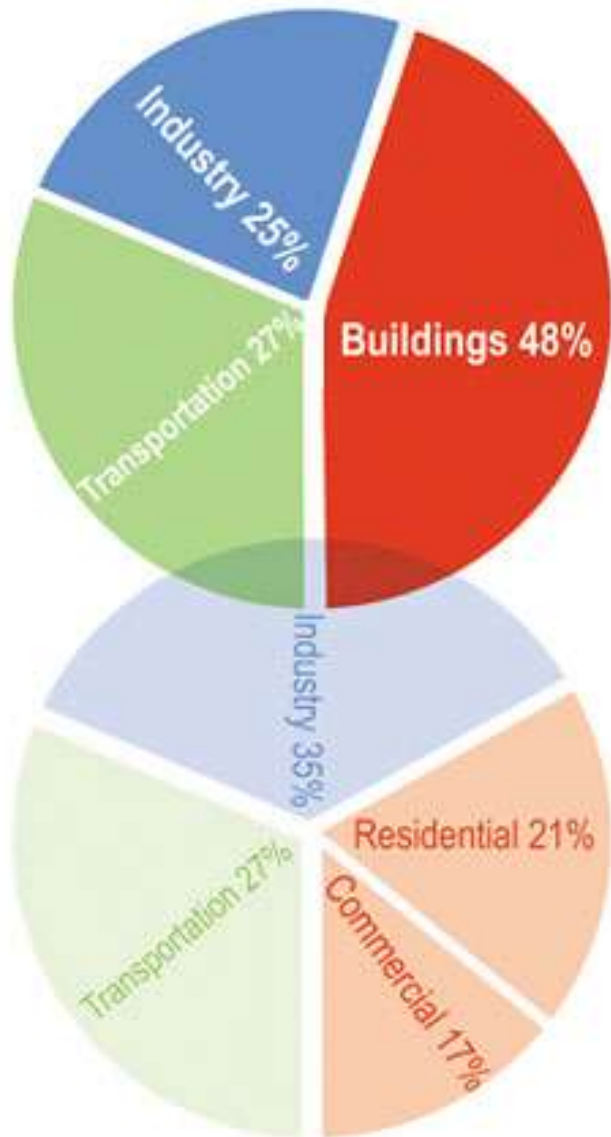


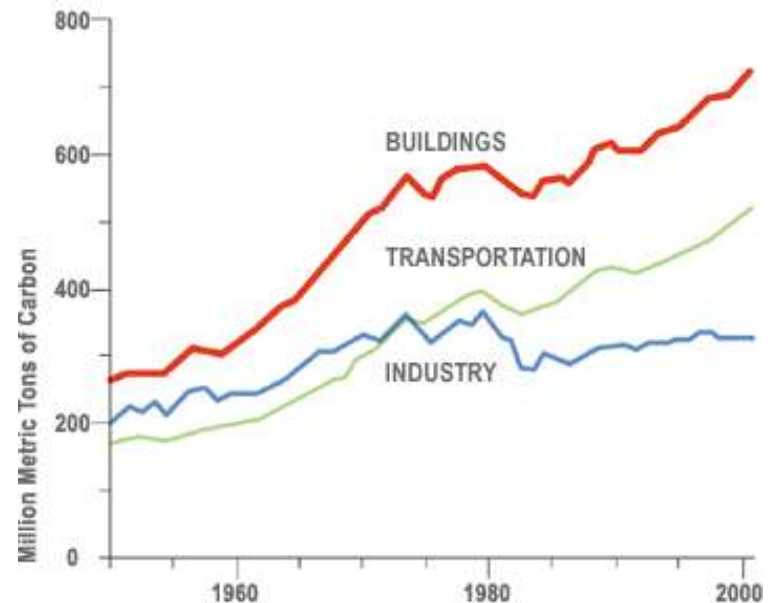


Energy Efficient Commercial Buildings

Jason Collins, AIA LEED AP CEA
Wolf Architecture, Inc.
Palmer, Alaska



- Buildings use more than 40% of our energy production
- Buildings are our highest CO2 producer



Electric Power by Fuel Source: How Does Alaska Compare to the U.S.?

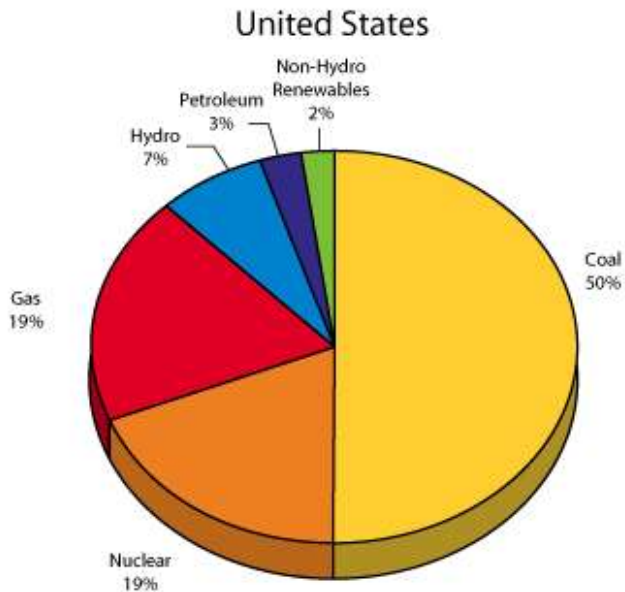
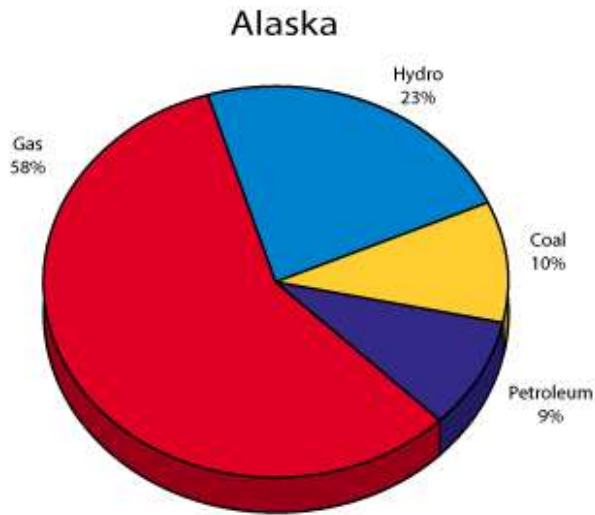
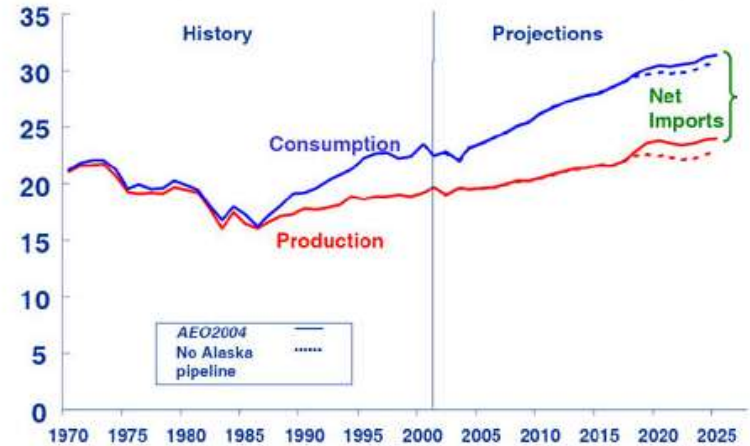
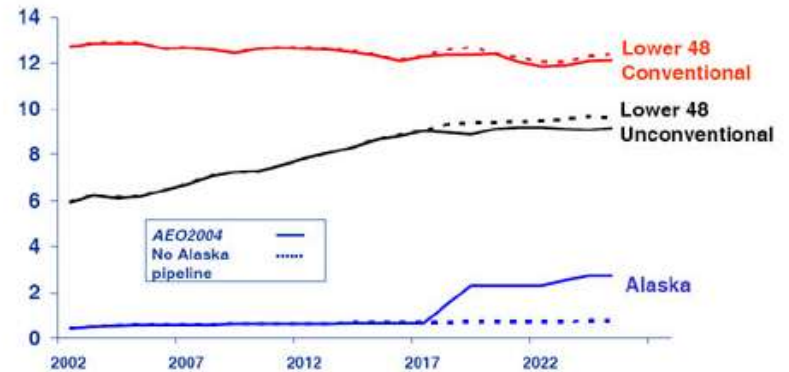


