

The logo for LONG features the word "LONG" in a bold, blue, sans-serif font. The letter "O" is replaced by a circular graphic composed of four overlapping, curved segments in red, blue, green, and white, creating a sense of motion or a globe. Behind the text is a large, faint, multi-colored circular graphic that mirrors the design of the "O" in the logo, with segments in red, blue, green, and white.

Technology for Better Buildings

*Sustainable Buildings, Energy Efficiency,
and Smart Buildings*

Feb 15, 2007

LCCC - Cheyenne, WY

Overview

- Who is LONG?
- What is a sustainable building?
- Sustainability in new vs. existing buildings
- How to get a sustainable building
- Contracting methods
- Measures
- Questions?



ENERGY SOLUTIONS

Who is Long?

- In business 40 years.
- Operate in WY, CO, UT, and NV.
- 350 employees – 26 in Wyoming
- Leading energy services company in Wyoming and Rocky Mountain region. Services include:
 - Energy efficiency and sustainable facility management
 - Facility management system supplier – Tridium, Invensys
 - HVAC equipment supplier – 60 major brands
 - HVAC O&M services
 - Customer training



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What is a sustainable building?

- Other terms: high performance design, resource efficient, LEED certified, etc
- Sustainability goes beyond LEED
 - LEED is helpful checklist and approach for new or existing buildings – www.usgbc.org/leed
- Primary issues are performance driven:
 - energy, water, air quality, continuous Cx, proactive O&M
- Secondary issues:
 - waste, site, materials, cleaning, transportation
- Resources: www.wdbg.org, www.usgbc.org, <http://www.wyomingbusiness.org/business/energy.aspx>



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Sustainability in new vs. existing buildings

- New construction
 - Pro: blank slate, dream BIG
 - Con: beware the first cost pitfall !!
 - Only 2% of total building cost
- Existing building
 - Turn infrastructure into asset
 - Pro: staff knowledge; existing O&M logs and utility bills → great baseline materials
- Bottom line: YOU CAN DO THIS!!



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How to get a sustainable building...

- Set Goals: establish base and stretch goals – energy- and water-efficiency targets, waste/recycling, etc.
- Make sure to have metrics identified -ex:
 - Energy Star label (base) and Energy Star score of 85 (stretch)
 - Ex: Reduce water by 20% vs. five year average, etc.



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How to get a sustainable bldg...

- Design /Build Contracting
 - One point of responsibility
 - Streamlined and coordinated project management
 - Concept of team vs. workgroup
- Use RFP/RFQ language to reward firms that can meet your goals and with sustainable experience
 - Consider performance bonus clauses for contract
 - Ex: Increase bonus if base goals are exceeded
 - Can also use criteria such as your satisfaction or O&M goals
- Bottom line – your goals need to be linked to contracting outcomes
- SMART BUILDING



ENERGY SOLUTIONS

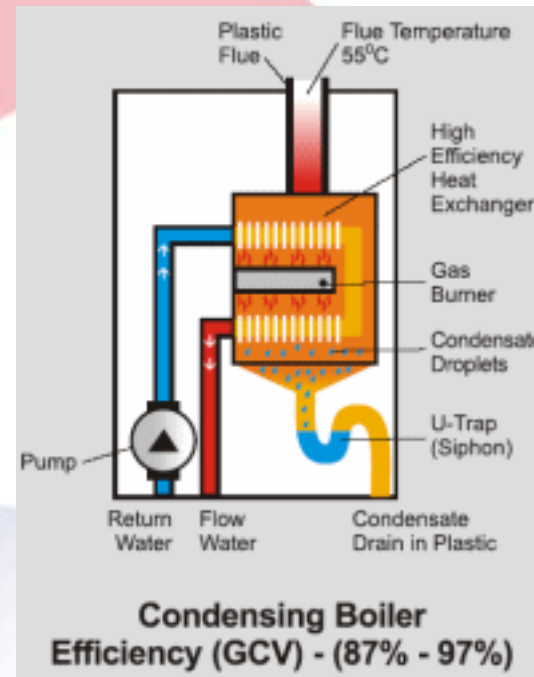
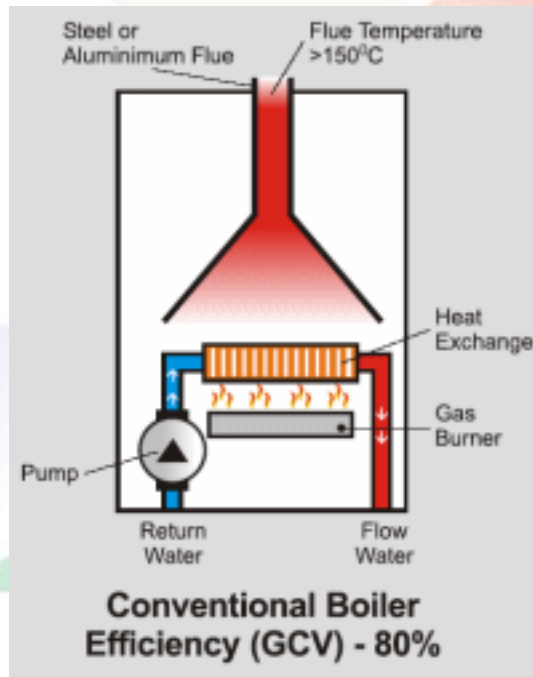
Measures – energy

