



Developing the Green Collar Workforce

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Reason for Change

- America - 30% of the world's energy
- Projected to increase 17% from 1995-2015
- Appliances, HVAC water heaters, consume 90%

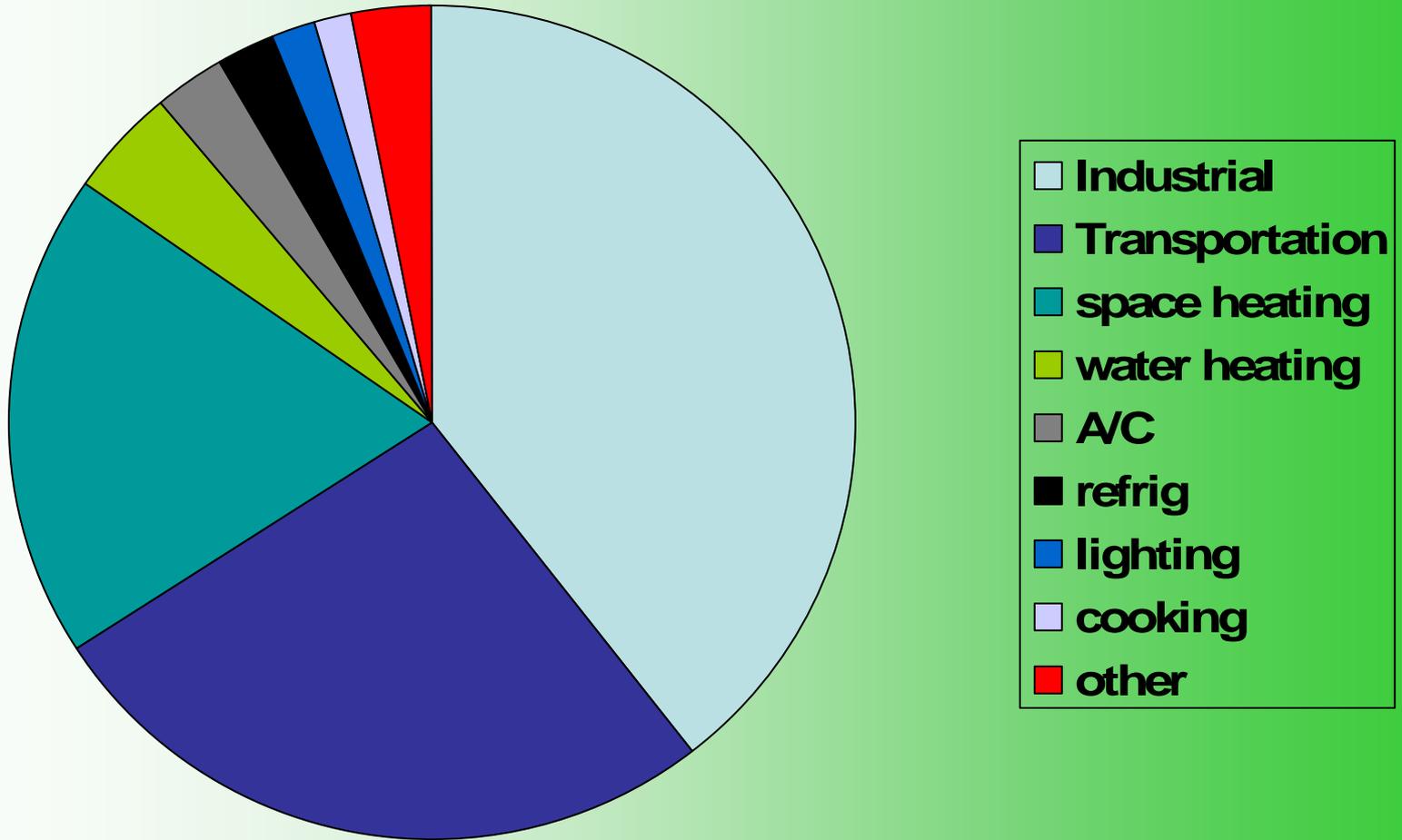
SOURCE: Solar Energy International; sei@solarenergy.org



