



Energy Use in Today's New Commercial Buildings

Nick Thiltgen

ASHRAE – Champlain Valley Chapter
Colchester, VT
October 1st, 2014

AGENDA

Energy Industry Trends

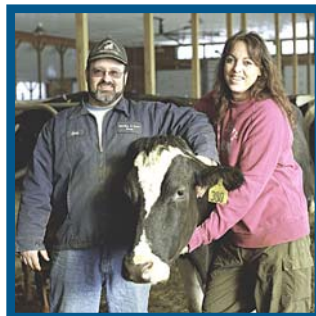
- Fuel, Electric, Photovoltaic

Building Efficiency

- Basic vs. Energy Efficient

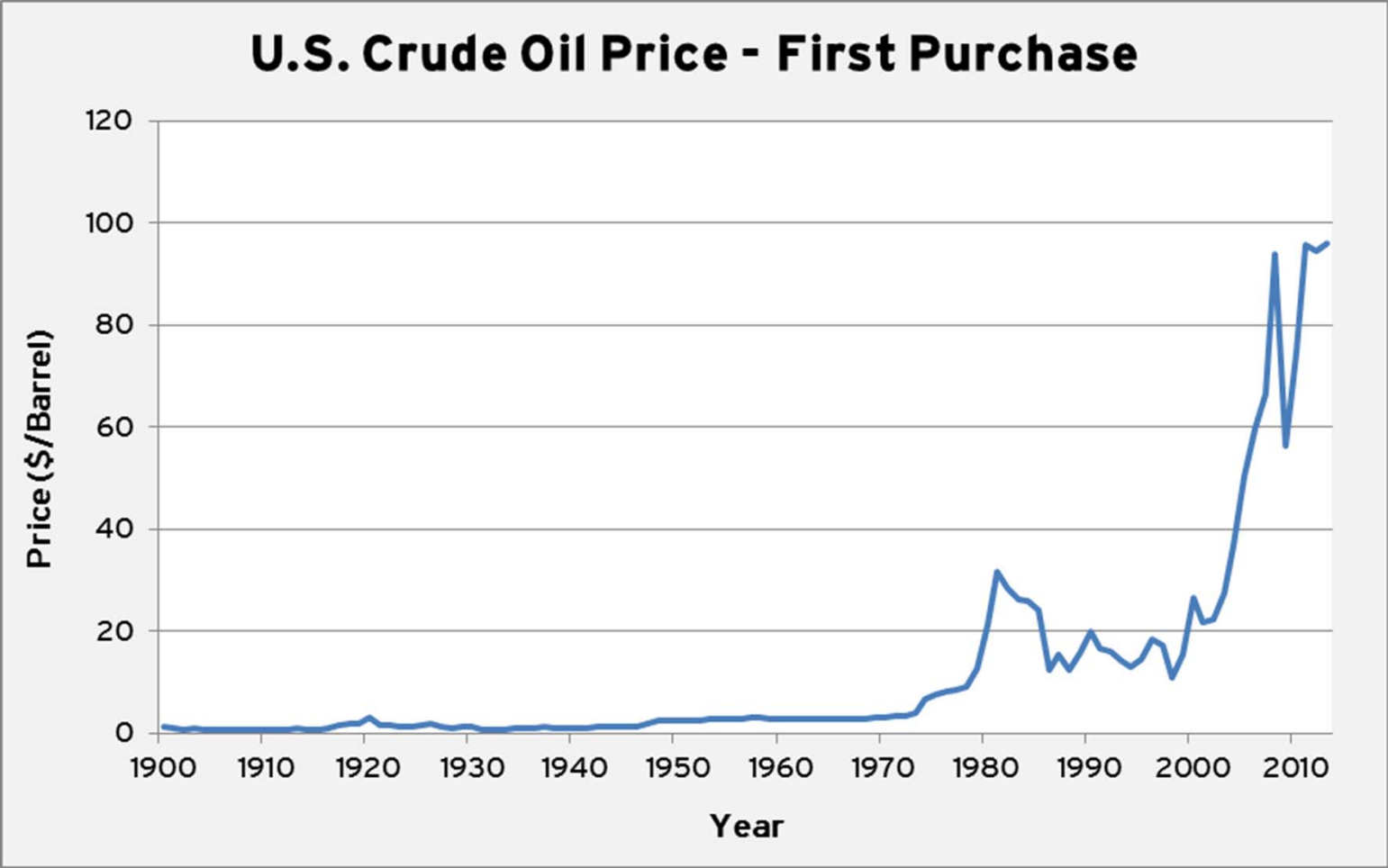
Efficiency Vermont

- Commercial New Construction Program
- Net Zero Energy Building Program

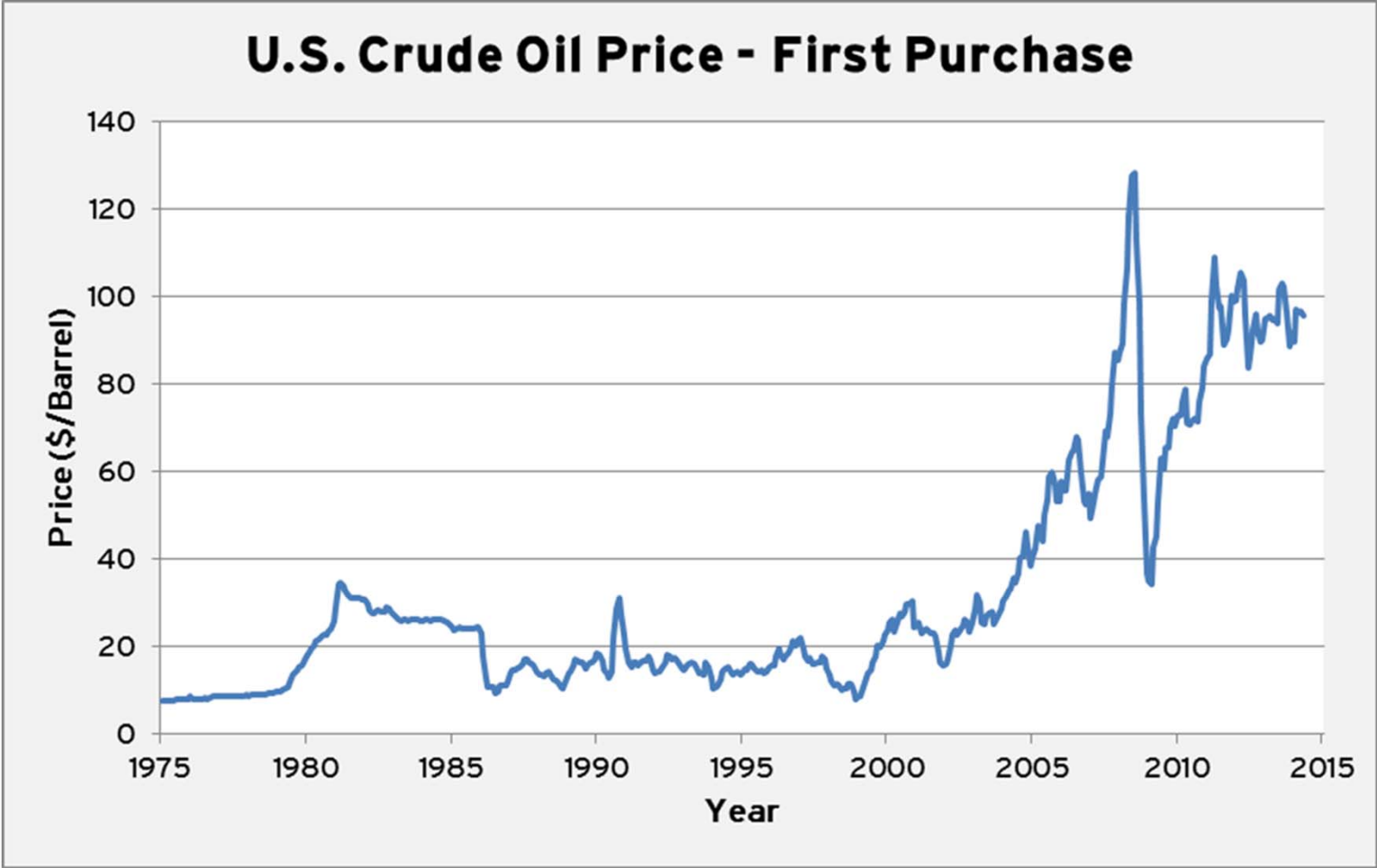


ENERGY INDUSTRY TRENDS

