Retailer Energy Alliance

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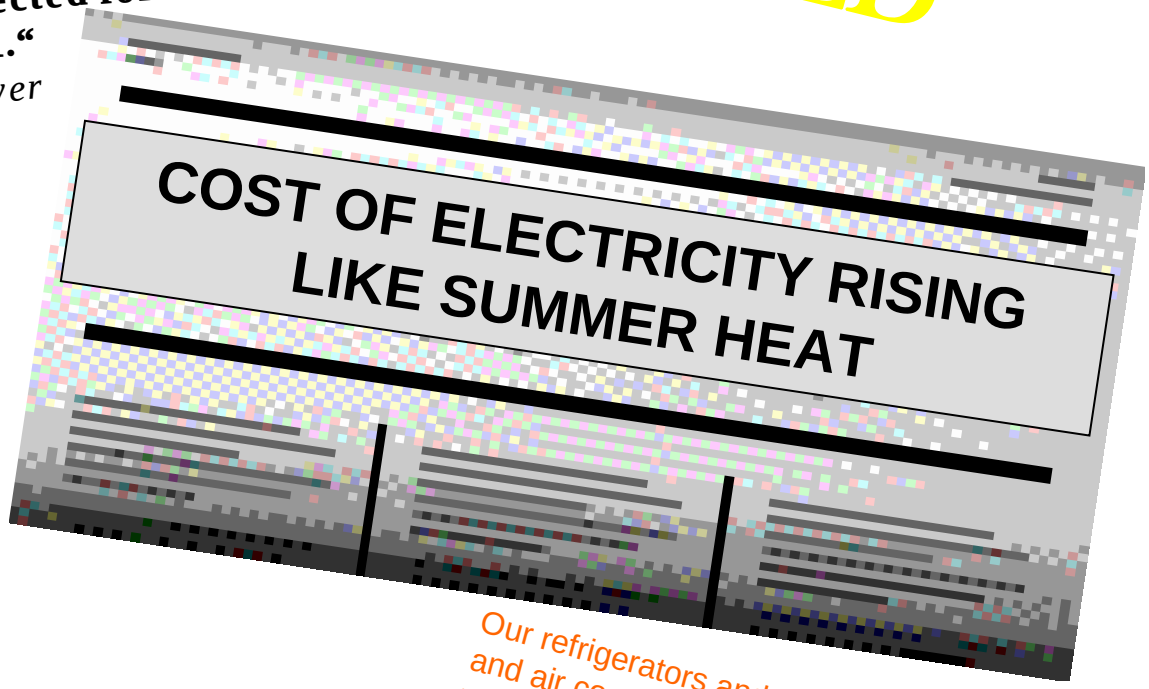
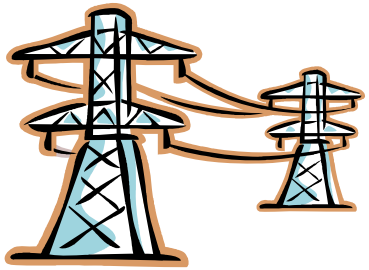
"A heat wave with record-breaking temperatures in California and other parts of the Western United States continues to tax the electricity system to the limits of its capacity. According to the California Independent System Operator (CAISO) today's demand is expected to reach 52,000 megawatts – a **demand level not projected for California until the year 2011.**"
-Flex Your Power

LEED



"Total spending on both electricity and energy is at a record high."
Mark Zandi,
Economy.com



Sustainable Design

Our refrigerators and stoves and air conditioners have gotten way **more efficient, but we're using so many more devices that require electricity**," says Jim Owen, a spokesman for the Edison Electric Institute in Washington. "Houses have gotten significantly bigger than a generation ago."