Figure 1. Natural Gas Production, Consumption, and Imports, 1970-2025 (trillion cubic feet)



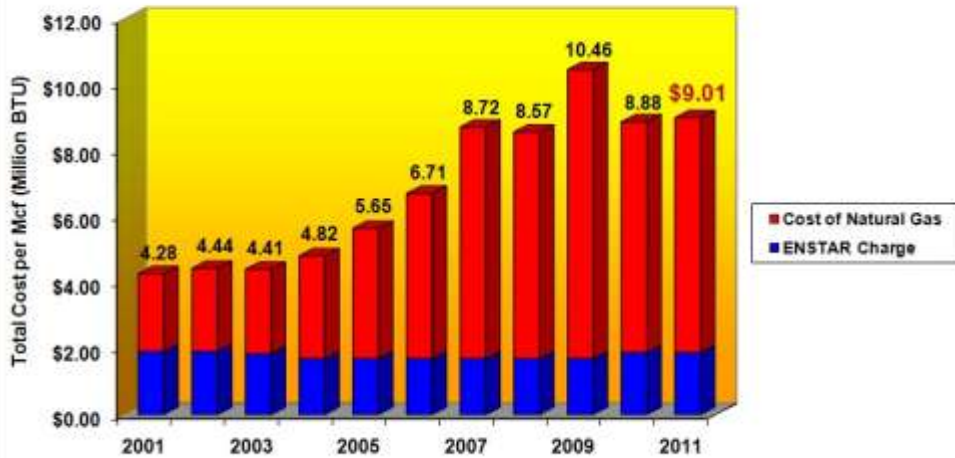
Source: National Energy Modeling System runs AEO2004.d101703e and NOAK.d012604b

Figure 3. U.S. Natural Gas Production, 2002-2025 (trillion cubic feet)



Source: National Energy Modeling System runs AEO2004.d101703e and NOAK.d012604b

Commodity Cost vs. ENSTAR Charge



Utility Rates – Natural Gas

G1 Residential size meter

- \$0.79723 ccf
- \$13.50 monthly service charge
- 420cfh max output

G2

- \$0.796 ccf
- \$29 monthly service charge
- 682cfh max output

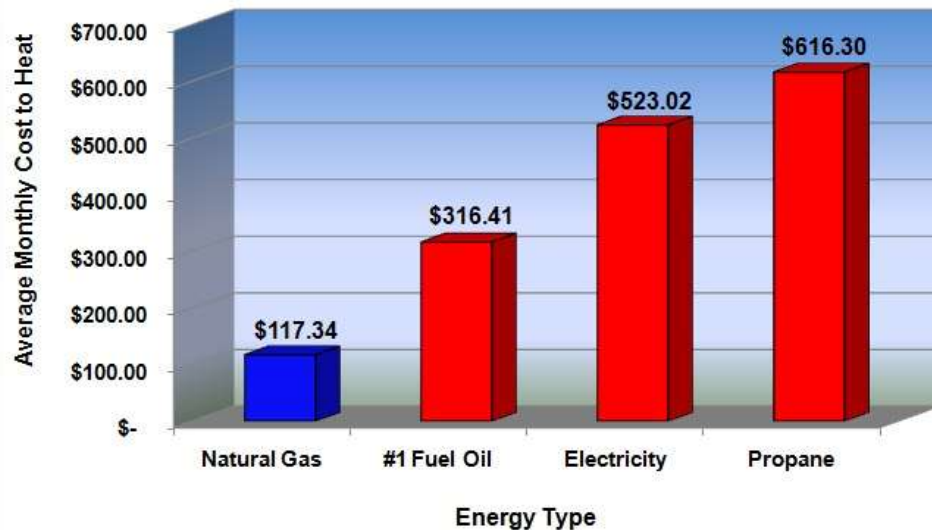
G3 Small Commercial

- \$0.79823 ccf
- \$109 monthly service charge
- 3,150cfh max output

G4 Large Commercial meter

- \$0.79723 ccf
- \$360 monthly service charge
- 18,375cfh max output

Average Monthly Cost to Heat
January 2011





Organizations throughout the Railbelt are making plans to deal with a potential natural gas shortfall this winter. While it's not considered likely, all agree that it is important to be prepared. Nobody wants to be caught unprepared on a cold, dark winter evening. That's why the electric utilities in the Railbelt, ENSTAR, the Municipality of Anchorage, and the Kenai Peninsula and Mat-Su boroughs have been working together on a collective approach to the situation.