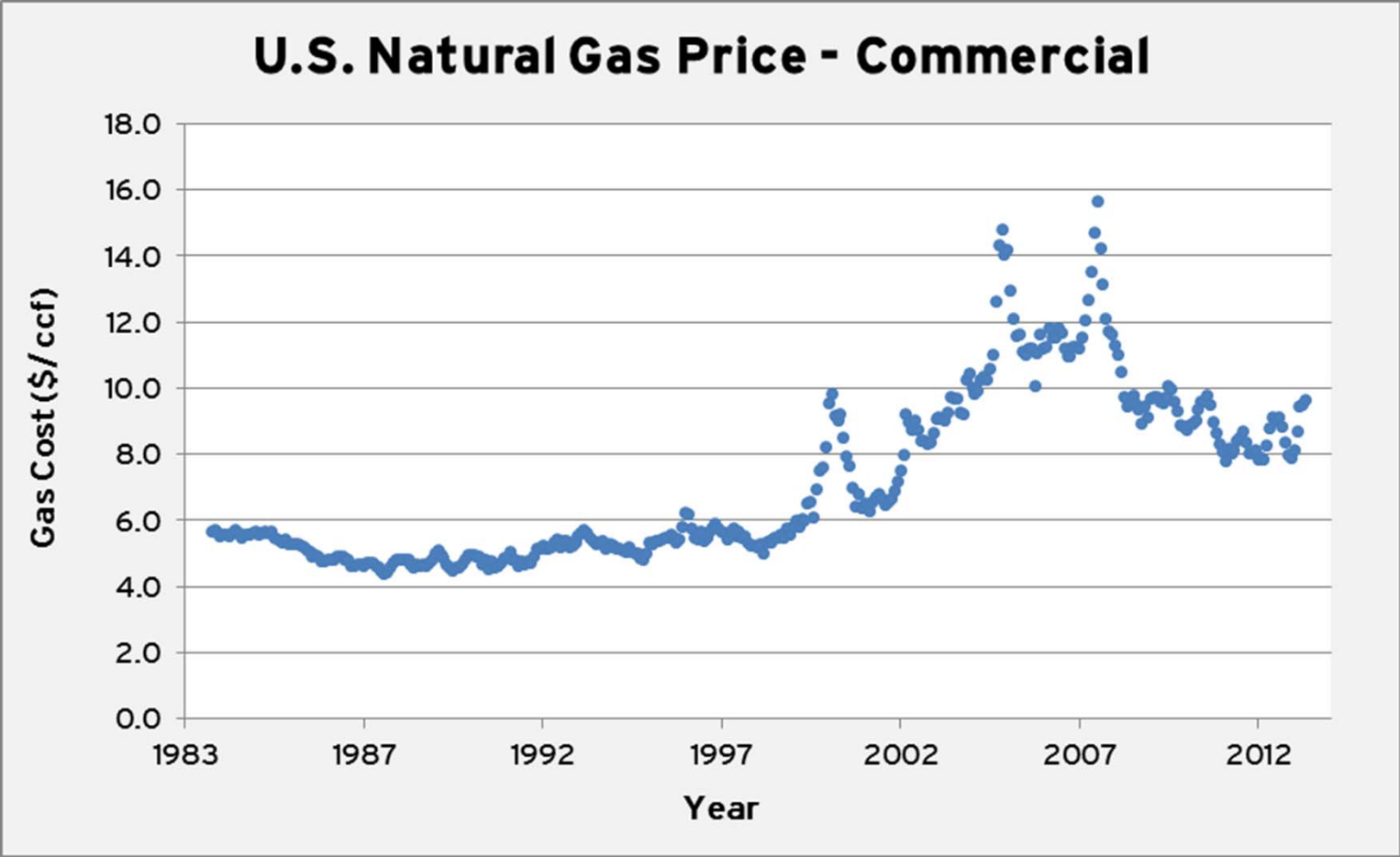
ENERGY INDUSTRY TRENDS



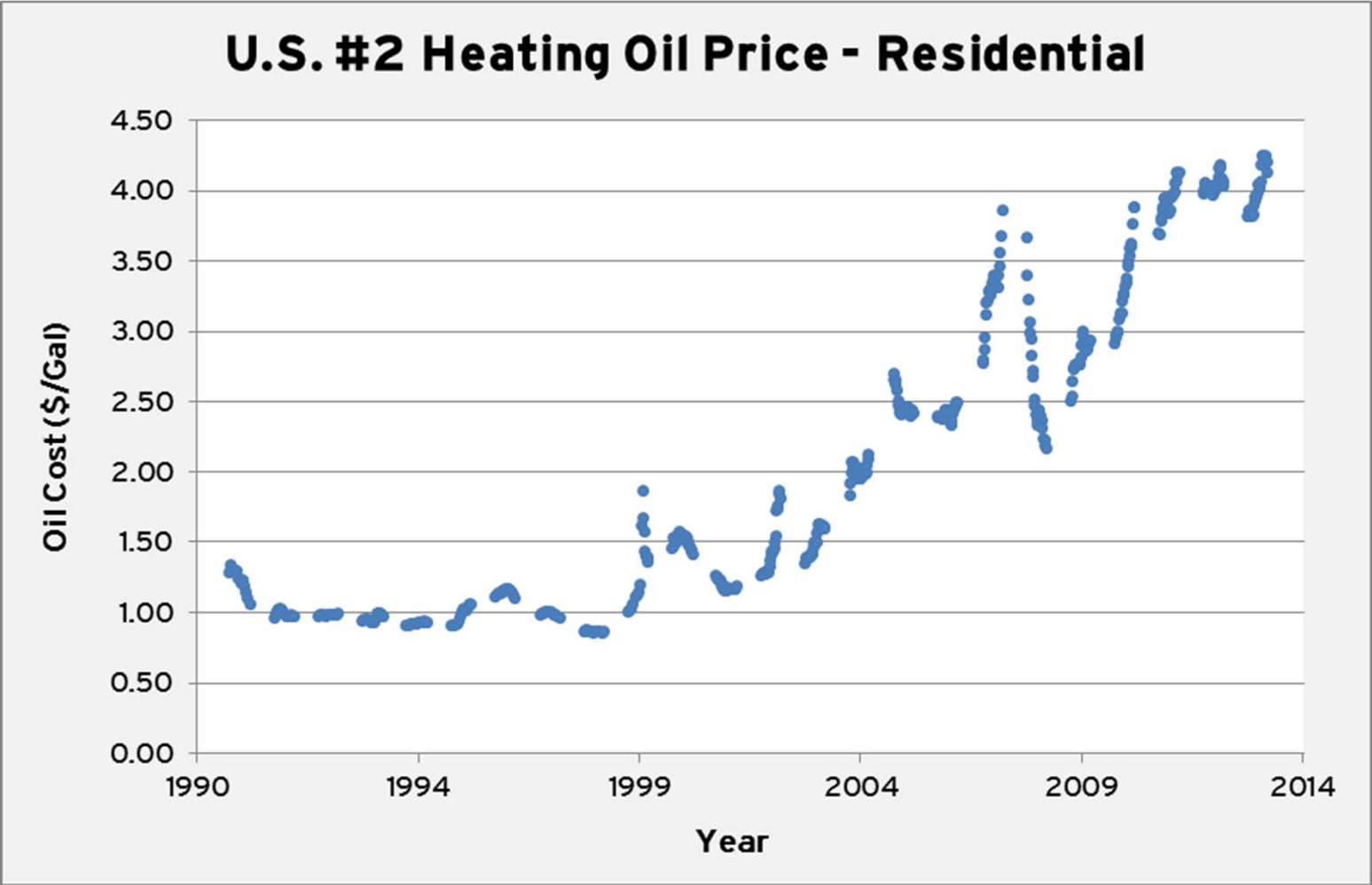
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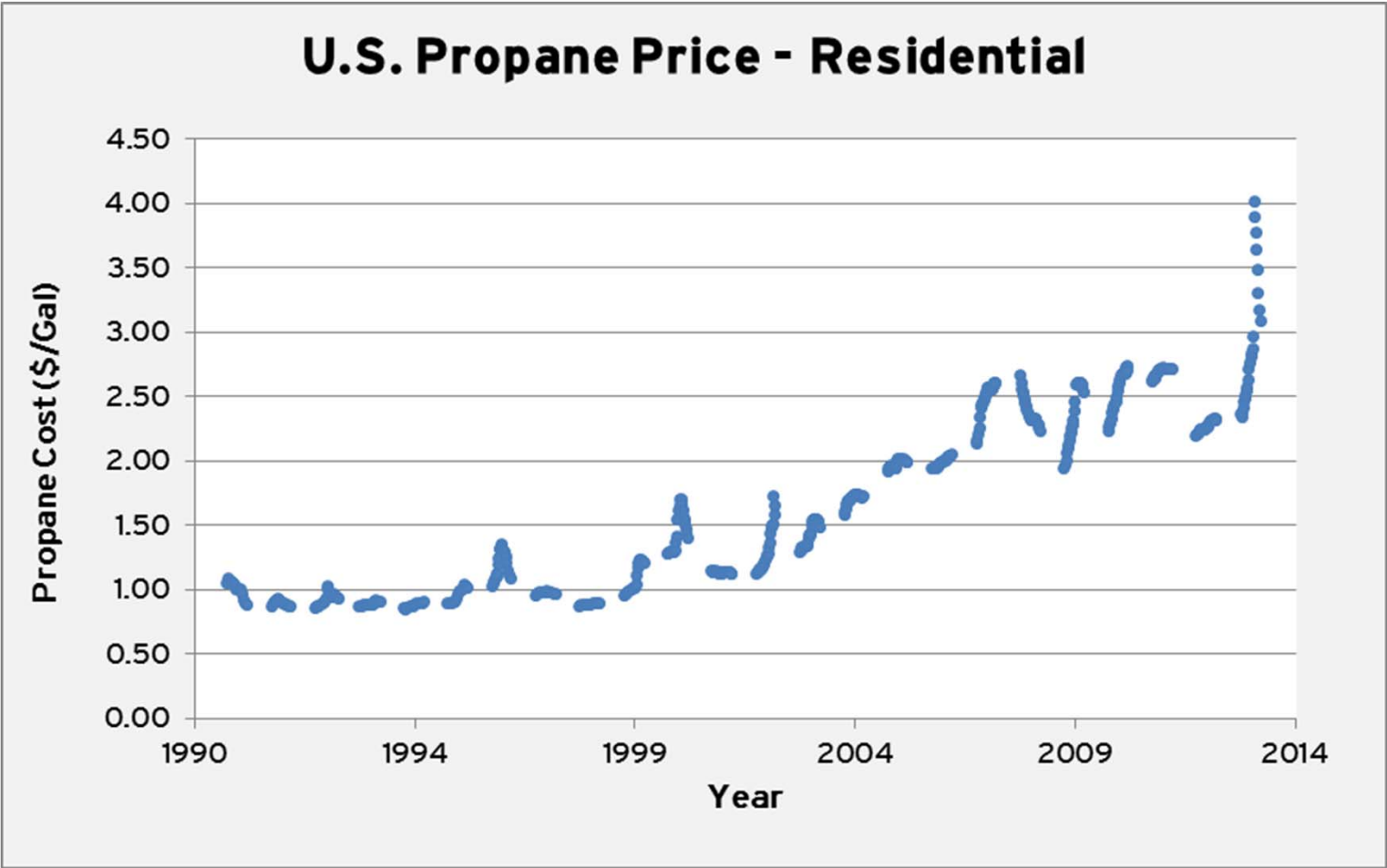
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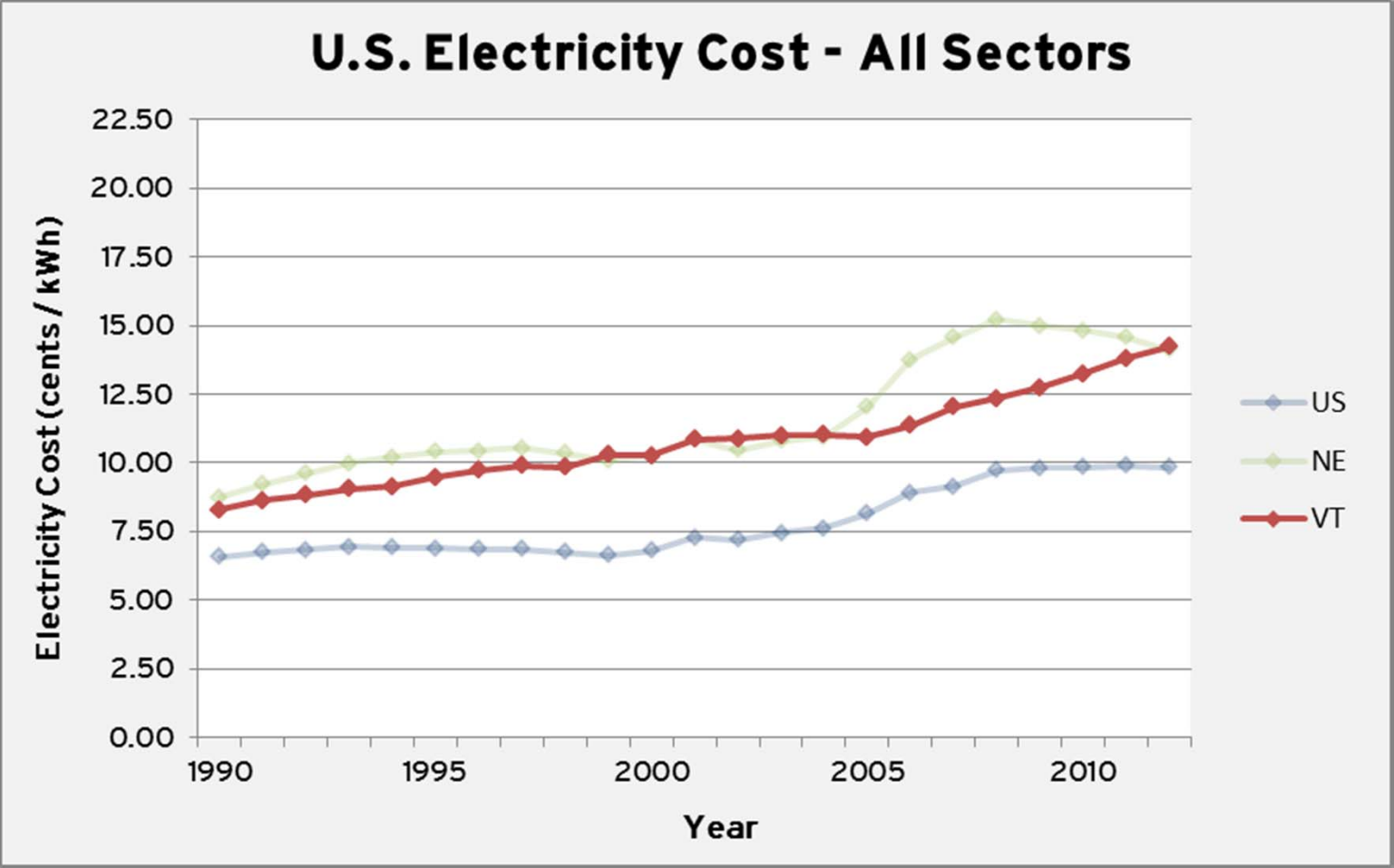
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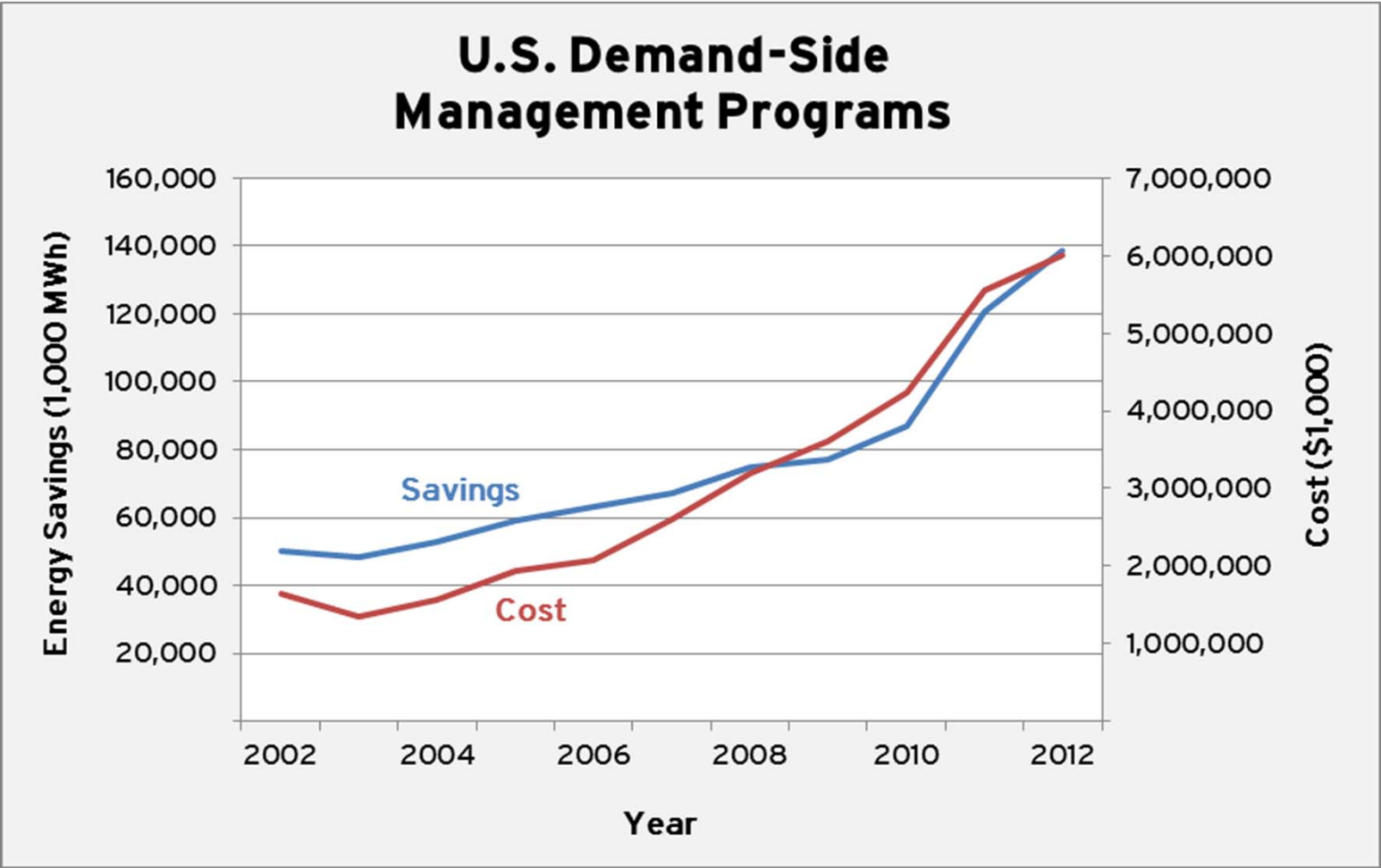
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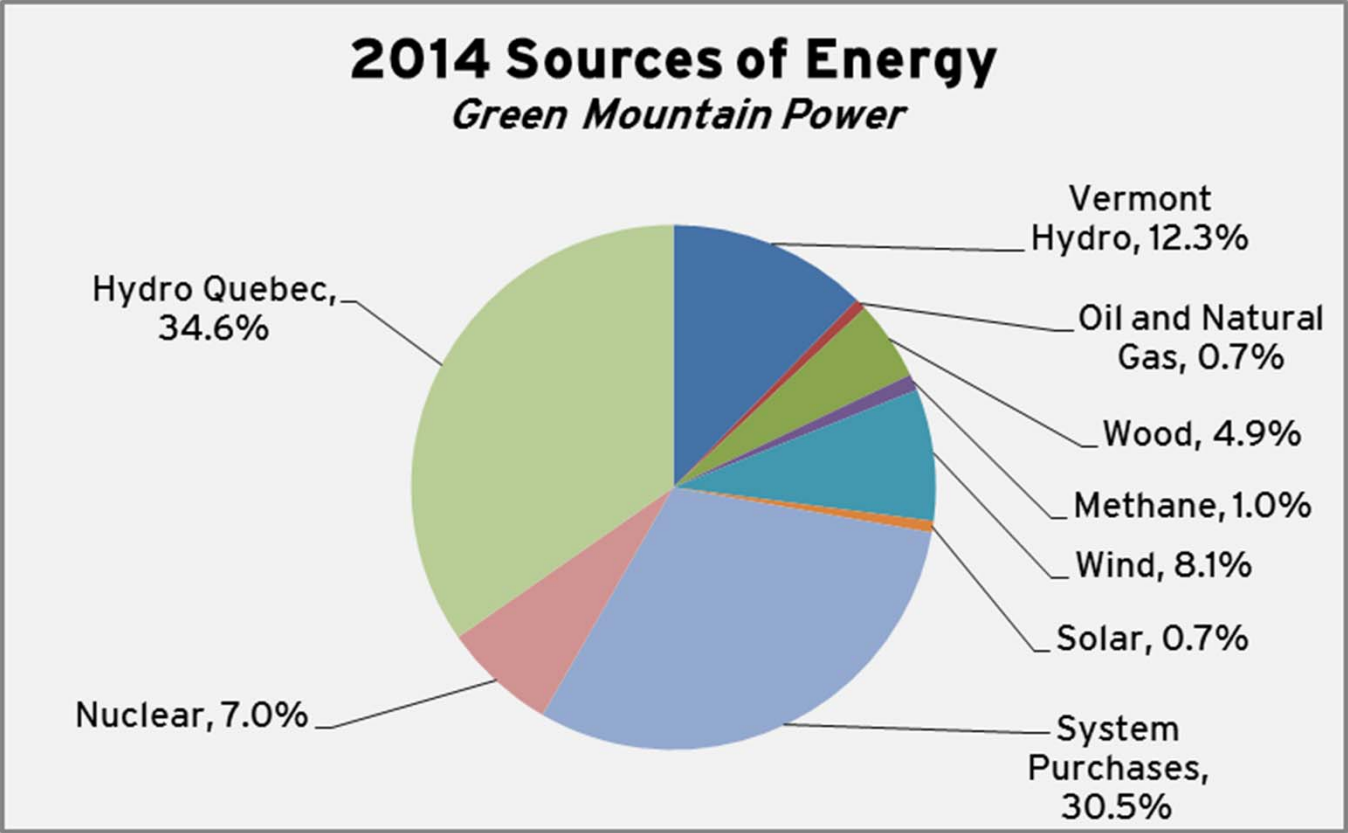
ENERGY INDUSTRY TRENDS



