

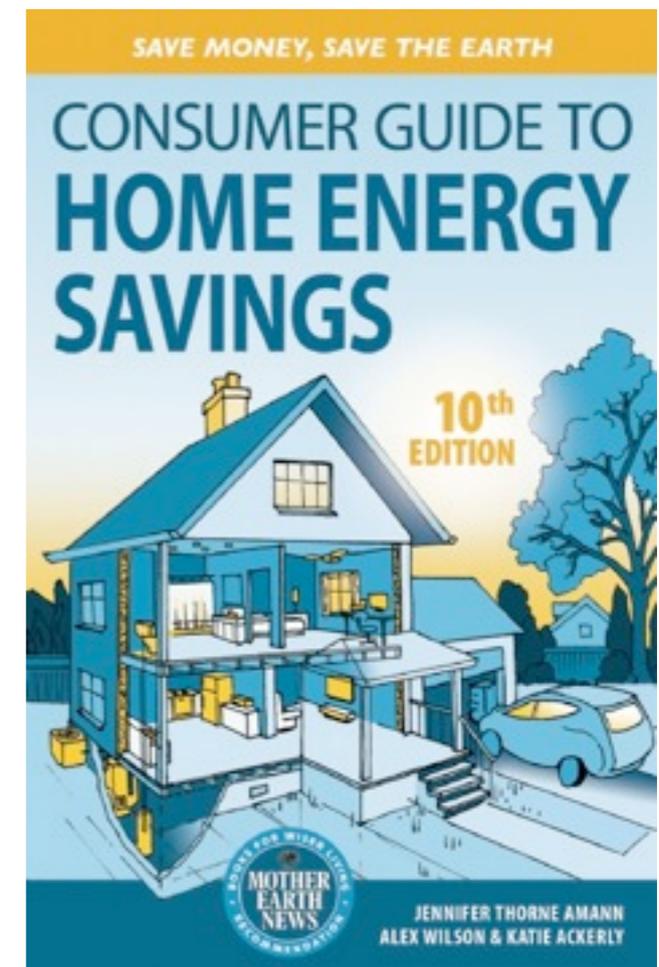


Chiras

Chap 1, 2, 3, 4, 5 , 6.

group notes emailed tonight

Consumer Guide to HES
Chap 1, 2, 3, 4, 5.
group notes emailed tonight



LECTURE #1 - Home Energy and Global Warming

How is global warming linked to energy use?
Explain the scenario regarding global warming.



What major economies have growing GHG emissions? Why?
What is the % of US GHG emissions coming from residential sector? explain.

What is the most important single end-use in homes regarding energy use?

Define Emission Factor for electricity. Why is it changing?
Define it for natural gas. Compare. Is nat. gas better than electricity from a Global warming perspective? Explain.

What are the unit of electricity/nat. gas used on utility bills?

LECTURE #2 - Attributes of Solar Homes

What is the ave. household \$ per year energy budget?

Cite 5 major elements of passive solar home design?

When are equinox/solstice happen?
Define.

Define solar altitude/elevation, and solar azimuth.

What is the proper orientation for passive solar homes?

Effect of windows for each side? How architects deal with south facing windows? East/west ones?

Define Thermal Mass. Examples?

Define R value, and U value.

Cite other designs defining a great solar passive home design.



LECTURE #3 - Home energy units/principles

Standardized unit for gas/oil/electricity?

What are the 1st and 2nd laws of thermodynamics?

What are the 3 ways of heat transfer? define. Apply to examples in houses.

Transmission heating load equation. Define HDD - why is it useful?

Define air leakage. CFM_{50} ? How is it measured?

What's a good value for a well air-sealed house?

Air exchange heating load equation.

Define Solar Heat Gain Coef.?

Know how calculate a window Direct Heat Gain and Thermal Loss.



LECTURE #4 - Home energy performance units

Simplified method to design overhang.

Why are overhangs usually on South?
Power %? Explain.

See example and overhang efficiency.

Understand how to read solar exposure of a building from a well documented photograph.



LECTURE #5 - Home energy performance units

Circular buildings. Are they great design in CA? Where could it be?

Be familiar with ave. kWh use of houses in US - Yearly/monthly/daily.

Be familiar with cost variability to heat a house depending on fuel.

Know how to read an electricity load seasonability, and interpret it.
Know how to read a gas load seasonability, and interpret it.

Define EUI / ECI. Be familiar with the scale (ie: What's a good score in CA?)



Mid-term - 10/11 1:30-3:00pm

1. All class documents authorized (textbooks, lecture slides, reading notes)
2. 30 questions - 1/2 point each - no partial credit
3. Bring a calculator or your iPhone...
4. **Your Reading assignment**
 - Read chapters 11 (all) in A,W & A - no group presentation
 - Lecture on lighting 3:15-4:15pm