Energy Disruption Customer Action Plan

CONDITION	MEANING	CUSTOMER ACTION
Green	Stable	Use energy wisely; be conservation minded Your utilities can provide tips on saving energy
Yellow	Caution	Set thermostat to 65 degrees in living areas, and 40 in the garage Lower water heater setting to "warm" or "vacation" Minimize usage of natural gas range Postpone doing laundry and dishes Turn off unnecessary lights and electronics
Red	Alert	Set thermostat at 60 degrees in living areas (55 if away) Turn water heater gas valve to "pilot" Do not use natural gas fireplaces, decorative heaters or gas grills Consolidate household activities into as few rooms as possible Use the microwave for cooking

**EVERY LITTLE BIT COUNTS.
TOGETHER WE CAN MAKE A DIFFERENCE.**

Utility Rates – Electricity

Residential/Single-Phase Charges

Facility Charge: \$5.65/month

- First 1300 kWh: \$0.10190/kwh
- Over 1300 kWh: \$0.08280/kwh

WPCRA : \$0.03144/kwh

Regulatory Charge : \$0.000552/kwh

Seasonal Service \$67.80 per year

Commercial/Three-Phase Charges

Facility Charge : \$13.37/month

Demand Charge: \$5.24/kilowatt

Energy Charge: \$0.06476/kwh

WPCRA: \$0.03144/kwh

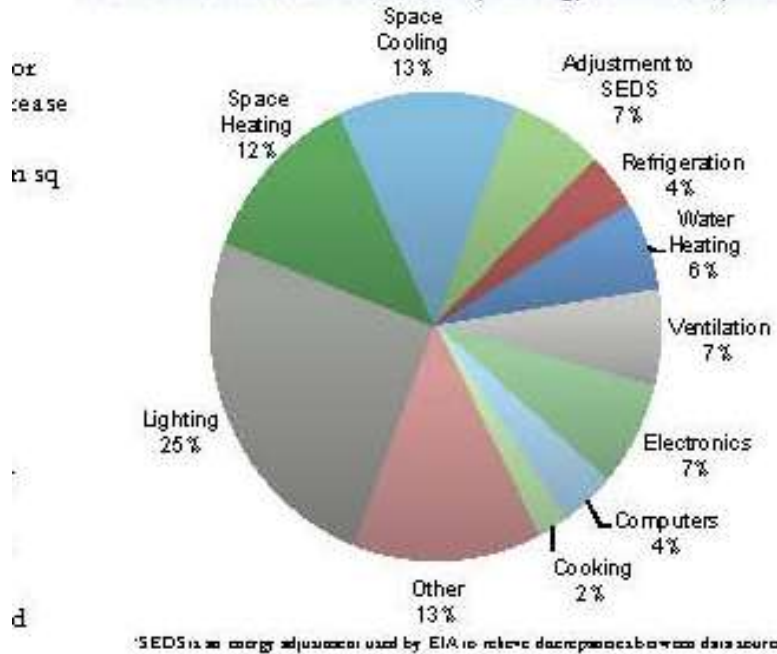
Regulatory Charge : \$0.000552/kwh

Example:

100kw demand = \$524/month

\$6,288 annually

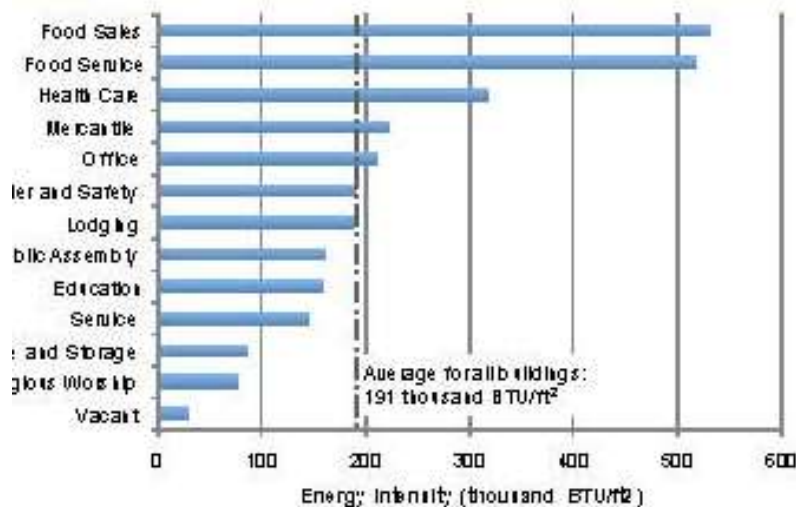
U.S. Commercial Sector Primary Energy End-Use (2006)*



Commercial Structures

- Dramatic Range of scales
- Range of Uses / Occupancies
- Higher Capital / Operating Costs
- Code Requirements
 - Fire + Life Safety
 - International Building Code
 - Mechanical
 - Uniform Plumbing Code
 - ASHRAE
 - Electrical
 - Energy Code
- Ventilation Requirements
- Natural Gas – higher service charge
- Electricity – demand charge

Primary Energy Intensity for U.S. Commercial Buildings (2003)²





Commercial Buildings



Wind Institute

- PEI, Canada
- Wind Research
Laboratories and
Workshop
- Geothermal heat pump
Four vertical wells
- Partial Earth berm
- Passive Solar
- Natural Daylighting
- Local Materials
Birch wood floors
Cedar shingle siding





Government of Canada

- Prince Edward Island, Canada
- LEED Gold
- Downtown location
- Brownfield site
- Landscaping—no irrigation
- High-eff. Plumbing (40%)
- Gray water collection/use
- Energy efficiency
 - Increased Insulation
 - Insulated Glazing
 - Automated systems
 - 65% Reduction



Government of Canada

- Natural ventilation
Raised Floor System
Atrium-passive return
- Natural Daylighting
Photocells on lights
- Shading devices
Also Photovoltaic
- Efficient Lighting
Direct-indirect plus task
Motion Sensors
- Low VOC Interiors



Government of Canada

- Photovoltaic Array
- Shading devices
Also Photovoltaic
- 111.5 kw Array
Grid tied
- February 2008-2010
Produced 250,000kwh
Offset 128,000kg CO₂
10% of Building's Power



MSB Animal Care

- Palmer, Alaska
- Addition
- Natural Daylighting
- Exterior insulation
2" Rigid + 2x6 w/ R21
R38 Low Slope Roof
- Ventilation System
- Energy Eff. Lighting
- Daylighting+Views
- Durable materials
EIFS Stucco / Metal Siding
Tile wainscot
Metal flashing at base
- +80% Adoption Rate

MATANUSKA-SUSITNA BOROUGH / VALLEY COMMUNITY FOR RECYCLING SOLUTIONS REGIONAL RESOURCE RECOVERY AND TRAINING PARK





MSB VCRS

- Palmer, Alaska
- LEED Gold
- Natural Daylighting
Triple Glazing / fiberglass
- Exterior insulation
5" Rigid R25
6" R50 Metal Panels
R17 Overhead Doors
- Ventilation System
- Energy Eff. Lighting
T5's, motion sensor
LED Exterior
- Durable materials
Metal Siding
Concrete interiors
Metal flashing at base



MSB VCRS

LEED compares energy use to a similar building built to standard energy/building code.