ENERGY INDUSTRY TRENDS

Energy	Unit	BTU/unit	Efficiency	\$/unit	\$/mmBtu
Electricity, Resistance	kWh	3,412	1.00	\$0.15	\$44.00
Propane	Gallon	91,600	0.93	\$2.76	\$32.00
Fuel Oil	Gallon	138,200	0.85	\$3.50	\$30.00
Wood Pellets	Ton	16,400,000	0.80	\$247.00	\$19.00
Natural Gas	Therm	100,000	0.93	\$1.52	\$16.00
Wood, Green	Cord	22,000,000	0.60	\$193.00	\$15.00
Electricity, Heat Pump	kWh	3,412	3.25	\$0.15	\$14.00

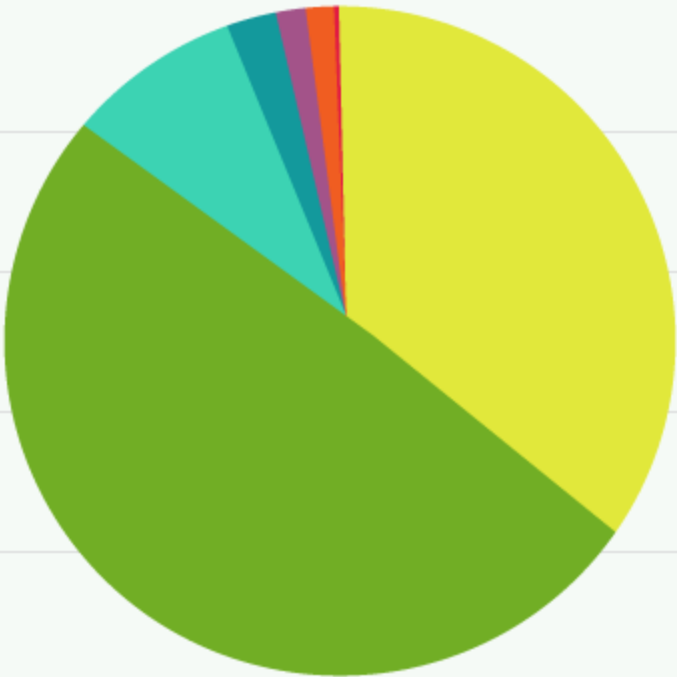
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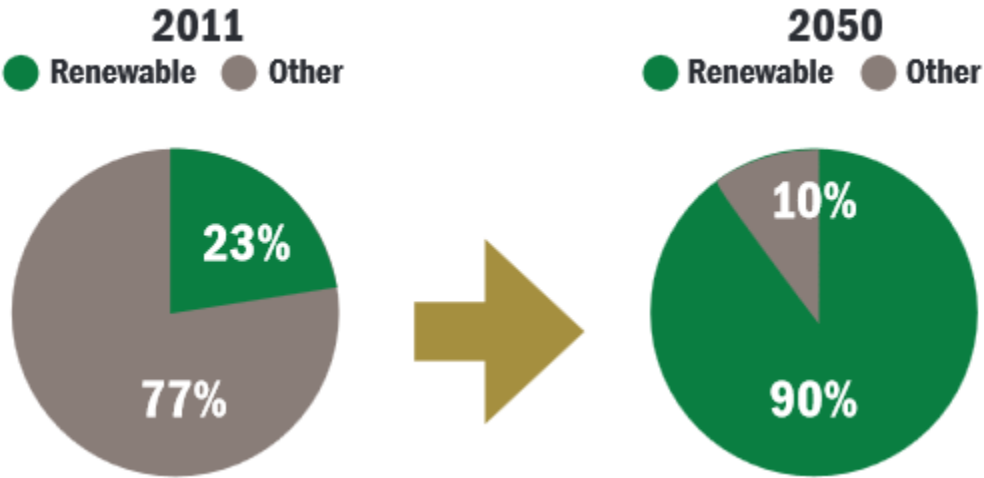
VERMONT GREENHOUSE GAS EMISSIONS