- Oil Hits ~~\$80~~ a Barrel
- Tennessee homes - least energy efficient in the nation, burning 1,240 kwh/month, far ahead of the national average of 850 kwh

Business Tennessee, *Crop Formations*, by Alexei Smirnov, March 2007

National Energy Use



Renewable Energy Options

- Solar electric
- Solar thermal
- Wind
- Hydroelectric
- Biomass
- Geothermal
- Ocean wave / currents
- Ocean tidal
- Conservation

Considerations

- Maturity
- Availability
- Reliability
- Maintainability
- Environmental
- Economic

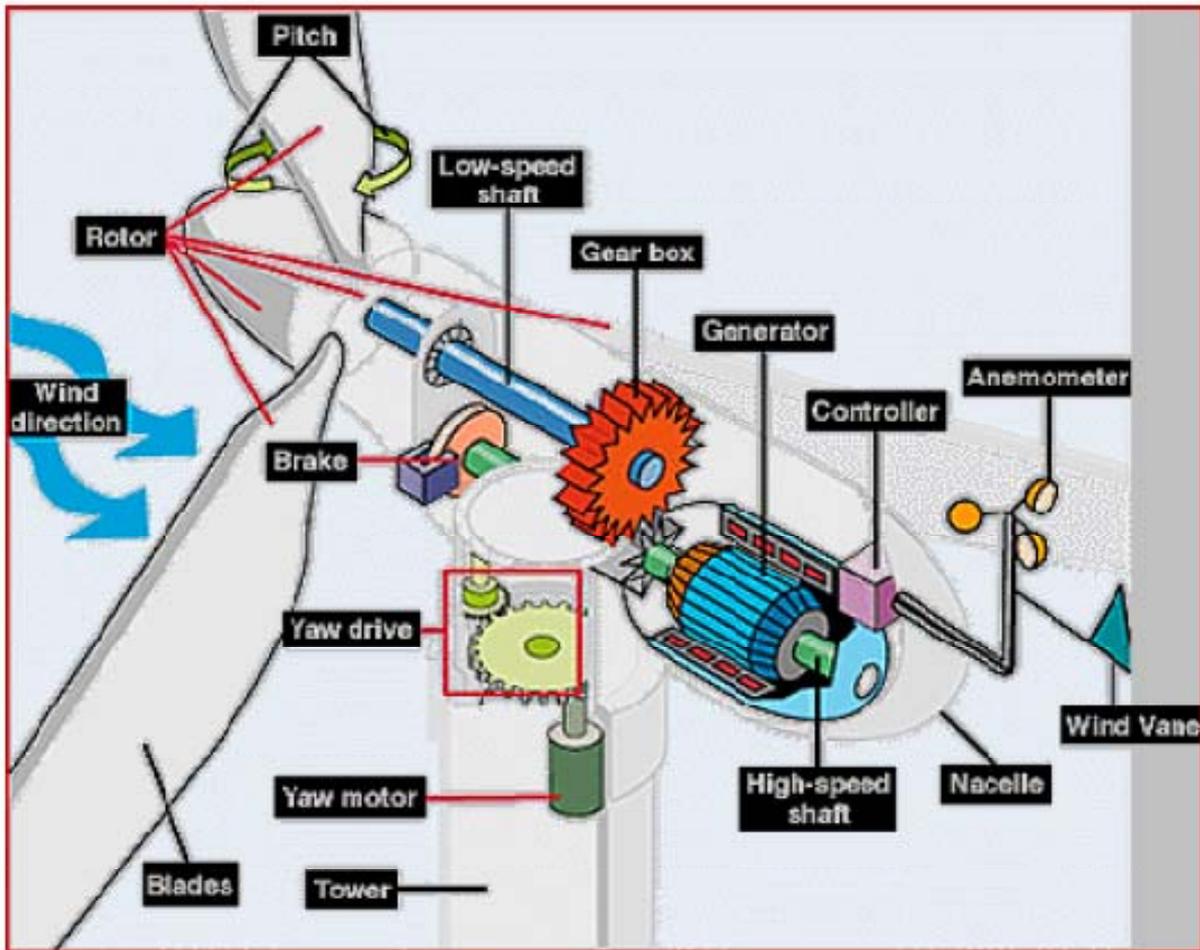
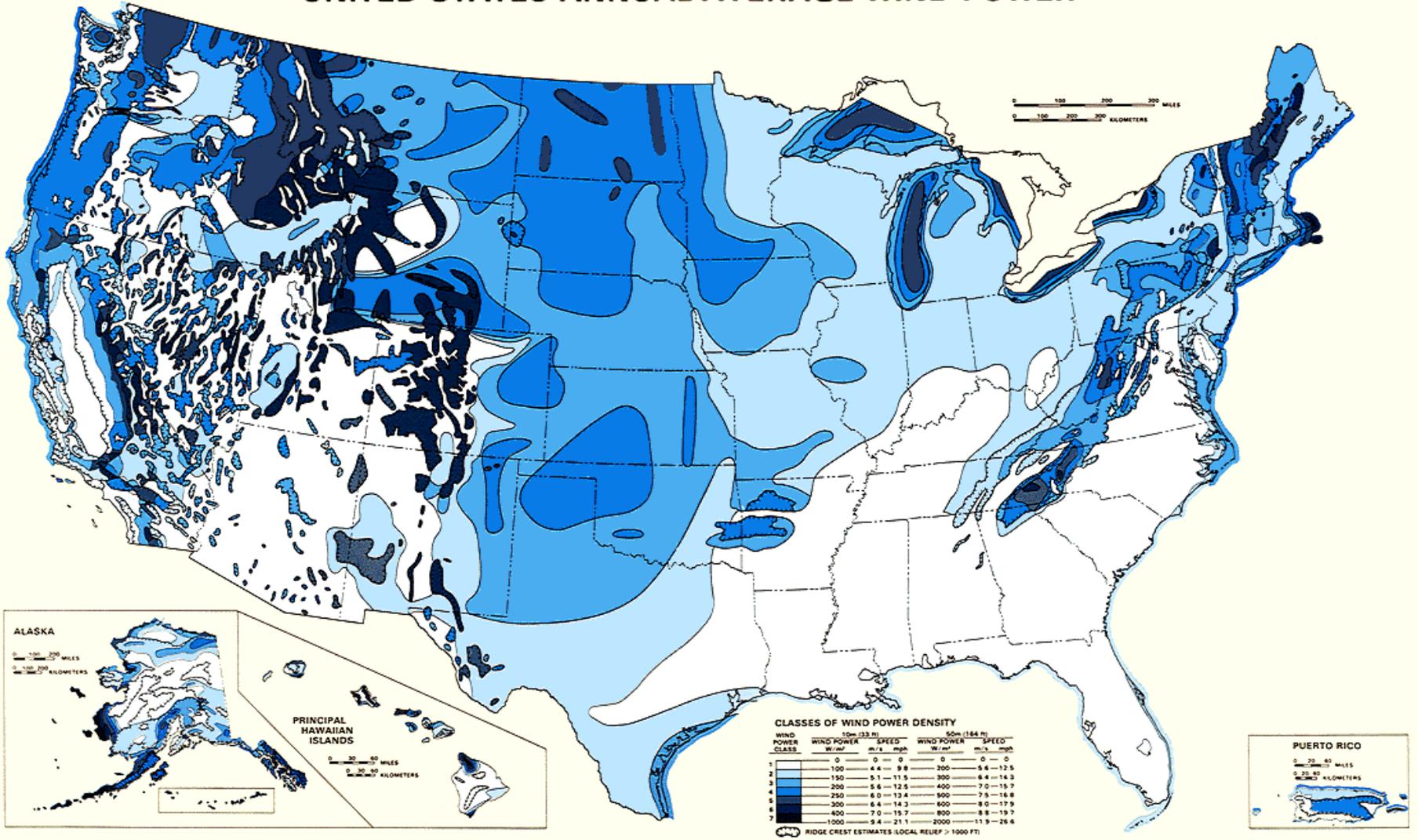