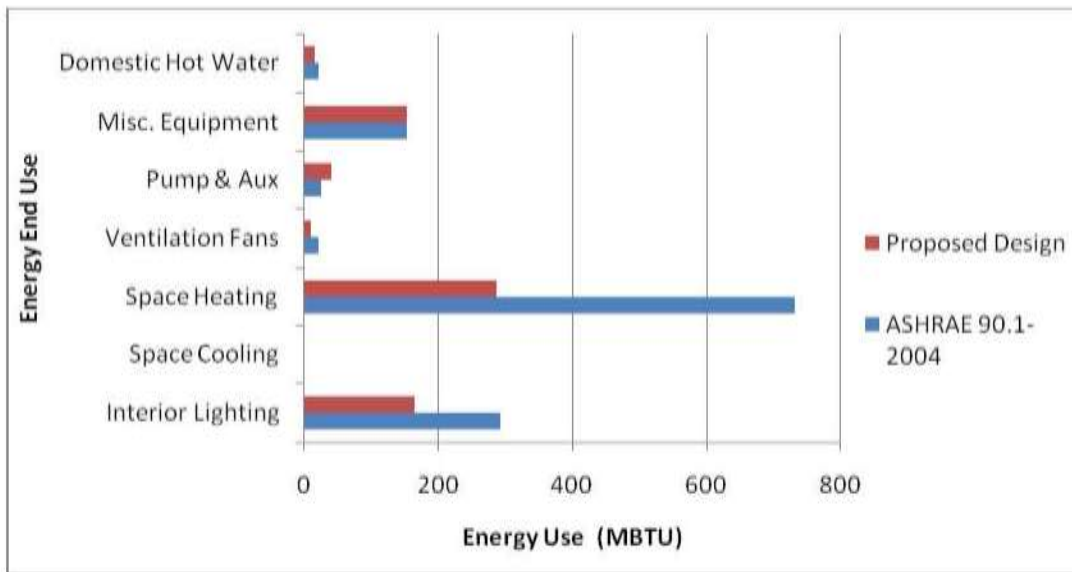


Figure 11: Energy by End-Use for ASHRAE 90.1-2004 Case and the Proposed Design

- Total Energy Savings – 50%
- Heating Savings – 60%
- Exterior Lighting – 77%
- Interior Lighting – 44%
- Ventilation Fans – 53%
- Domestic Hot Water – 20%
- Water Reduction Use – 44%
- Recycled Content – 45%
- Regional Materials – 21%
- Waste Reduction – 95%

MSB VCRS

LEED compares energy use to a similar building built to standard energy code.

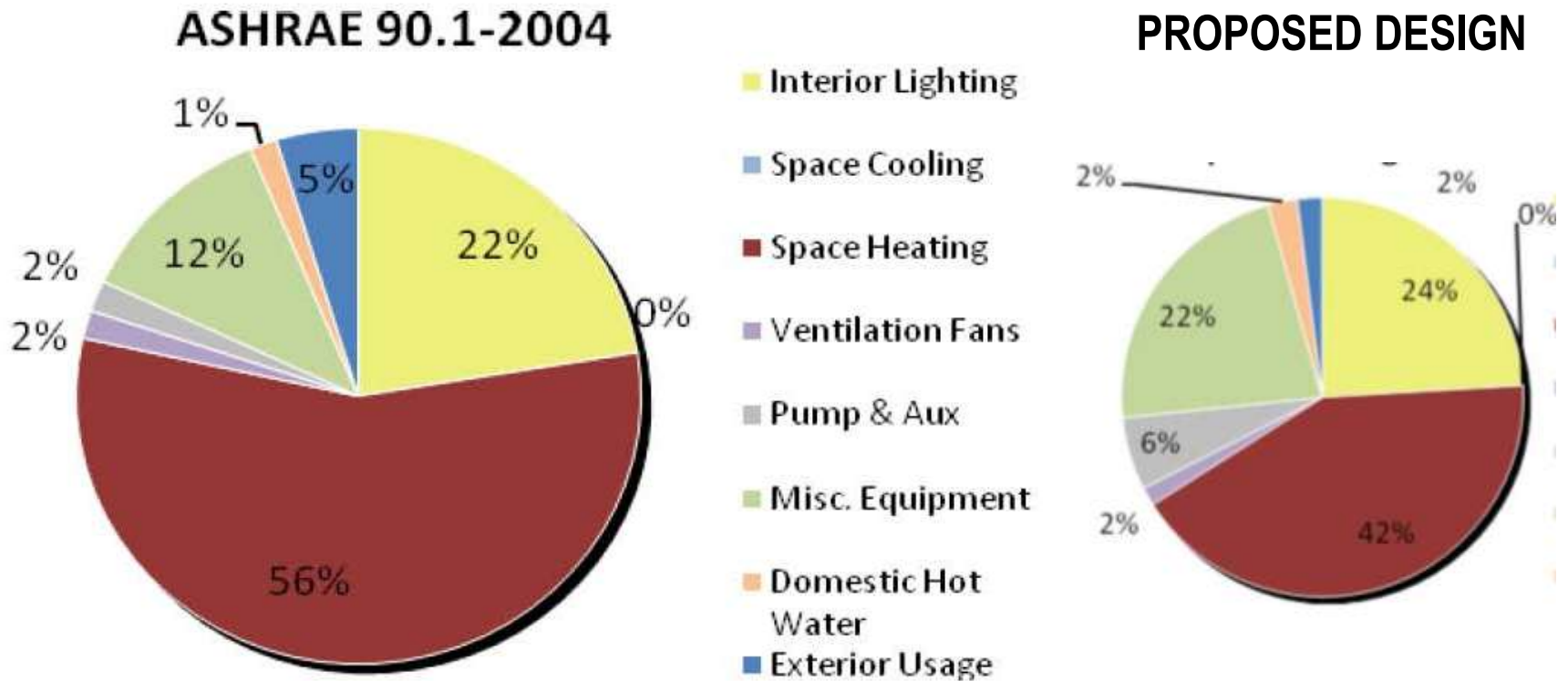


Figure 12: End-Use Profile for ASHRAE 90.1-2004 Case and the Proposed Design

ALASKA AIR NATIONAL GUARD - 176TH WING RELOCATION BRAC TRAINING FIRE STATION - ELMENDORF AIR FORCE BASE

SUSTAINABLE SITES

- SITE FOR BEST PASSIVE SOLAR GAIN
- USE NATURAL CONTOURS FOR SITE DRAINAGE
- USE OF SWALES, RIVER ROCK BEDS AND INFILTRATION BASIN FOR DRAINAGE RUNOFF COLLECTION AND STORMWATER MANAGEMENT
- MAINTAIN LOW PROFILE AND SMALL SIDE TO MINIMIZE WINTER WINDS
- GRAVEL PAVING - PERVIOUS SURFACE AND RECYCLE HEAT ISLAND
- MINIMIZE SITE LIGHT POLLUTION
- PARKING FOR ALTERNATIVE VEHICLES AND CARPOOLS
- BICYCLE RACK AND SHOWER FACILITIES