BY SOURCE
(2010)

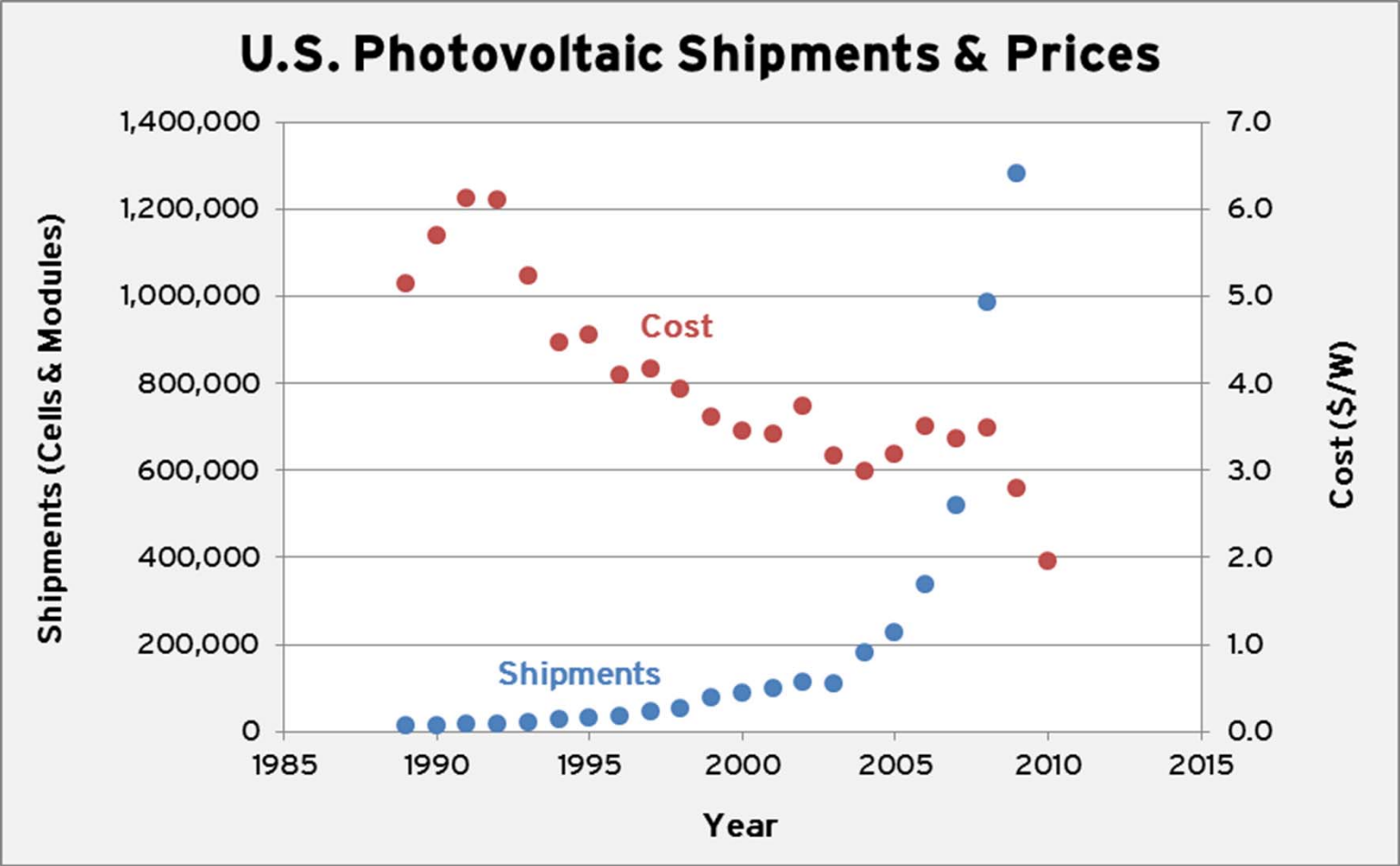


- 47% - Transportation
- 31.6% - Residential, Commercial and Industrial Use
- 10.3% - Agriculture
- 4.1% - Electricity Supply (Consumption)
- 3.6% - Industrial Processes
- 3.2% - Waste Management
- 0.2% - Fossil Fuels

ENERGY INDUSTRY TRENDS



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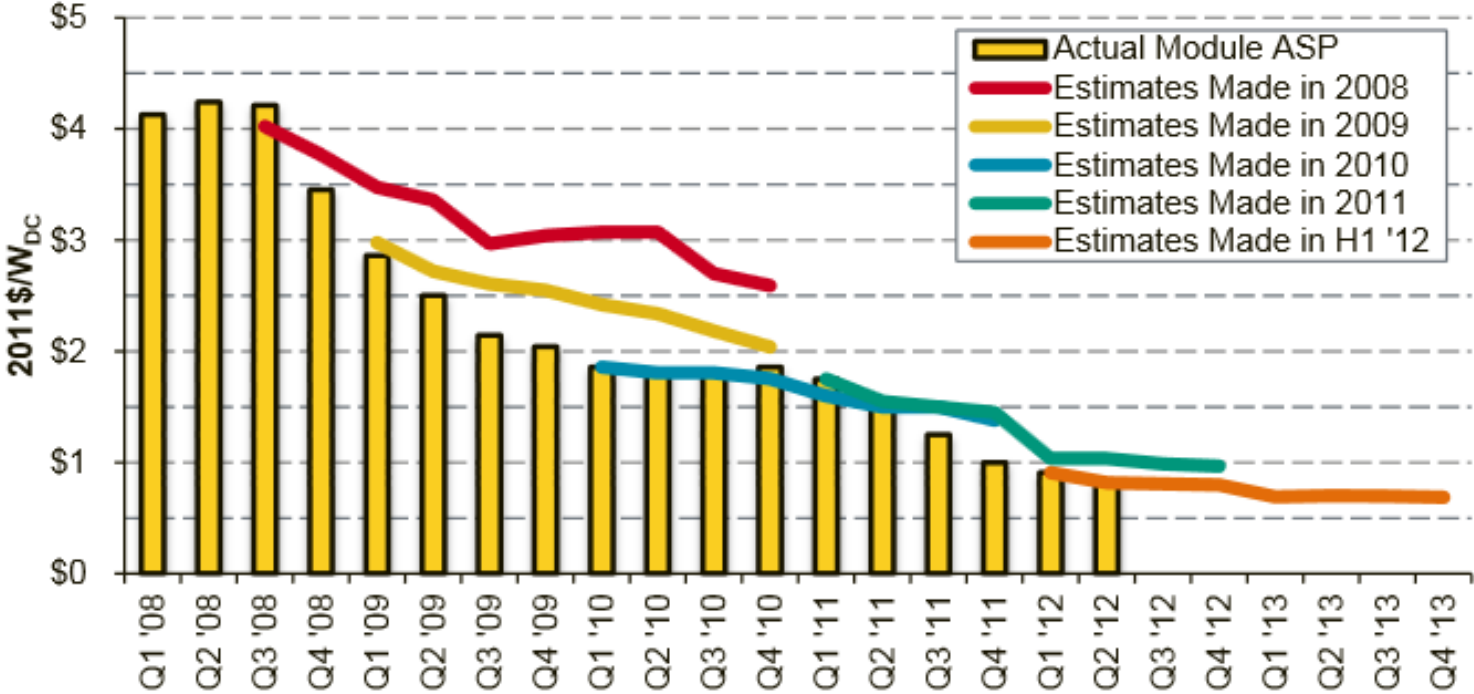
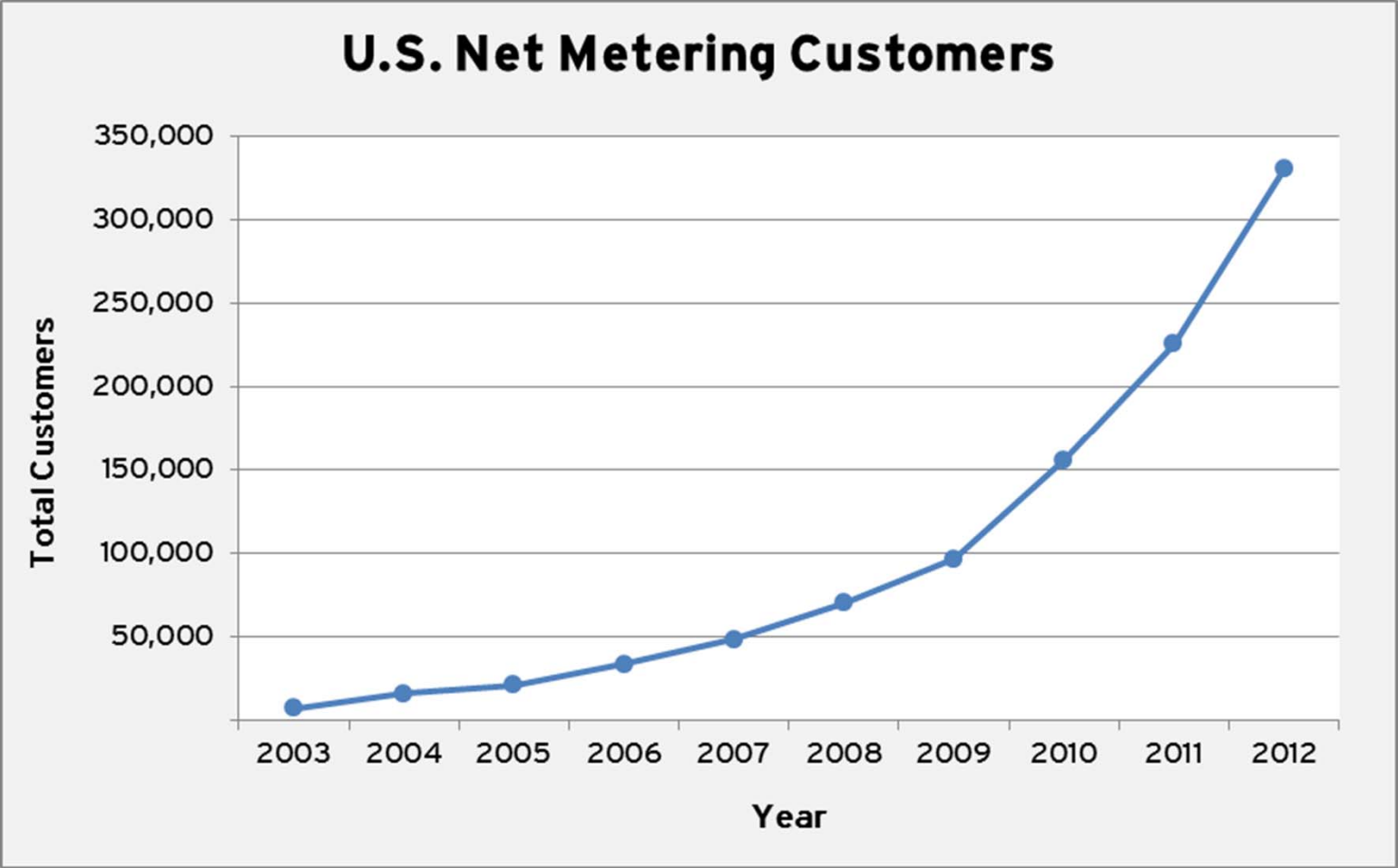