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What We Sell

- General Merchandise Stores
  - Photo processing
  - Pharmacy
  - Food Avenue® restaurants
- SuperTarget Stores
  - In addition to above
  - Expanded grocery
  - In-store bakery
  - Deli
  - Meat
  - Produce

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Who We Are

- Target is an upscale discounter
- Online business, Target.com
- 2007 revenues $63 billion
- Stores – 210 million ft^2
- 360,000 employees
- Minneapolis HQ

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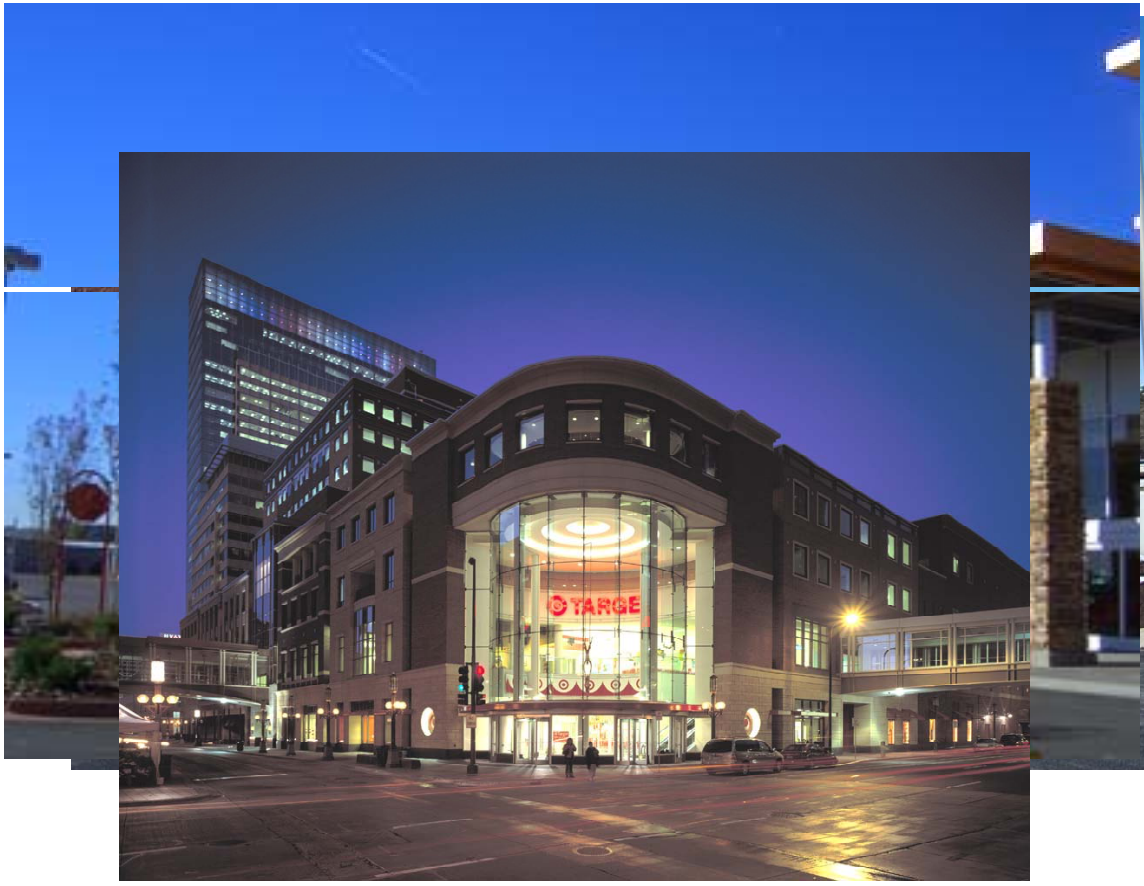
Range of Formats/ Locations

- P-Proto (1395)
  - 110,000 ft² sales floor
  - Market refrigeration
  - 47 states and DC
- SuperTarget (218)
  - 140,000 ft² sales floor
  - Full grocery
  - 22 states
- Unique Stores
  - Urban areas
  - 34 multilevel
- DC/Warehouse
  - 30 locations



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Where We Are Going

- 100 new stores per year
  - Alaska and Hawaii in 2009
- 50 significant remodels per year
- Market remodel/updates
- Retrofits – RTUs, lighting
- Similar format and concepts going forward