LEED NC
USGBC Version 2.2 Project Checklist

Category	Requirement	Compliance
Sustainable Sites	SS1 - Minimize Site Disturbance	Compliant
	SS2 - Protect or Restore Natural Areas	Compliant
	SS3 - Minimize Heat Island Effect	Compliant
	SS4 - Reduce Site Emissions	Compliant
Water Efficiency	WE1 - Reduce Water Consumption	Compliant
	WE2 - Reduce Water Consumption	Compliant
	WE3 - Reduce Water Consumption	Compliant
	WE4 - Reduce Water Consumption	Compliant
Energy and Atmosphere	EA1 - Optimize Building Energy Efficiency	Compliant
	EA2 - Optimize Building Energy Efficiency	Compliant
	EA3 - Optimize Building Energy Efficiency	Compliant
	EA4 - Optimize Building Energy Efficiency	Compliant
Materials and Resources	MR1 - Recycled Content	Compliant
	MR2 - Recycled Content	Compliant
	MR3 - Recycled Content	Compliant
	MR4 - Recycled Content	Compliant
Indoor Environmental Quality	IEQ1 - Enhance Indoor Air Quality	Compliant
	IEQ2 - Enhance Indoor Air Quality	Compliant
	IEQ3 - Enhance Indoor Air Quality	Compliant
	IEQ4 - Enhance Indoor Air Quality	Compliant

WATER EFFICIENCY

- LOW FLOW WATER FIXTURES, REDUCED WATER USAGE 38% BELOW STANDARD
- 1.3 GPF TOILETS, 0.50 GPF URINAL, 0.50 GPM FAUCETS, 1.30 GPM SHOWERS
- STANDARD IS: 1.6 GPF TOILETS, 1.0 GPF URINAL, 2.0 GPM FAUCETS, 2.0 GPM SHOWERS
- WATER EFFICIENT LANDSCAPING FEATURES, NATIVE PLANTING

ENERGY AND ATMOSPHERE

- SUPER EFFICIENT ENVELOPE
- R15 RIGID INSULATION AT SLAB AND FOUNDATION WALLS (CODE IS R9)
- R24 METAL PANELS AT EXTERIOR WALLS (CODE IS R19)
- R33 METAL PANELS AT ROOF (CODE IS R30)
- R14 EXTERIOR OVERHEAD DOORS
- SIMPLE BUILDING FORM - MINIMIZES HEAT LOSS AND CONVECTION CURRENTS
- EFFICIENT GLAZING UNITS
- EFFICIENT ZONED HEATING SYSTEM
- 94% EFFICIENT BOILERS, 92% EFFICIENT AIR HANDLING UNIT
- RADIANT HEATING FOR MORE EFFECTIVE "COMFORT ZONE"
- AREAS ZONED FOR APPARATUS BAY, OFFICES, LOCKER ROOMS
- HIGH EFFICIENCY LIGHT FIXTURES UTILIZING LONG-LASTING T5 BULBS
- PHASED LIGHTING LEVELS ALLOW FOR REDUCED ENERGY USE (MULTIPLE BALLASTS)

MATERIALS AND RESOURCES

- MINIMIZE CONSTRUCTION WASTE, MANAGE RECYCLING
- RECYCLED CONTENT - 35% TOTAL BUILDING
- RECYCLED CONTENT PRE-ENGINEERED STEEL FRAME 35%
- STEEL FABRICATIONS AND DETAILING - 25 TO 33%
- PREFINISHED INSULATED METAL PANELS - 31%
- RAPIDLY RENEWABLE MATERIALS - 30% BASED FOAM
- RECYCLED CONTENT DOOR SYSTEMS 30-40%
- RECYCLED CONTENT SUSPENDED CEILING TILES - 35%
- RECYCLED CONTENT RUBBER WALL BASE - 10%
- RECYCLED CONTENT WASHROOM PARTITIONS - 100%
- RECYCLED CONTENT LAMINATE CASEWORK FINISHES - 25%
- REGIONAL MATERIALS - 25% TOTAL BUILDING
- SITE WORK AND FILL
- CONCRETE - 84% AGGREGATES AND FINES IN MAT-SU
- CONCRETE MASONRY UNITS MANUFACTURED IN MAT-SU
- CERTIFIED WOOD - 36% TOTAL WOOD PRODUCTS
- FOREST STEWARDSHIP COUNCIL CERTIFIED PRODUCTS

INDOOR ENVIRONMENTAL QUALITY

- CO MONITORING AND EXHAUST SYSTEM, MAKE-UP AIR WITH HEAT EXCHANGER
- CONSTRUCTION AIR QUALITY MANAGEMENT (PLAN AND FLUSH-OUT)
- LOW-EMITTING PAINTS AND COATINGS AND SEALANTS
- LOW-EMITTING MATERIALS - GREENGUARD CERTIFIED LAMINATE CASEWORK FINISHES
- NO VOC METAL PANEL FOAM CORE, NO VOC BUTYL TAPE
- VIEWS IN OCCUPABLE AREAS
- NATURAL VENTILATION AT OFFICE AREAS
- CONTROLLABLE LIGHTING ARRAYS, PHASED LIGHTING
- CONTROLLABILITY OF THERMAL SYSTEMS, ZONED HEATING AREAS



WHAT IS LEED?
THE LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED) IS A THIRD-PARTY CERTIFICATION PROGRAM AND THE NATIONALLY ACCEPTED BENCHMARK FOR THE DESIGN, CONSTRUCTION AND OPERATION OF HIGH PERFORMANCE GREEN BUILDINGS. LEED HELPS BUILDING OWNERS AND OPERATORS THE TOOLS THEY NEED TO HAVE AN IMMEDIATE AND MEASURABLE IMPACT ON THEIR BUILDING'S PERFORMANCE. LEED PROMOTES A WHOLE-BUILDING APPROACH TO SUSTAINABILITY BY FOLLOWING BEST PRACTICES IN FIVE KEY AREAS THAT ARE INDICATED ON THIS DRAWING.