Figure 14. Actual module average selling price reduction vs. average analyst expectations



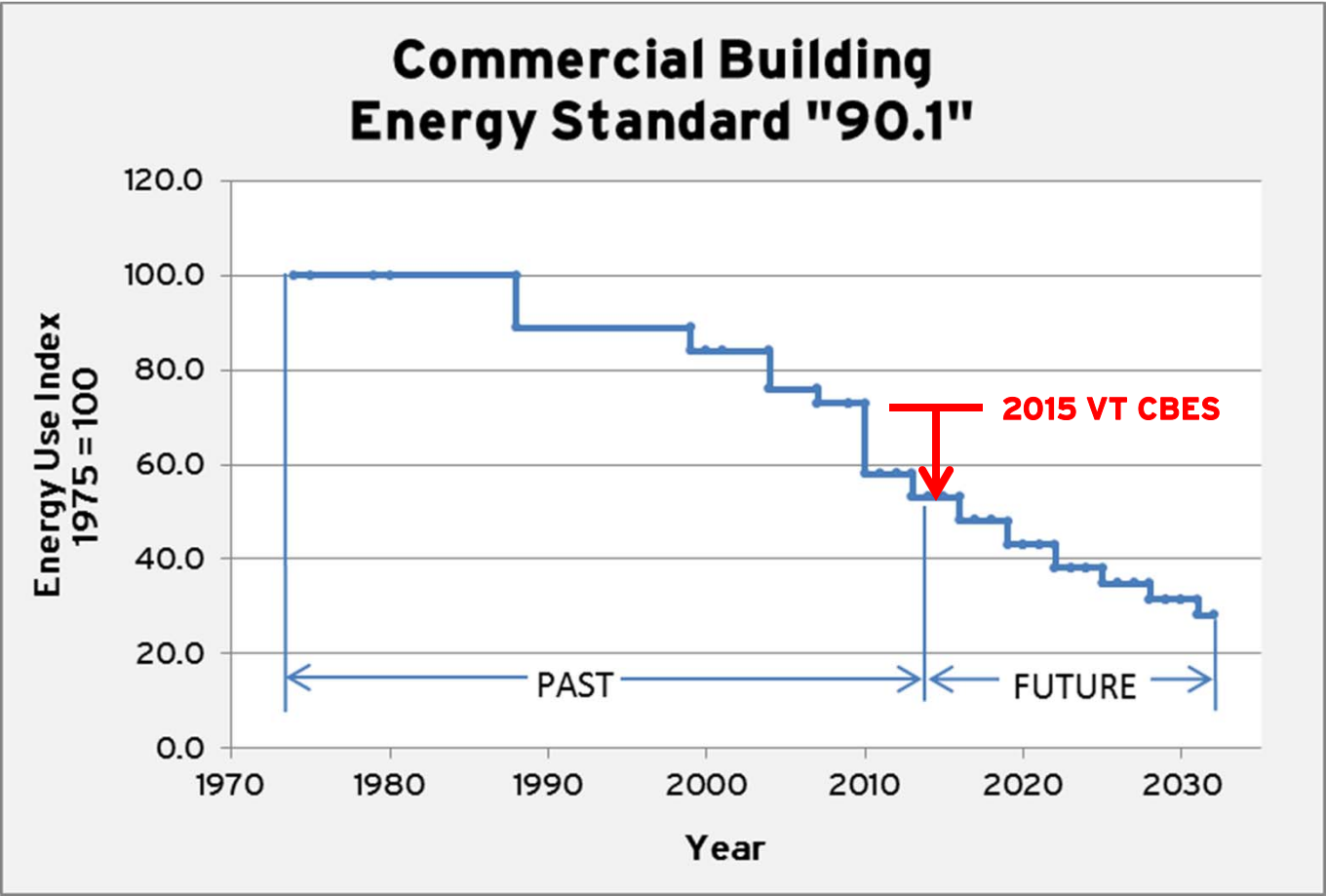
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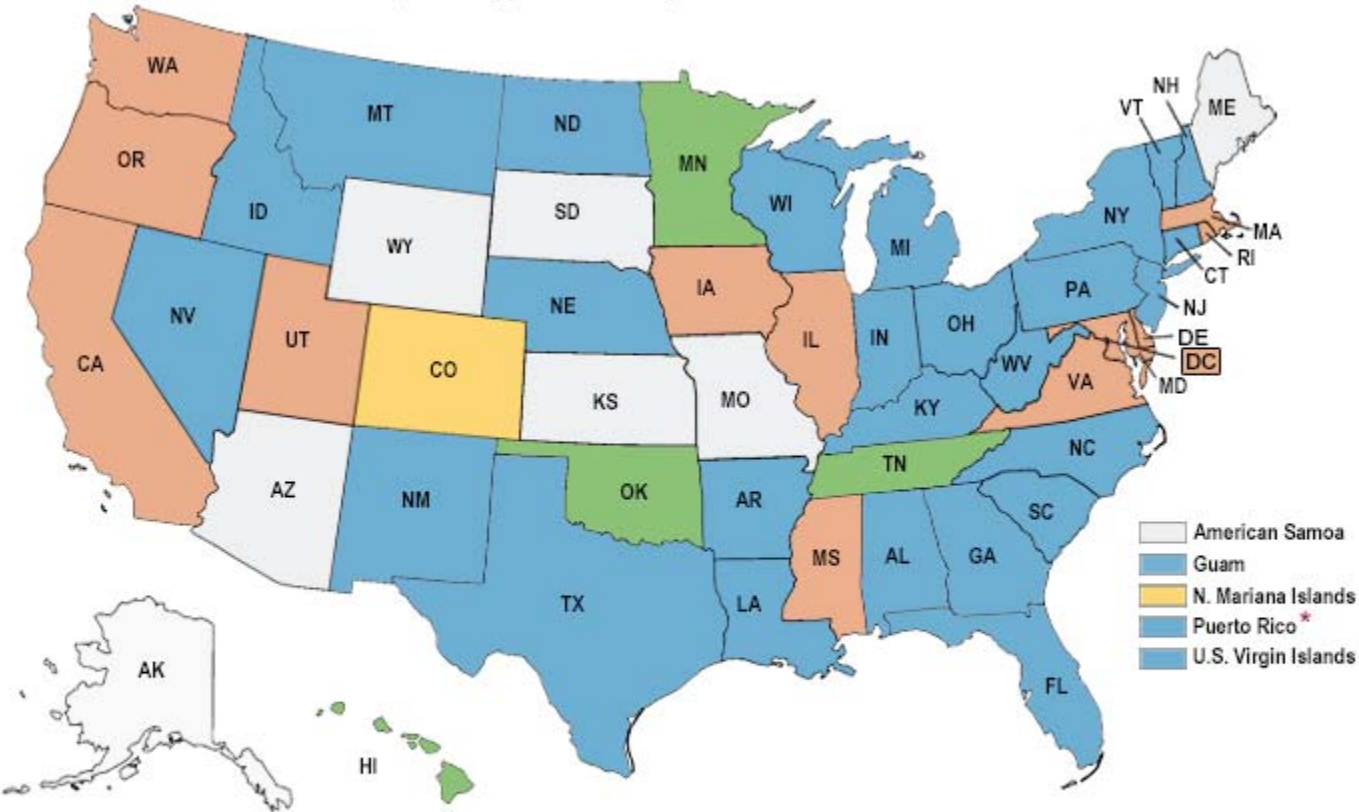


BUILDING EFFICIENCY

ENERGY INDUSTRY TRENDS



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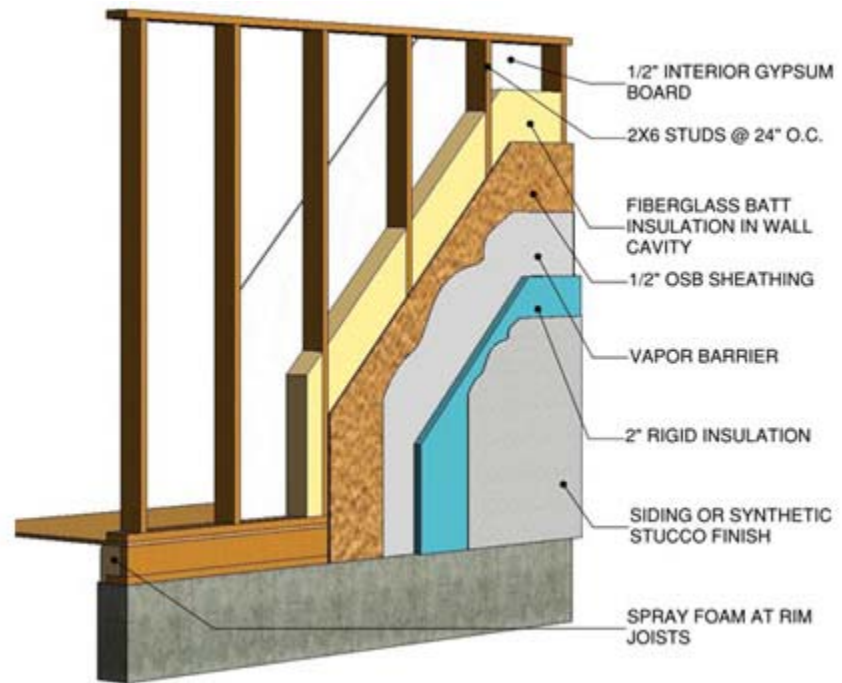
13 ASHRAE 90.1-2010/2012 IECC equivalent or more energy efficient	29 ASHRAE 90.1 - 2007/2009 IECC equivalent or more energy efficient	4 ASHRAE 90.1 - 2004/2006 IECC equivalent or more energy efficient
	2 ASHRAE 90.1 - 2001/2003 IECC equivalent or less energy efficient	8 No Statewide Code