- Common energy measures in Wyoming
 - Typically electricity inexpensive while gas varies
 - Flat plate heat exchangers, VFDs, lighting, DDC and/or additional control points, economizer / OA optimization
 - Condensing boilers, heat recovery, third party NG supplier



ENERGY SOLUTIONS

Ex. condensing boiler



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Measures – water

- Remember: more water typically used outside than inside
- Water measures
 - Outside: xeriscaping, night-time irrigation, limit grass to athletic fields, use fescues or blue grama, water retention?
 - Inside: ½ gal urinals, low-flow toilets, auto flush sensors, shower timers in schools, pool covers, and leak detections



ENERGY SOLUTIONS

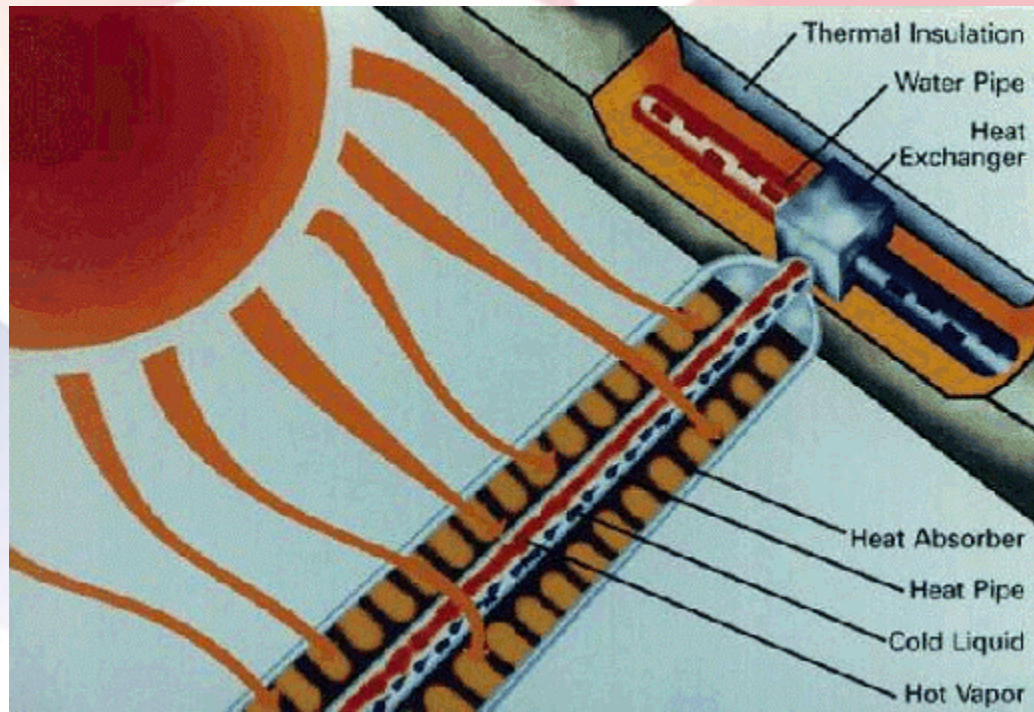
Renewable energy

- Active Solar Collectors
- Ventilation

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Ex. vacuum tubes – heat pipes



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Measures – other

- Don't forget about comfort!
 - Productivity offers biggest payback of all !!
 - Ex: fine tune controls to reduce hot/cold calls and maintain comfort zone
 - Ex: adequate OA in supply