WHAT IS THE USGBC?
THE U.S. GREEN BUILDING COUNCIL IS A 501(C)(3) NON-PROFIT COMMITMENT OF LEADERS MOVING TO MAKE GREEN BUILDINGS AVAILABLE TO EVERYONE WITHIN A GENERATION.

WHAT ARE THE BENEFITS OF PURSUING LEED?
APART FROM THE OBVIOUS PHYSICAL BENEFITS OF GREEN BUILDING, LEED PROVIDES THIRD-PARTY VALIDATION OF THE BUILDING ACHIEVEMENTS. RESEARCH INDICATES THAT CERTIFICATION AND COMMENSURATE CAN IMPROVE BUILDING PERFORMANCE BY AS MUCH AS 30%. LEED CERTIFICATION ALSO PROVIDES ACHIEVEMENT IN AN INTERNATIONALLY-RECOGNIZED GREEN BUILDING PROGRAM.

WHAT'S THE SIGNIFICANCE OF CERTIFICATION?
THE HOME RECYCLING FACILITY WILL BE ONE OF THE FIRST LEED CERTIFIED PROJECTS IN THE MERRILL VALLEY AND ONE OF THE FIRST GOLD-LEVEL CERTIFIED IN ALASKA. WHO WILL ALSO BE ONE OF THE FIRST INDUSTRIAL FACILITIES IN ALASKA TO BE LEED CERTIFIED. IT WILL BE THE FIRST LEED-SUBMITTED RECYCLING FACILITY IN ALASKA AND ONE OF ONLY A FEW LEED CERTIFIED RECYCLING FACILITIES IN THE US.



ANG Fire Station

- Elmendorf AFB, Alaska
- New Prototype
- Additional insulation
 - 3" R25 Metal Panels
 - 2" Rigid + 2x6 w/ R21
 - R40 Roof Panels
- Zoned Heating System
- Monitored Air System
- Energy Eff. Lighting
 - T5s and LED Exterior
- Durable materials
 - Painted concrete block
 - Metal Panels
 - Metal flashing at base





ANG Fire Station

LEED compares energy use to a similar building built to standard energy/building code.

- Total Energy Savings – 27%
- Gas Savings – 28%
- Elect. Savings – 25%
- Heating Savings – 28%

- Water Reduction Use – 38%
- Recycle Content – 35%
- Regional Content – 11%
- Waste Reduction – 76%



Image Audio

- Wasilla, Alaska
- Relocation
- Natural Daylighting
- Additional insulation
2" Rigid + 2x6 w/ R21
- Cold Roof w/ R38 batt
- Zoned radiant slab
- Zoned air system
- Energy Eff. Lighting
- Durable materials
Painted concrete block
Glazed Tile
Metal flashing at base



Image Audio

- 38% Total Energy Savings
- 73% Heating Savings
 - \$5,000 annually
- Total Electric is double average retail electrical (because it is a audio /visual store)
 - \$10,000 annually
- Pursuing the Energy Star standard award



MSB Public Safety 63+66

- Wasilla, Alaska
- New Prototype
- Additional insulation
 - 2" Rigid + 2x6 w/ R21
 - 8-12" Rigid Low Slope
- Zoned radiant slab
- HRV Air System
- Energy Eff. Lighting
 - T5s and LED Exterior
- Durable materials
 - Painted concrete block
 - EIFS Stucco
 - Metal Siding
 - Metal flashing at base



MSB Public Safety

- Wasilla, Alaska
- Heating Savings
 - Station 63 – 30%
 - Station 66 - 32%
- High-efficiency modulating boilers, radiant heat floor
- Vehicle air exhaust system on sensors
- Snowmelt-separate mini-boiler on sensors
- HRV at Living Quarters on Station 63





One Blind Dog Office

- Palmer, Alaska
- Additional insulation
R25 Batt Insulation
8-12" Rigid at Roof
- Natural Daylighting
Light shelf and sunshade
- Energy Eff. Lighting
T5s and LED Exterior
Photocells and
Occupancy Monitors
- Durable materials
Cementitious panels
Metal Panels
- Renewable Energy
15kw PV Array



Daylighting

- Glazing amount

- Location

South – overhang / shade

West – vertical shade

- Glazing type

U-value

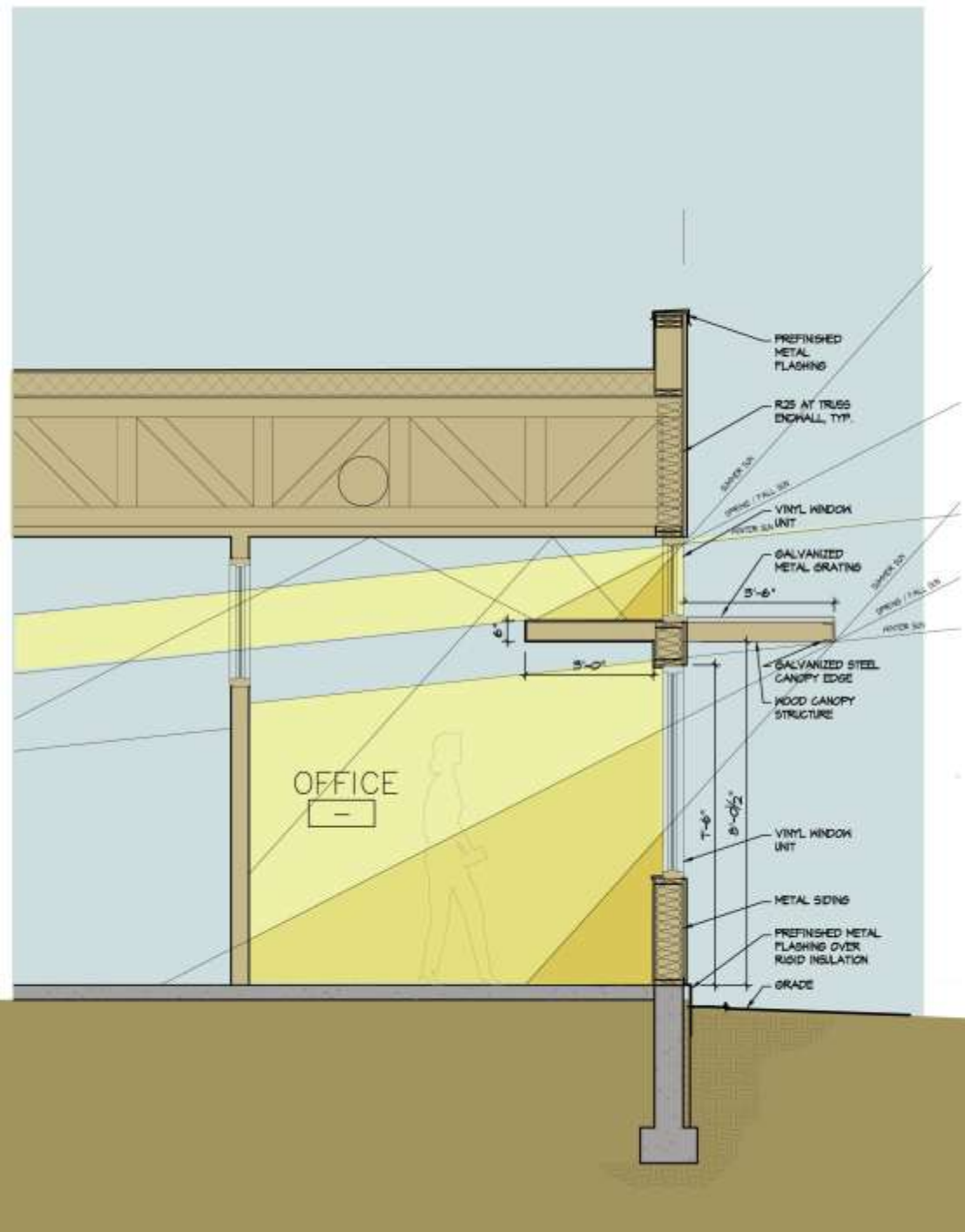
Solar Heat Gain Coeff.