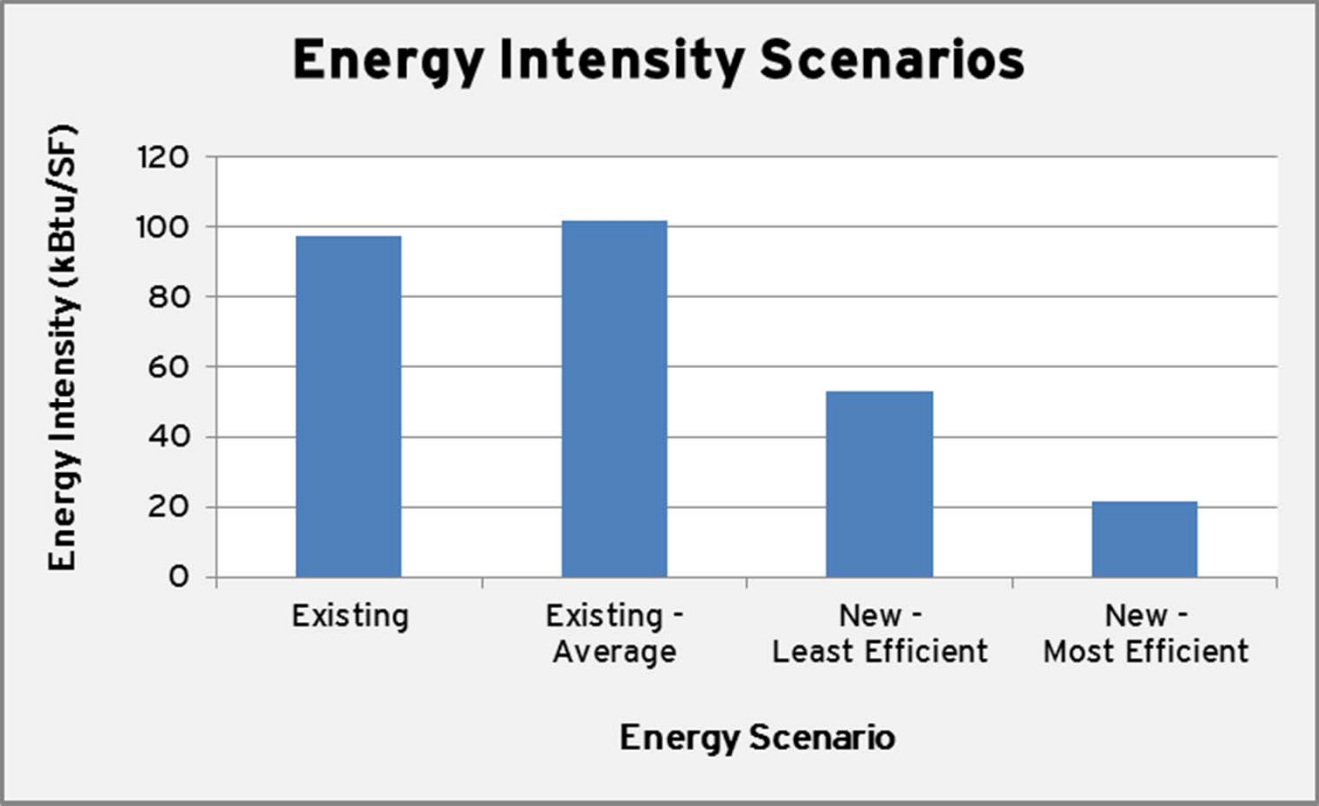
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Efficiency Measures

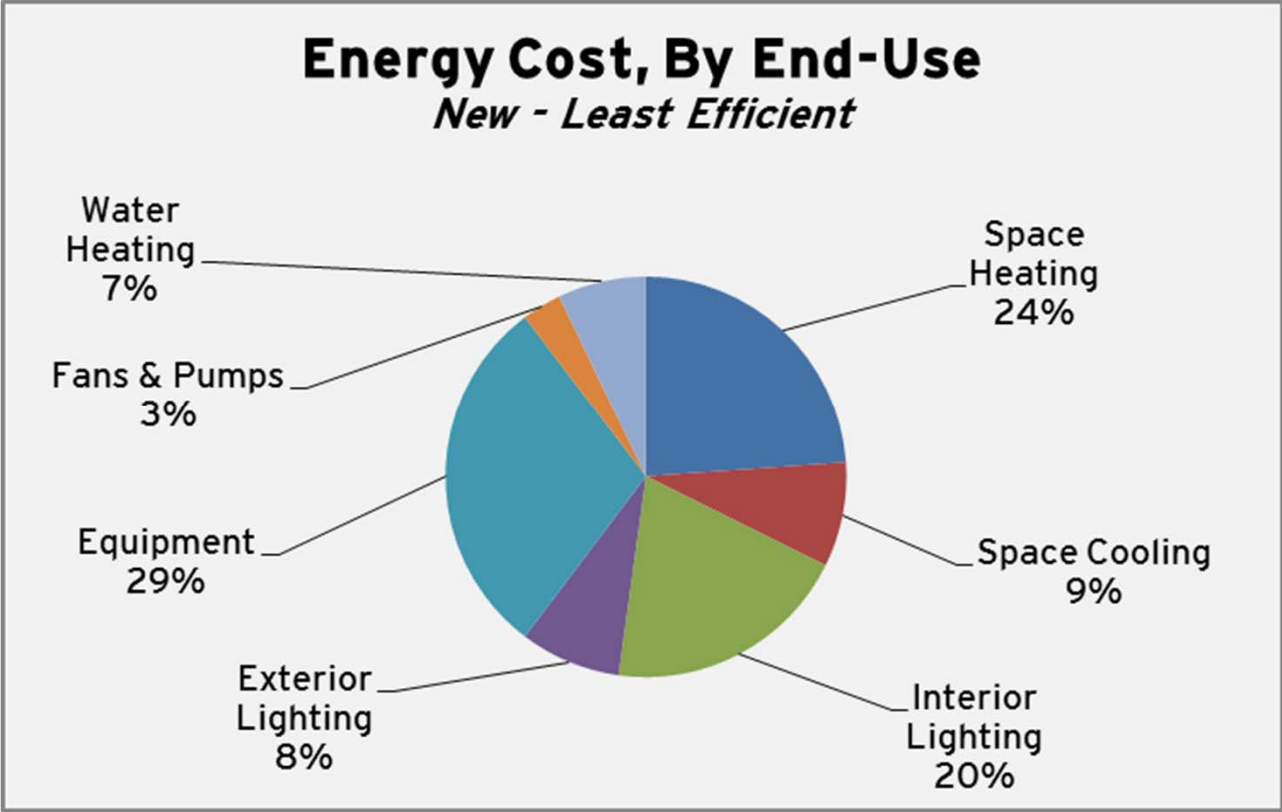
- Envelope
- Lighting
- HVAC
- Plug Loads / Other