ENERGY SOLUTIONS

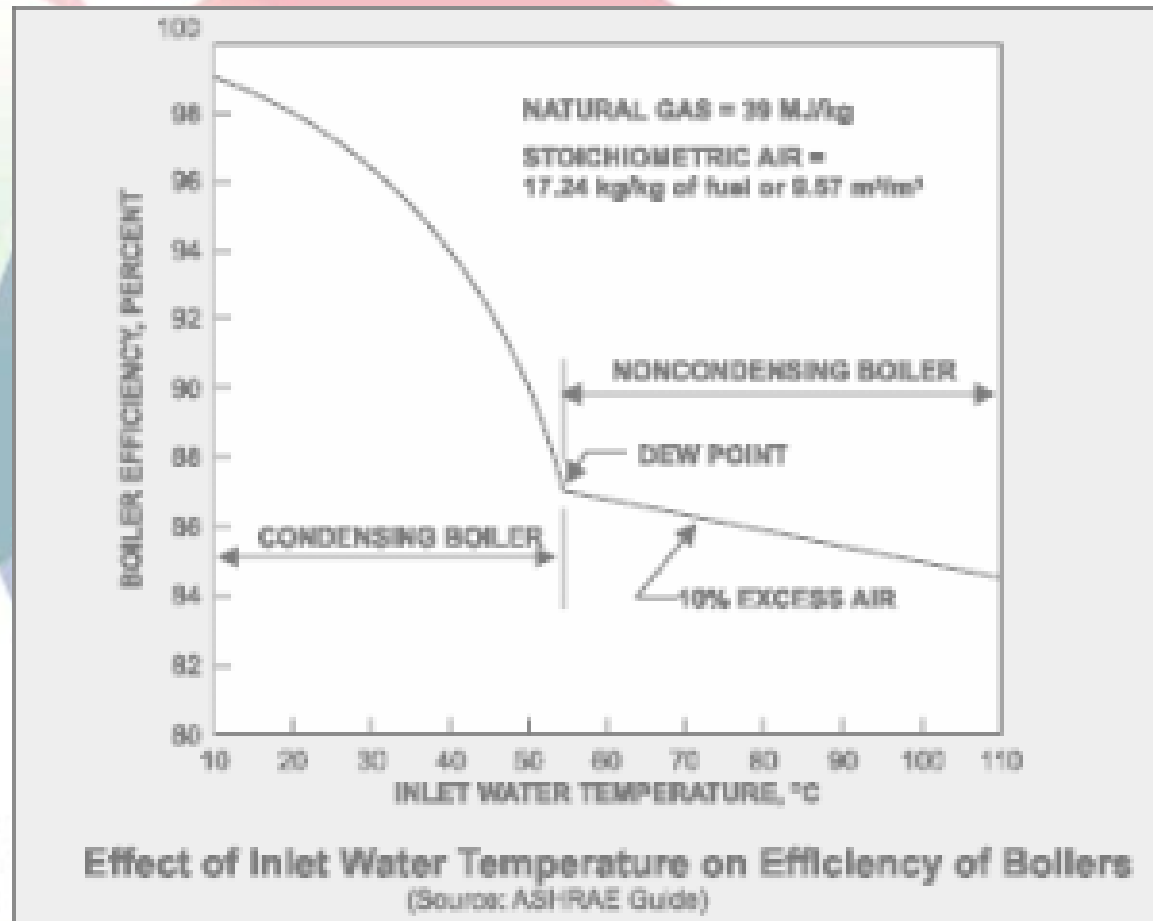
Smart building

- Role in helping the previous measures along
 - Avoiding Pitfalls
 - Establish baselines and expectations
- Starts w/ BAS
 - Basic functions – “worst case”
 - S/S, Zones, overrides, capacity, resets



ENERGY SOLUTIONS

Ex. Condensing boiler again



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Smart Building

- “Building Accounting”
 - Rational process
 - Providing useful information
 - Decision makers
- A Smart Building is about Information!