Figure 1 - Wind Turbine Major Components

**U.S. Summary Table – Manufacturing Firms with Technical Potential to Enter
Wind Turbine Market**

NAICS code	Code Description	Total Employees	Annual Payroll (\$1000s)	Number of Companies
326199	All other Plastics Products	501,009	15,219,355	8,174
331511	Iron Foundries	75,053	3,099,509	747
332312	Fabricated Structural Metal	106,161	3,975,751	3,033
332991	Ball and Roller Bearings	33,416	1,353,832	198
333412	Industrial and Commercial fans and blowers	11,854	411,979	177
333611	Turbines, and Turbine Generators, and Turbine Generator Sets	17,721	1,080,891	110
333612	Speed Changer, Industrial	13,991	539,514	248
333613	Power Transmission Equip.	21,103	779,730	292
334418	Printed circuits and electronics assemblies	105,810	4,005,786	716
334519	Measuring and Controlling Devices	34,499	1,638,072	830
335312	Motors and Generators	62,164	2,005,414	659
335999	Electronic Equipment and Components, NEC	42,546	1,780,246	979
Total		1,025,327	35,890,079	16,163

UNITED STATES ANNUAL AVERAGE WIND POWER



Options

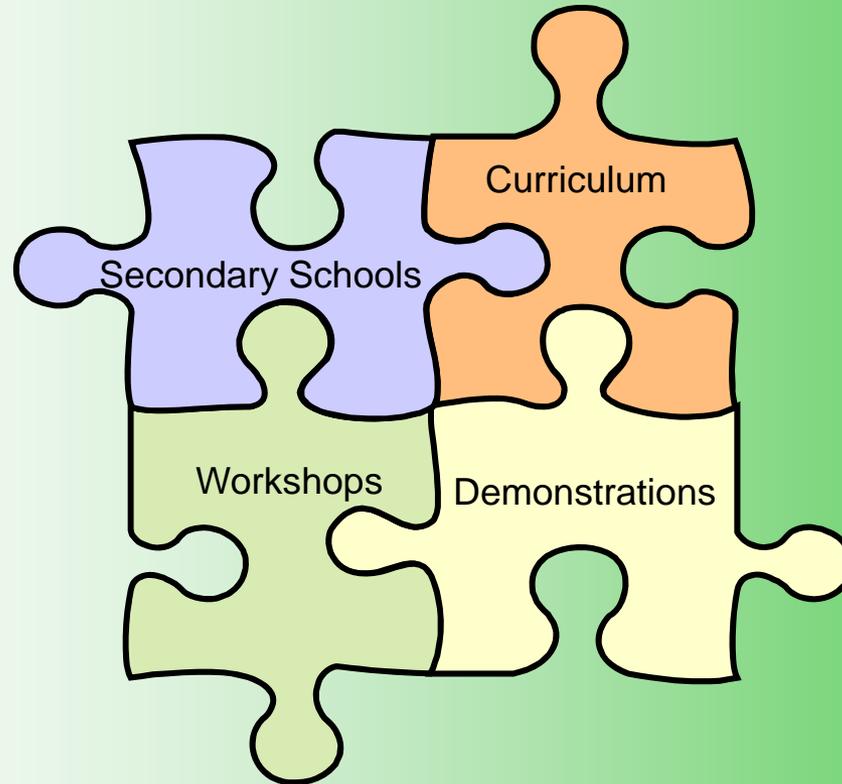
	Maturity	Availability	Reliability	Maintain	Environment	Economic
Solar electric	M	M	M	H	L	H
Solar thermal	H	M	M	H	L	M
Wind	M	L	M	M	M	H
Hydro	H	M	M	H	M	M
Wave	L	L	L	L	L	H
Tides	L	L	L	L	L	H
Biomass	M	H	H	M	M	M
Geo - thermal	M	H	H	M	M	M
Efficiency	H	H	H	H	M	M