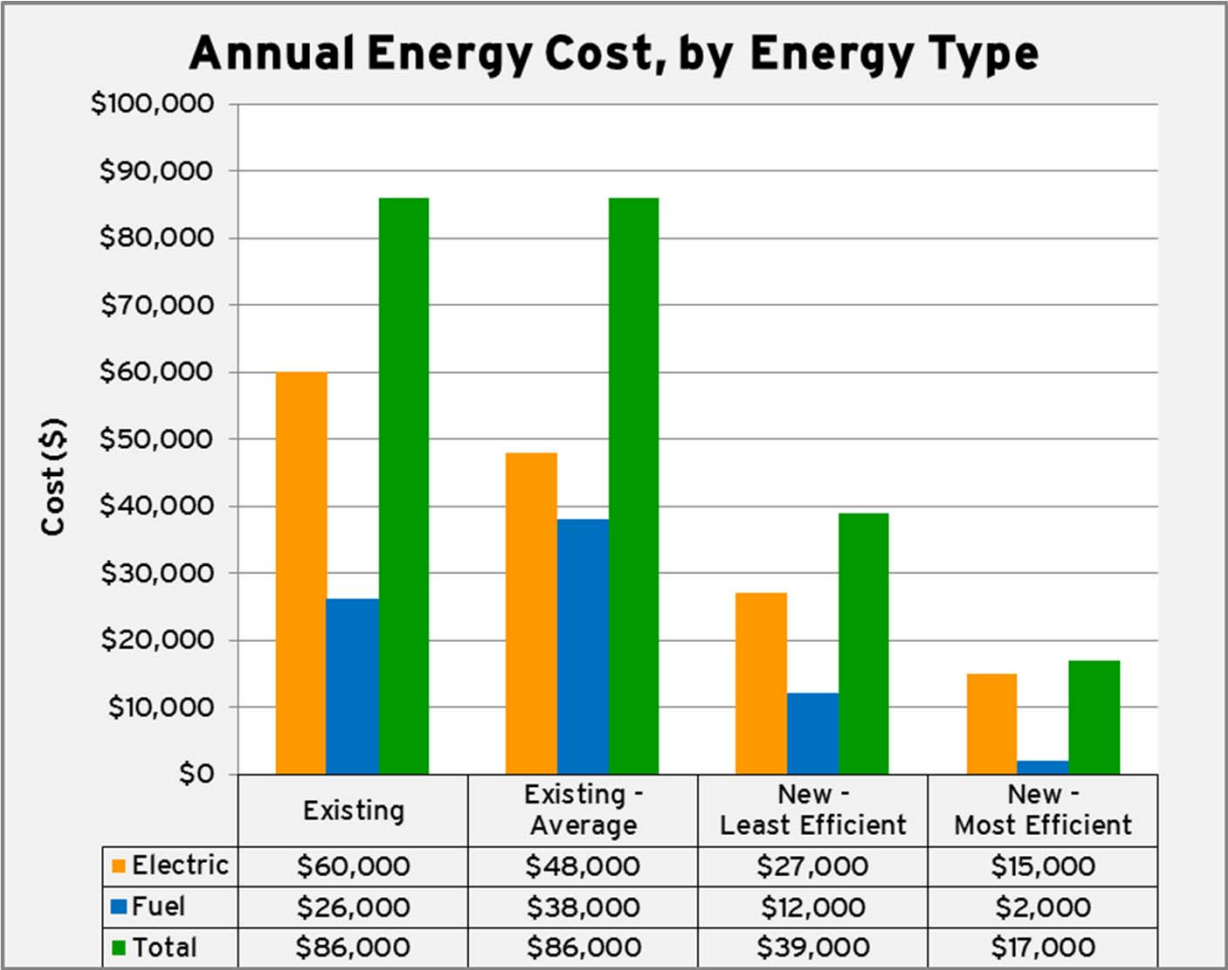
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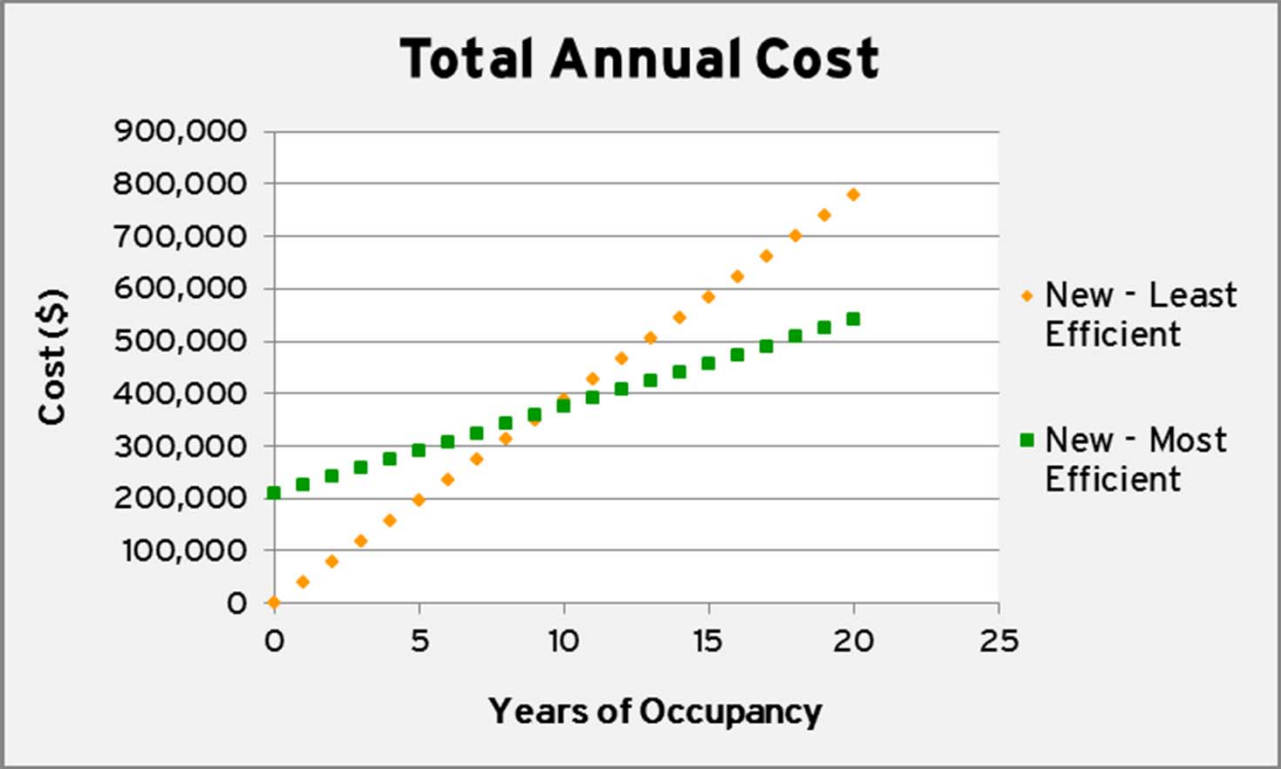
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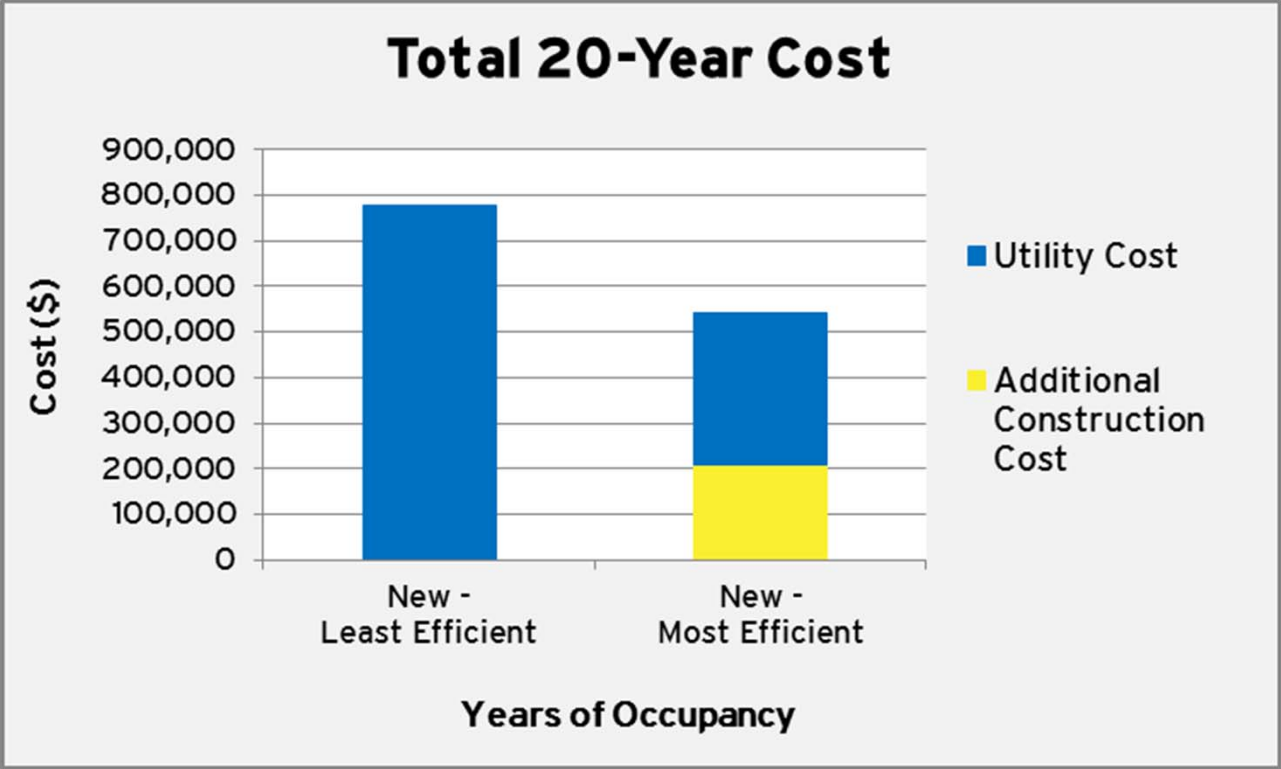
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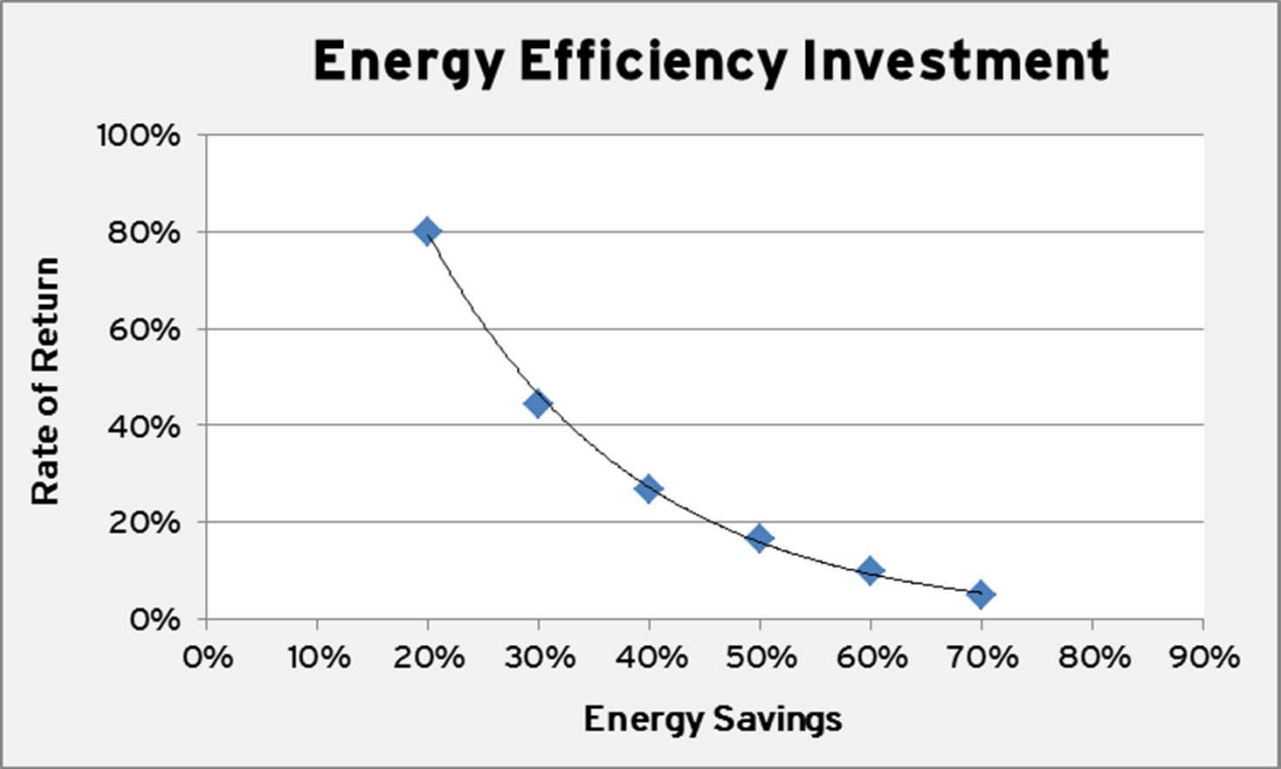
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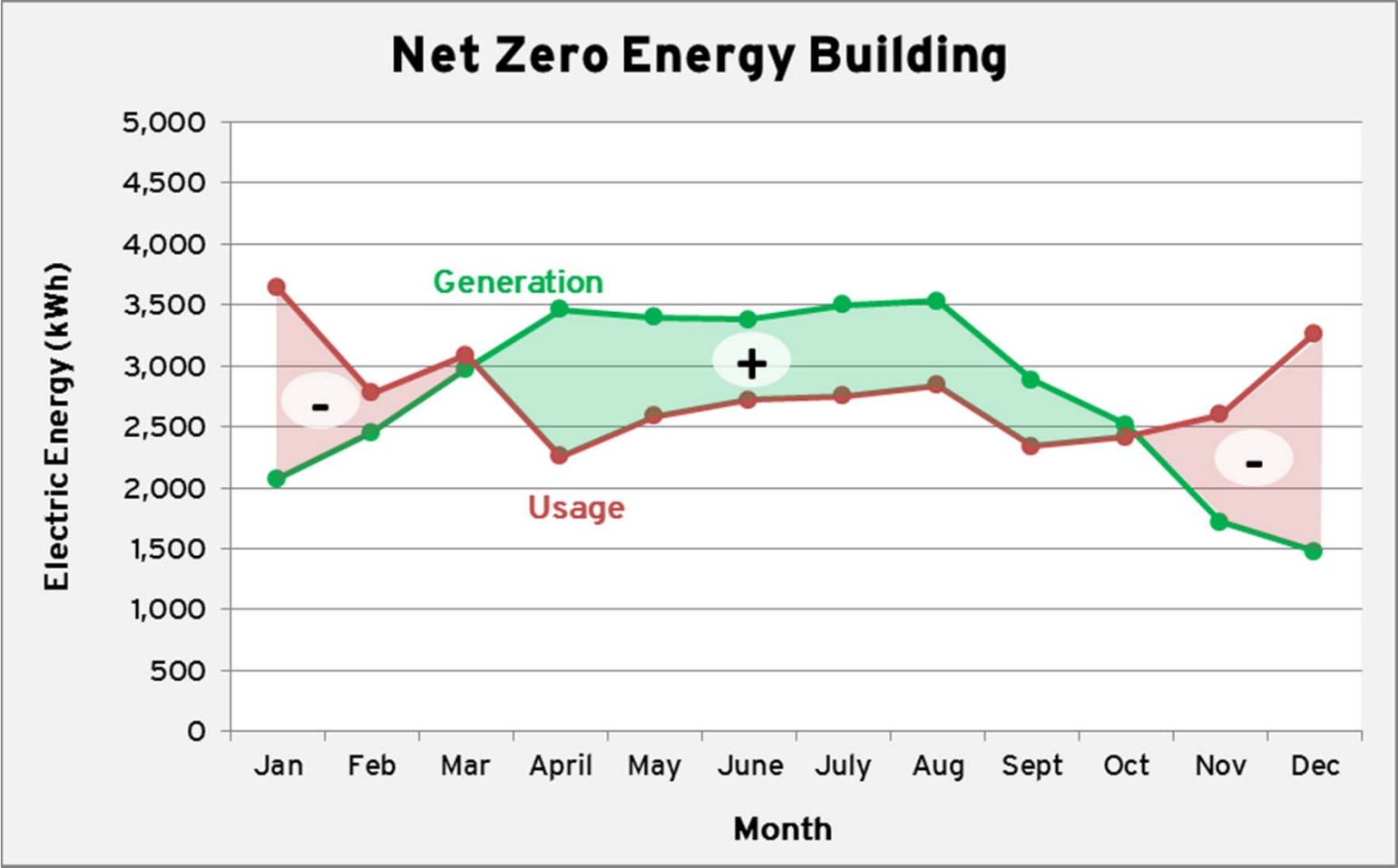
BUILDING EFFICIENCY