ENERGY SOLUTIONS

Smart Building

- Storing data
- Access to system, internet, etc.
- Access to data, exchange over LAN
- Actionable Reports



ENERGY SOLUTIONS

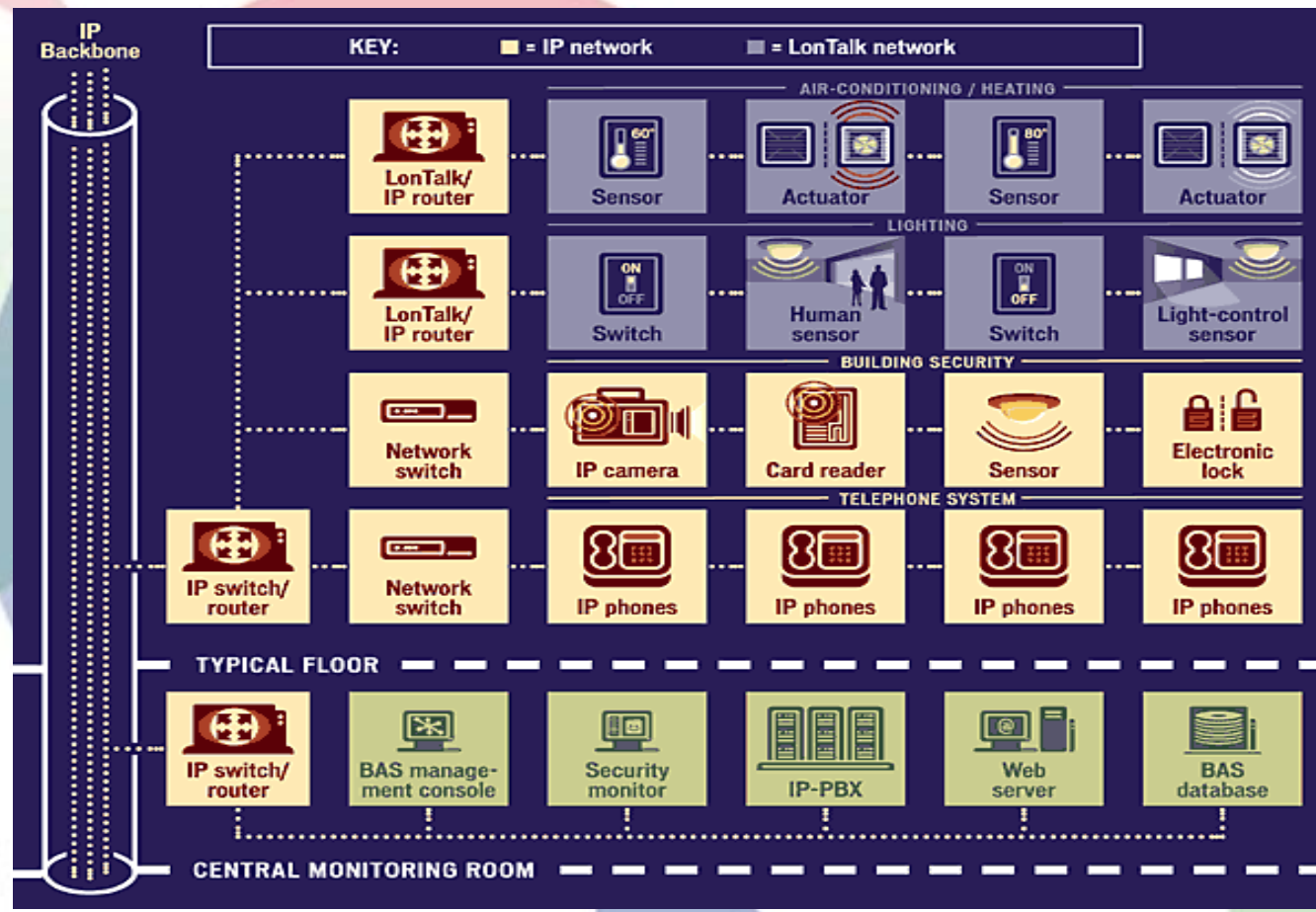
Smart Building

- Beyond BAS “basic functions”
- Efficiency at Zone level control
- Systems Integration
 - HVAC
 - Energy – submetering, etc.
 - Lighting
 - Security
 - Accounting G/L



ENERGY SOLUTIONS

Diagram - Backbone



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Smart Building

- At the Zone Level...
 - Best information about load
 - Occupancy Control via Card Access
 - Lighting Control via Daylighting and Card Access
 - Zone HVAC – what are the best technologies?



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Smart Building

- “Future Proof”
- Optimized load is best hedge
 - Need a “gauge”
- Backbone can provide for all building functions
- Flexibility of space



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Smart Building

- Challenges
- Implementation team
- Technical

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Questions?

■ Thank you!

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