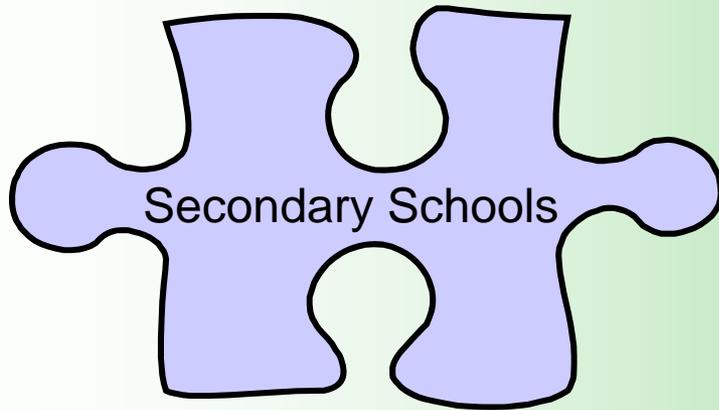
Knowledge, Skills, & Abilities

	Electric	Mechanical	Structural	Process	Math	Technology
Solar electric	X		X	X	X	X
Solar thermal		X	X	X	X	X
Wind	X	X	X		X	X
Hydro	X	X	X		X	X
Wave	X	X	X	X	X	X
Tides	X	X	X	X	X	X
Biomass	X	X	X	X	X	X
Geo - thermal	X	X	X	X	X	X
Efficiency	X	X	X	X	X	X

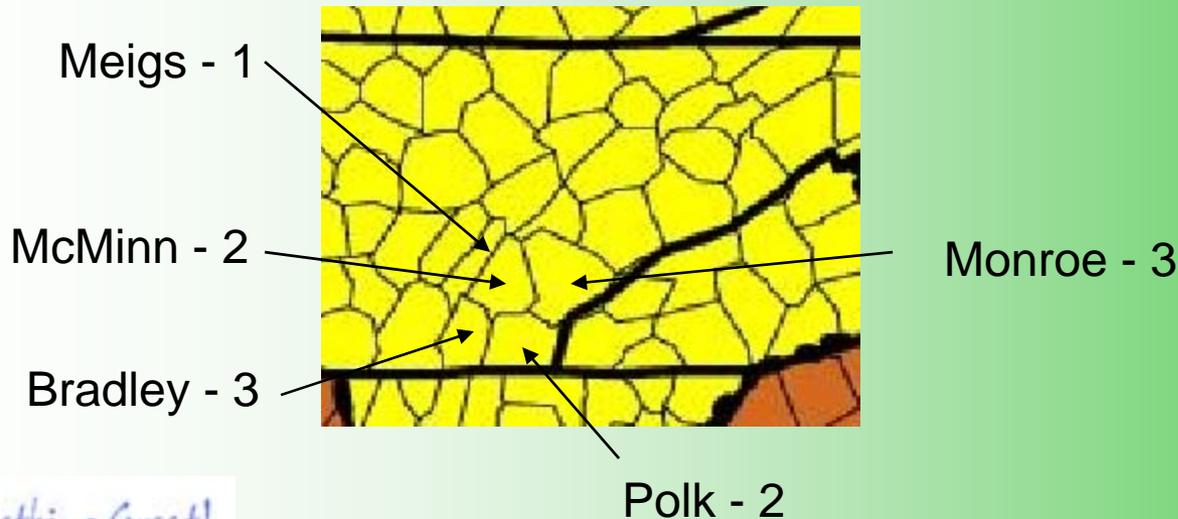


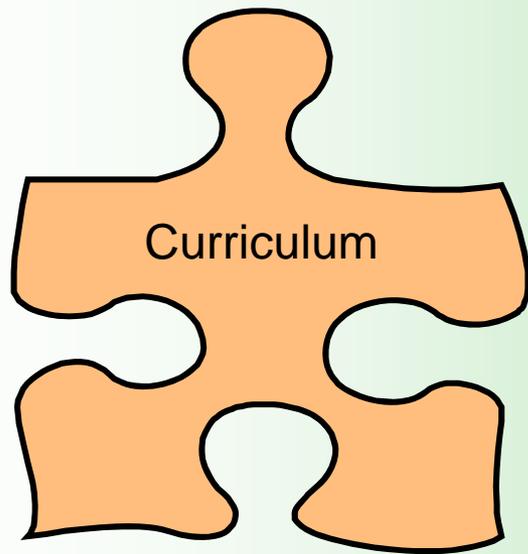
“Tennessee Valley Zero Energy Homes”