Financing

- Principle - \$200,000
- Interest Rate – 4%
- Term – 15 Years

Year	Annual Energy Savings	Annual Payments (Principal & Interest)	Net Annual Cash Flow
0		\$ -	\$ -
1	\$ 20,750	\$ (17,750)	\$ 3,000
2	\$ 20,750	\$ (17,750)	\$ 3,000
3	\$ 20,750	\$ (17,750)	\$ 3,000
4	\$ 20,750	\$ (17,750)	\$ 3,000
5	\$ 20,750	\$ (17,750)	\$ 3,000
20	\$ 20,750	\$ -	\$ 20,750
	\$ 415,000	\$ (266,250)	\$ 148,750

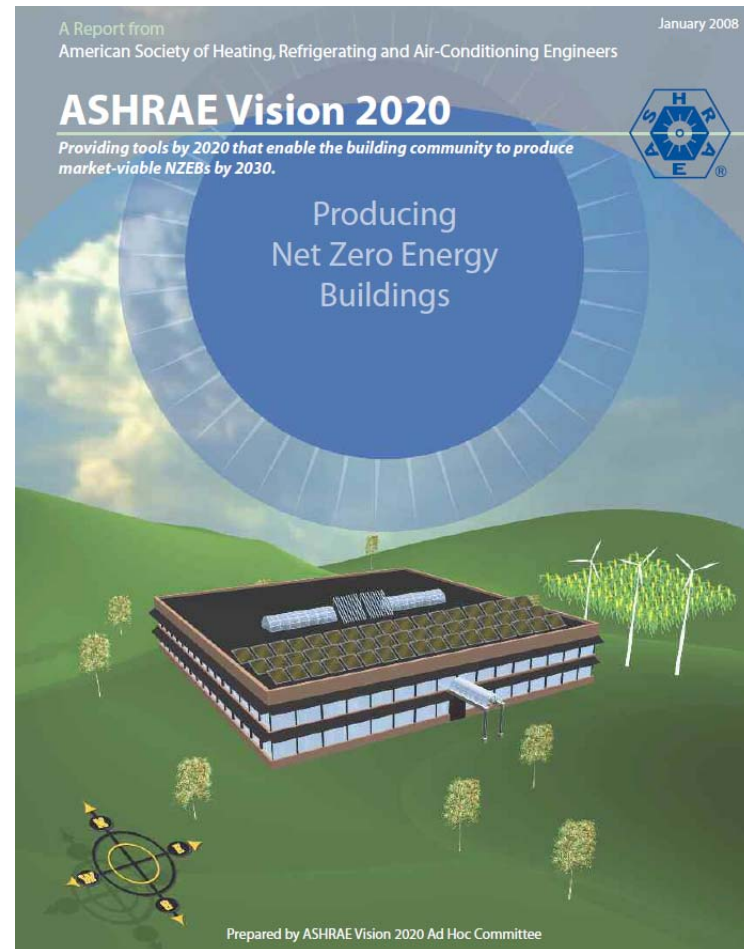
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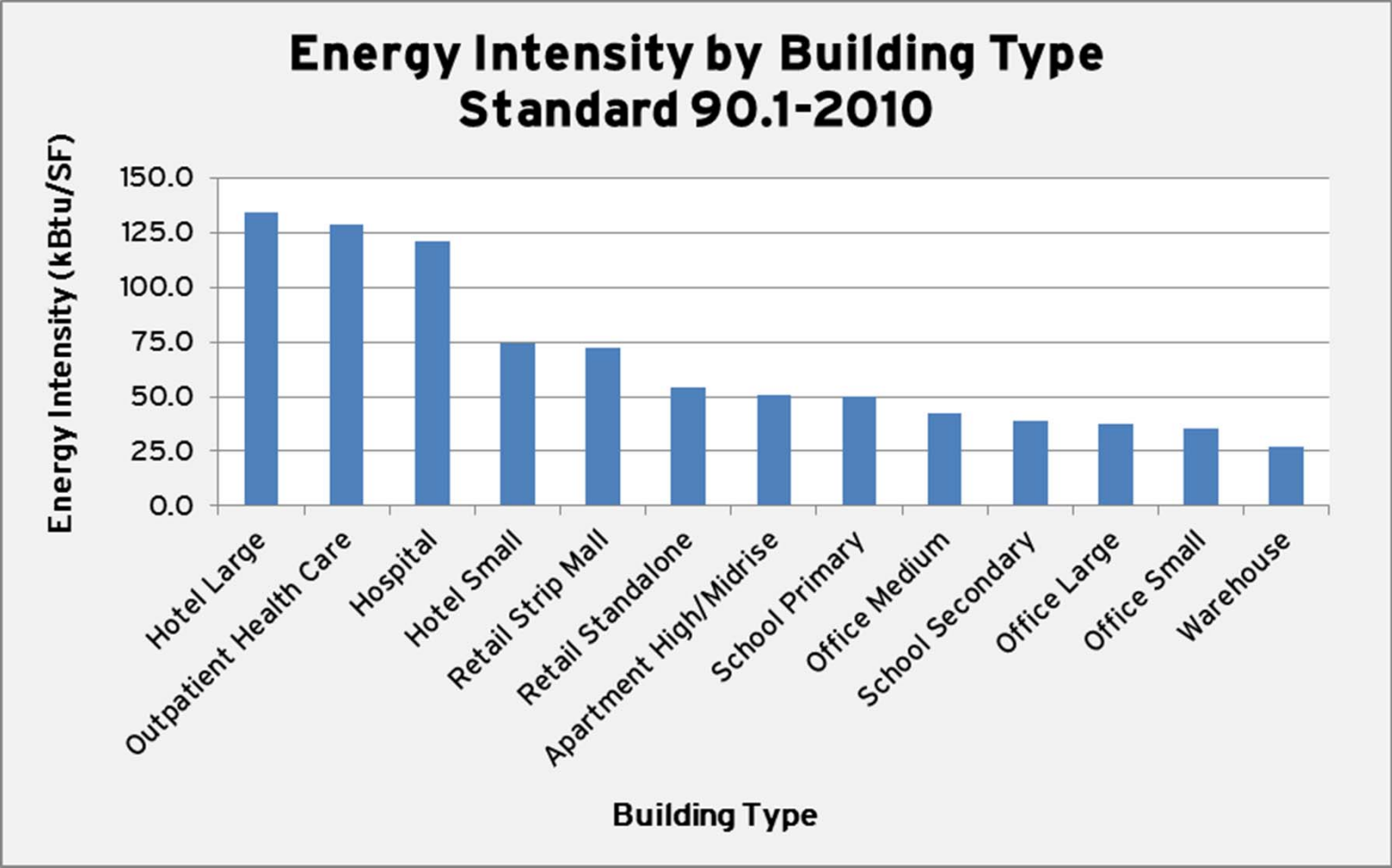
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Net Zero Energy - New Buildings by 2030

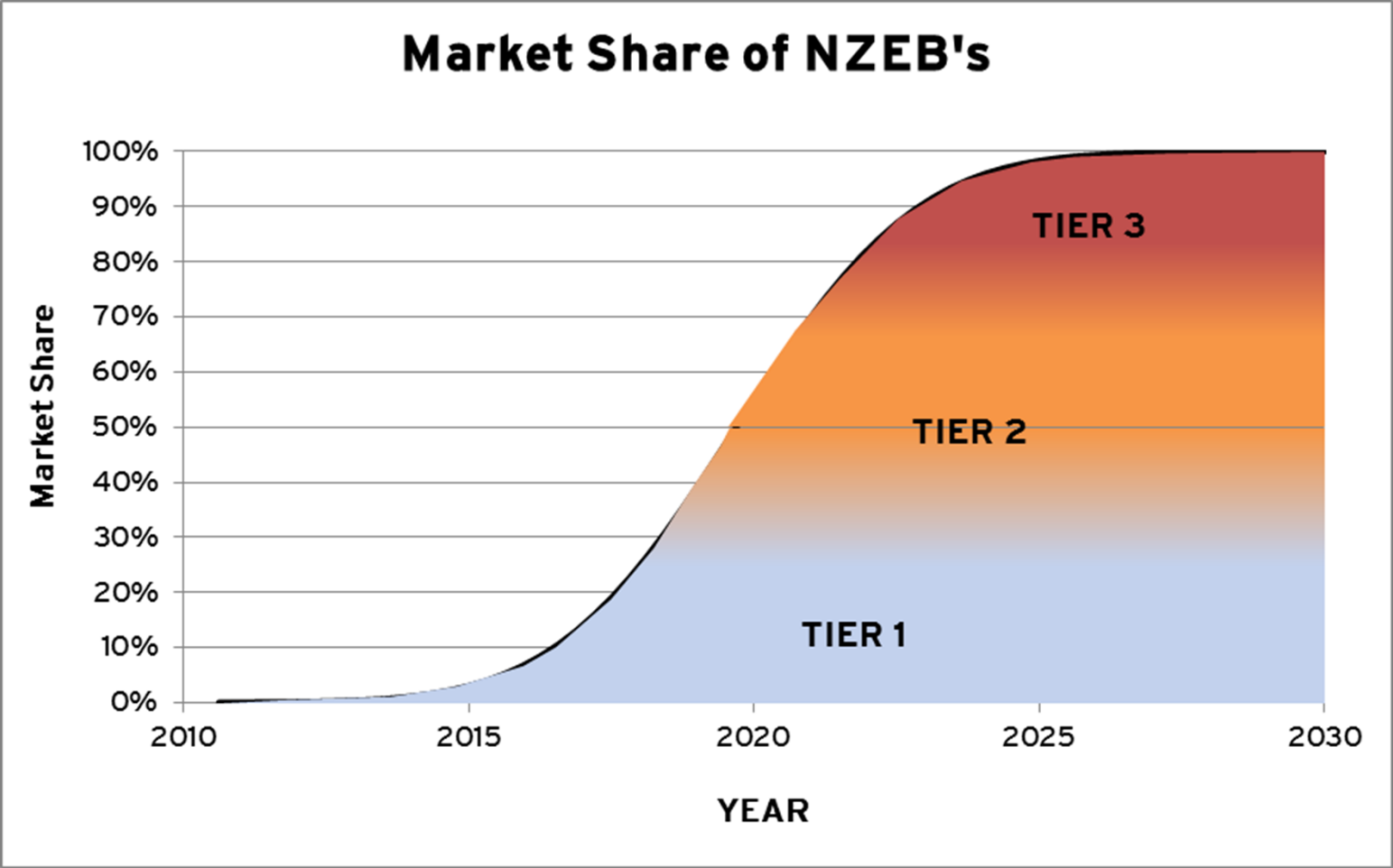
- Federal Government
- State Government
- Local Government
- Industry Organizations
– AIA, ASHRAE
- Businesses



BUILDING EFFICIENCY



BUILDING EFFICIENCY





EFFICIENCY VERMONT

Commercial New Construction Program

EFFICIENCY VERMONT - PROGRAM

1 Determine your energy efficiency goal and approach



EFFICIENCY VERMONT - PROGRAM

2 Invite us to a kick-off or early design meeting



Contact our Project Intake Coordinator at PICS@veic.org or 802-658-6060 X7662 to set up a meeting.



***PLEASE NOTE :** To receive full financial assistance for your project, you must involve Efficiency Vermont at this stage of your process.

3

Work with us to incorporate energy efficiency into design, construction, and operation

EFFICIENCY VERMONT - PROGRAM

Net Zero Energy Building Pilot Program

- Energy Efficiency
- Renewable Energy Generation
- Net Zero Design & Performance
- Energy Charrette
- Energy Modeling
- Commissioning
- Energy Metering



AGENDA

Energy Industry Trends

- Fuel, Electric, Photovoltaic

Building Efficiency

- Basic vs. Energy Efficient

Efficiency Vermont

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- Net Zero Energy Building Program



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