Visible Transmittance

- Canopies and Sunshades

- Lightshelf

- Skylights / light-tubes



Residential Retrofits										2000
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Existing							Total Savings - All Ratings		
Energy Cost	CO2 Lbs/yr	Energy Use	CO2 Product	Avg.	Energy Saved	CO2 Reduced	CO2 Tons/h		
\$89,219	749,375	\$65,853	548,513	26%	\$23,636	200,862	100.4		

Commercial Retrofits									
----------------------	--	--	--	--	--	--	--	--	--

800	Alascon Shop	\$ 1,330	21,375	\$ 985	14584	26%	\$ 345	6791	3
850	Children's Place	\$ 2,984	28,143	\$ 2,200	18887	26%	\$ 784	9256	5
1005	Wasilla Station (exist)	\$ 25,417	244,196	\$ 24,079	228662	5%	\$ 1,338	15534	8
1106	Talkeetna Library	\$ 6,732	47,982	\$ 4,862	34756	28%	\$ 1,870	13226	7
1107	Palmer Wells Fargo	\$ 19,663	203,790	\$ 18,346	190431	7%	\$ 1,317	13359	7

Energy Use	CO2 Product	Energy Saved	CO2 Reduced	
\$50,472	487,320	\$5,654	58,166	29

Total Retrofit Savings	\$116,325	1,035,833	\$29,290	259,028	129
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Commercial New Designs									
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		Code			Design	% Red.	Saved		
		Energy Cost	CO2 Lbs/yr	Energy Cost	CO2 Lbs/yr		Energy Cost	CO2 Lbs/yr	
707	MSB Valley Recycling	\$30,071	312,137	\$21,154	96,000	30%	\$8,917	216,137	108
714	Aulman Residence	\$4,655	20,951	\$1,745	9,061	63%	\$2,910	11,890	6
901	Image Audio	\$24,875	258,235	\$15,308	156,085	38%	\$9,567	102,150	51
920	One Blind Dog Office	\$5,141	49,037	\$3,594	30,671	30%	\$1,547	18,366	9
922	Adonai Clinic	\$9,915	94,736	\$6,580	60,986	34%	\$3,335	33,750	17
925	ANG Fire Station	\$10,679	110,848	\$7,792	80,881	27%	\$2,887	29,967	15
936-63	MSB Fire Station 63	\$9,849	99,769	\$6,671	64,757	32%	\$3,178	35,012	18
936-66	MSB Fire Station 66	\$8,559	86,274	\$5,793	55,897	32%	\$2,766	30,377	15
1005	Wasilla Station (addition)	\$17,772	184,473	\$12,992	134,857	27%	\$4,780	49,616	25

New Demand	New CO2	Energy Saved	CO2 Avoided	CO2 Tons
\$ 81,629	689,195	\$ 39,887	527,265	264

Total Savings / Reductions	\$ 69,177	786,293	393
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Total New Demand / New CO2 Production	\$ 52,339	430,167	215
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Where To Next?

- Net Zero
Winter energy demands?
- Passiv Haus
How to provide heat?
- Living Building Challenge
Get off combustion?
- Commercial Energy Audits
Improve our building stock
- Replenishable Buildings
Buildings that give back