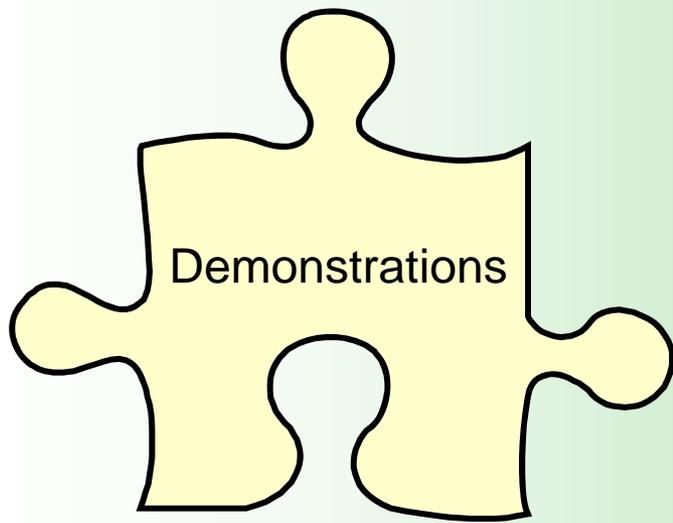
- 11 High Schools
- 1 TN Technology Ctr.
- 5 county service area
- Programs and Demonstrations
- Recruiting
- Scholarships





- Existing Construction Technology
- Updated to include
 - Renewable Energy
 - Energy Efficient Construction
 - PV Panel Installation
 - Geothermal heat pump
 - HERS Rater Training
 - Service Learning – HFH
- Revising other courses to align
 - Construction Techniques
 - Standard Building Codes
 - Architectural Drawing
- Adding Curriculum
 - Alternative Fuels
- Added 17 hr. IT ZEH Certificate
- Certifications
 - PV Installer
 - HERS Rater





Solar PV Installation / Utility Inter-tie

Web based data collection and display

VAWT Installation

Habitat Energy Star House

EERC Techniques

Solar HW

Solar PV Powered pump

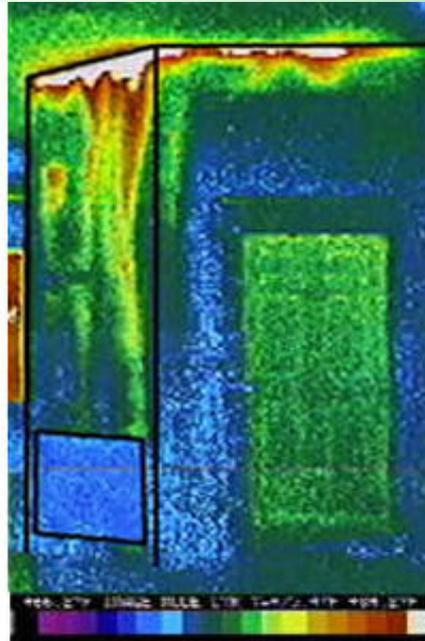
Dedicated Classroom/Lab

Ground Source HVAC

SIP / ICF samples

Thermography

Mobile Road Show





84.6°F

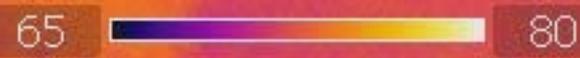
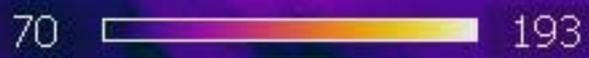
FLIR
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73.2°F

FLIR
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59.2°F

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89.2°F

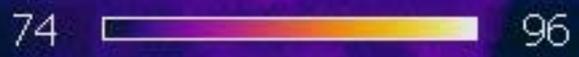
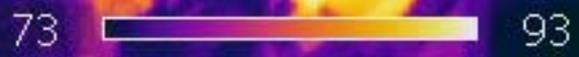
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83.1°F

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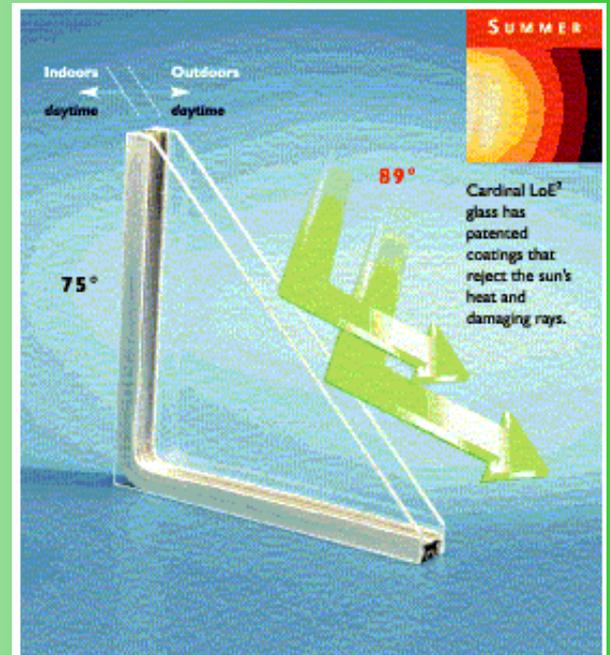
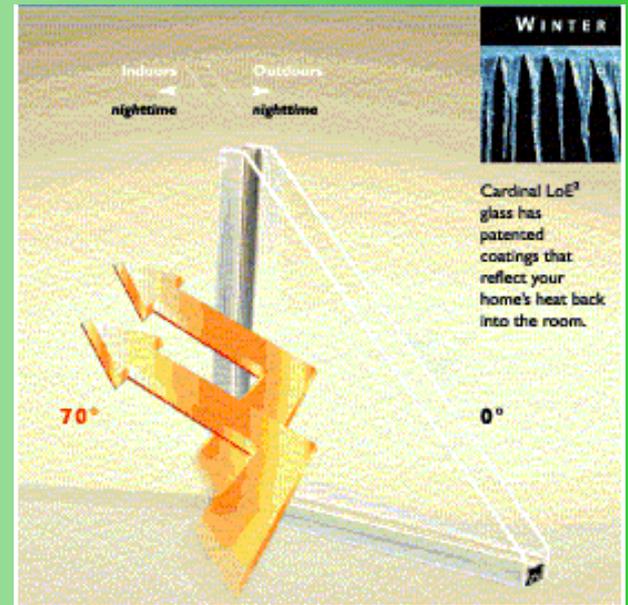
92.7°F

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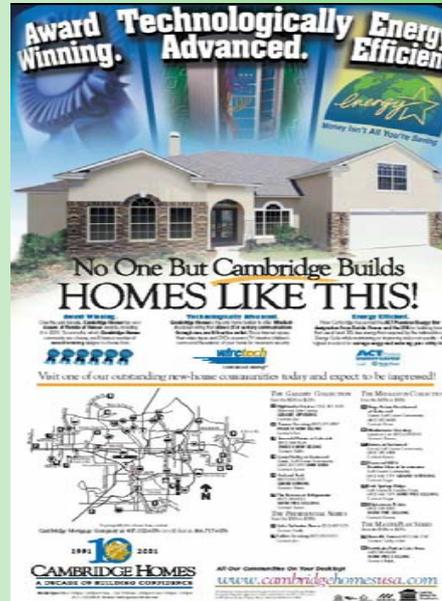
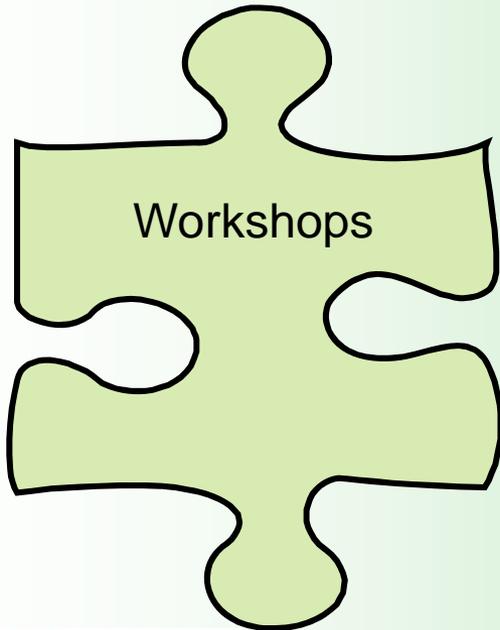