USGBC LEED Building Program

Sustainable Sites

- Site Selection / Preservation
- Transportation
- Storm Water
- Heat Island

Water Efficiency

- Landscaping
- Water Use / fixtures

Energy and Atmosphere

- Energy Performance
- Renewable Energy

Materials and Resource

- Reuse, Recycle, Local Products
- FSC Certified Wood

Siting

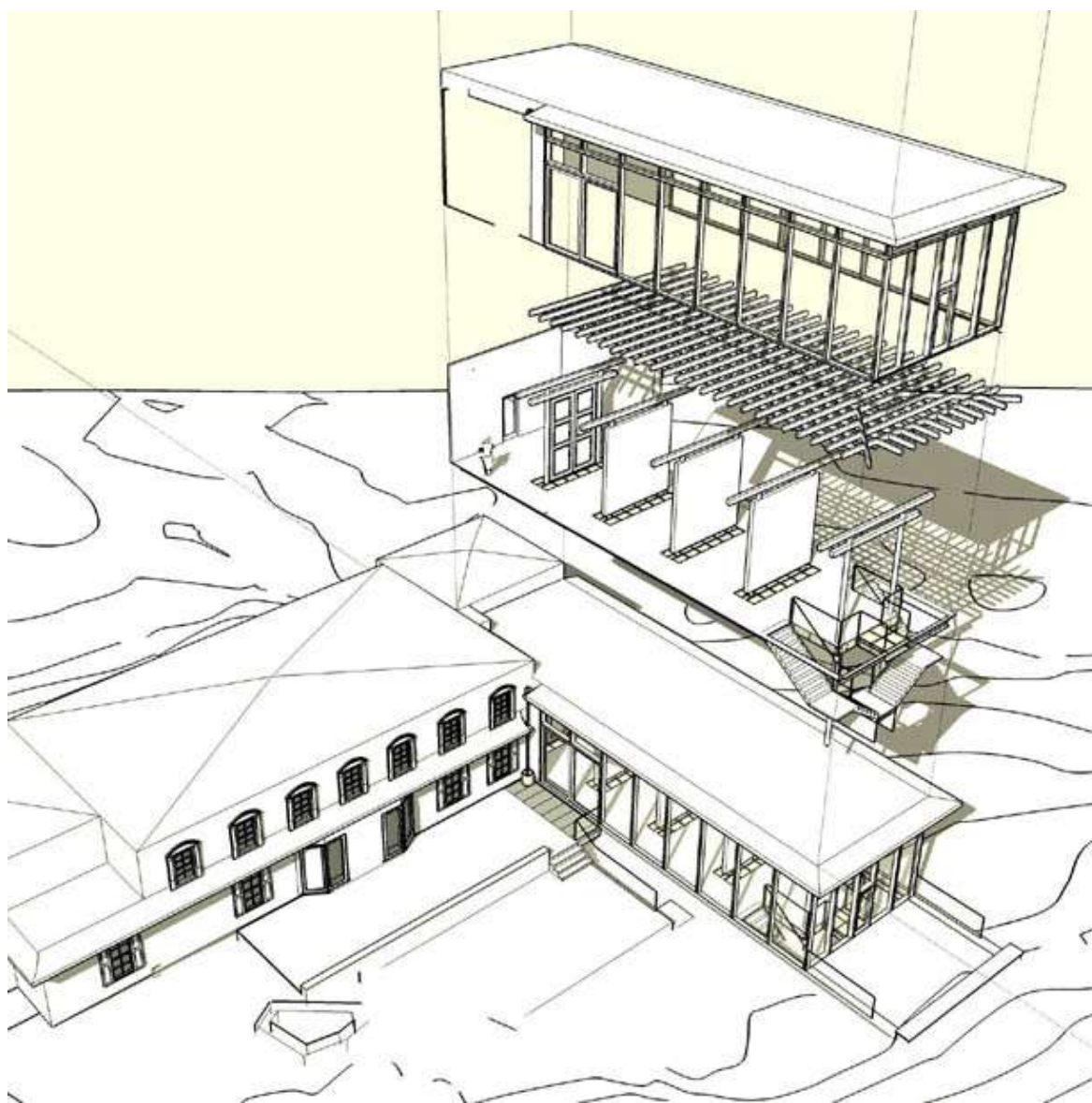
- Limit Impact
- Location
- Transportation / use
- Solar Orientation
- Wind Rose
- Topography
- Utilize contours
- Natural Resources
- Gravel + soil on-site
- Vegetation
- Seasonal shading
- Wind protection
- Stormwater controls



Water Efficiency

- Conservation
- Efficient Fixtures
 - Toilets – 1.2gpf dual flush
 - Urinal – 0.5gpf, waterless
 - Sink – aerator
 - Showers – 2.5gpm
- Landscaping
 - Limit irrigation by species
 - Rainwater collection
 - Graywater use
- Solar Aquatics Systems
 - Appropriate Sizing





Thermal Envelope

- Envelope Design
- Orientation
- Increased Insulation
- Window Selection
Glass (U, SHGC, Visibility)
- Changing Codes
- Payback

Heating / Cooling

- Selection of Systems
- Engineering
- Energy Models
- Heating / Cooling Zones
Eliminate cooling
- Code Changes



Materials

- Reduce Waste
Planning
VCRS, Craigslist
- Local Materials
Concrete, CMU
Wood, trusses, trim, floors
Cellulose insulation
Windows
- Recycled Materials
Steel – 25%+
Manufactured – 20%+ easy
- Reused Materials
Refinish / repurpose
- Rapidly Renewable



Interior Environment

- Ventilation
- Isolation / Exhaust
Laundry, vehicles,
chemicals
- Low VOC
Paints and Sealants
Finishes
Carpets – Greenguard
Wood / Composites
- Thermal Comfort
- Control over environment
- Daylighting



Efficient Lighting

- T5's
- Super T8's
- Photocells
- Occupancy Sensors

- LEDs – exterior use
Payback 5yrs+
Ease of maintenance
- LEDs – interior use
Payback 18yrs+

- Exterior
Dark Skies - cut off
Photocells, Timers



Renewables

Last step - after all other efficiency measures

- Wind
10-15yrs
- Solar Thermal
5-10yrs
- Solar Photovoltaic
15-30yrs
- Geothermal
10-20years

Residential Retrofits

Project	Name	Existing		Renovated		% Red.	Saved	
		EnergyCost	CO2 Lbs/yr	EnergyCost	CO2 Lbs/yr		EnergyCost	CO2 Lbs/yr
090314MW	Mike Wedge	\$ 4,605	44,877	\$ 3,542	33,769	23%	\$ 1,063	11108
090321GS	George Stuart	\$ 5,122	41,680	\$ 2,906	27,280	43%	\$ 2,216	14400
090517PP	Pete Praetorius	\$ 2,239	8,123	\$ 1,752	5,943	22%	\$ 487	2180
090315PT	Pam Troutman	\$ 4,028	22,304	\$ 2,473	18688	39%	\$ 1,555	3616
081119GB	Gene Backus	\$ 5,394	32,366	\$ 2,145	16627	60%	\$ 3,249	15739

Commercial Retrofits

800	Alascon Shop	\$ 1,330	21,375	\$ 985	14584	26%	\$ 345	6791
850	Children's Place	\$ 2,984	28,143	\$ 2,200	18887	26%	\$ 784	9256

Energy Use	CO2 Product
\$16,003	135,778

Energy Saved	CO2 Reduced
\$9,699	63,090

Commercial New Designs

	Code	Design		% Red.	Saved			
		EnergyCost	CO2 Lbs/yr		EnergyCost	CO2 Lbs/yr		
707	Valley Recycling	\$34,831	358,915	\$11,012	96,000	68%	\$23,819	262,915
714	Aulman Residence	\$4,655	20,951	\$1,745	9,061	63%	\$2,910	11,890
901	Image Audio	\$25,710	266,904	\$15,754	156,085	39%	\$9,956	110,819
920	One Blind Dog Office	\$5,141	49,037	\$3,594	30,671	30%	\$1,547	18,366
922	Adonai Clinic	\$9,915	94,736	\$6,580	60,986	34%	\$3,335	33,750
925	ANG Fire Station	\$9,388	97,177	\$6,360	64,385	32%	\$3,028	32,792
936-63	MSB Fire Station 63	\$9,849	99,769	\$6,671	64,757	32%	\$3,178	35,012
936-66	MSB Fire Station 66	\$8,559	86,274	\$5,793	55,897	32%	\$2,766	30,377

New Demand	New CO2
\$ 57,509	537,842

Energy Saved	CO2 Reduced
\$ 50,539	535,921

Total Savings / Reductions

Energy Saved	CO2 Reduced
\$ 60,238	599,011

Total New Demand / New CO2 Production

New Demand	New CO2
\$ 47,810	474,752