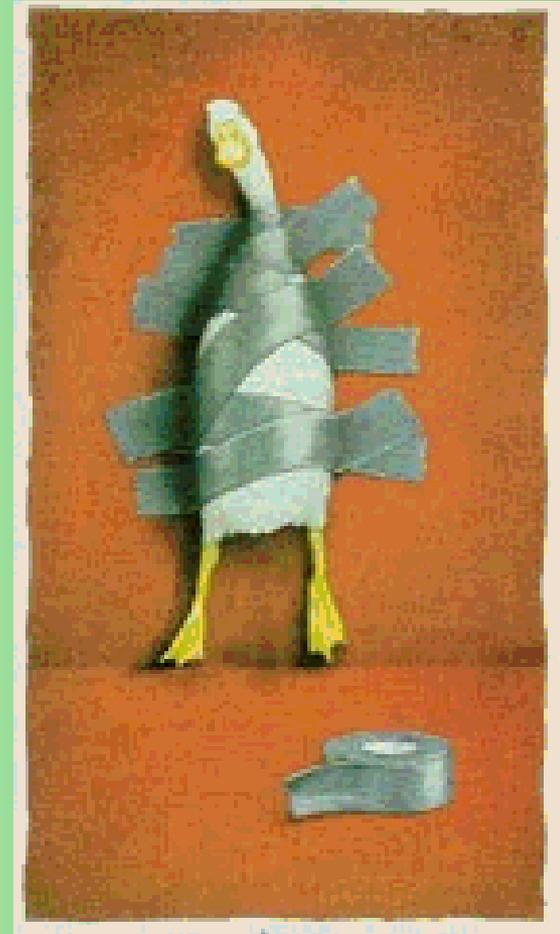




- Builders
- Contractors
- Suppliers
- Utilities
- Homeowners
- Bankers
- Realtors
- Civic / Non Profits



- Inform
- Educate
- Promote
- Recruit
- Challenge





Job Opportunities

- 17 -18,000 new green collar jobs in TN (REPP) – wind, solar, geothermal, biomass
- Energy Efficient Construction
- UT Bioenergy programs – 4000 new jobs and 3000 satellite jobs
- Third party analysis and verification



Top 10 Reasons To “Think ZEH”

- Fits faith values
- Environmental preservation
- Saves money
- Energy security– national & personal
- Status symbol
- Hobby/ fun
- Enhance visibility/ marketing
- Home improvement
- Utility value – adds space, shading, etc.
- Get a good deal – utilize incentives

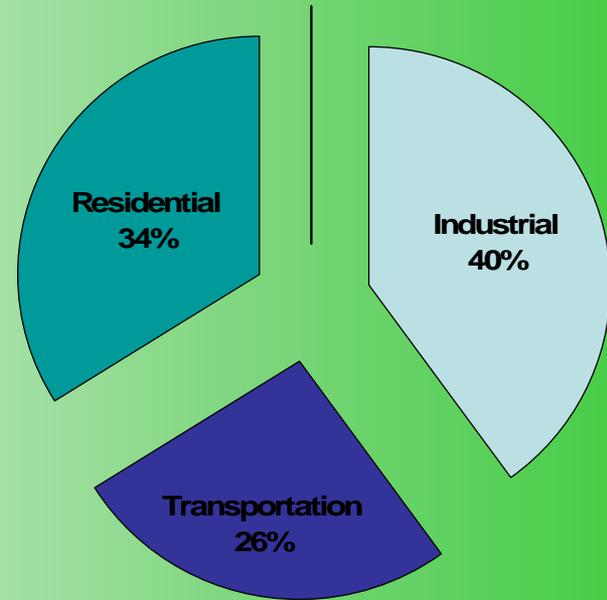
More Reason for Change

- Off-the-shelf technologies can cut heating, cooling, and lighting costs by up to 80%
- Replacing one ICB with a CFL means 1000 pounds less carbon dioxide and savings of \$67 on energy costs over the life of the bulb.
- Decrease energy use 1% = saving 55 million barrels of oil per year. That's \$1 billion!

SOURCE: Solar Energy International; sei@solarenergy.org

Coming Soon

- Alternative Fuels Laboratory
- Produce bio-diesel with used cooking oil
- Eliminate paying for disposal



Questions