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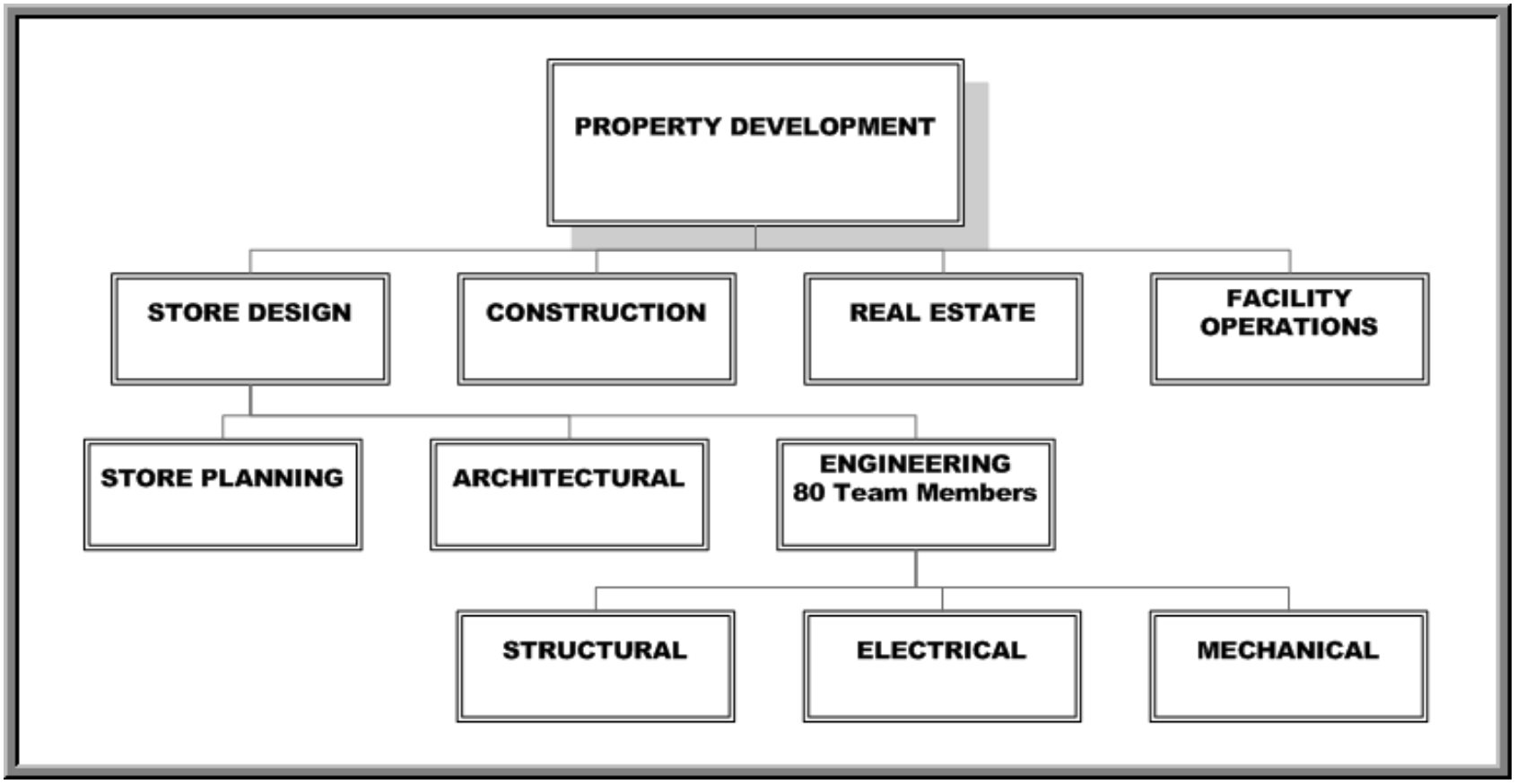
Business Structure



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How We Manage Design, Construction, and Operations

- Design – Standard Prototypes
  - Site-specific variation for heating/cooling and code requirements.
  - Prototypes are becoming more regional.
  - Consultants or internal team complete site-specific CDs
  - Unique store process
- Construction - Selected general contractors and bid subcontractors
  - Most energy consuming equipment is direct purchased
  - Stores open in March, July, and October.

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How We Manage Design, Construction, and Operations

- Commissioning – HQ managed process
  - Retrocommissioning 50 stores per year
  - New store commissioning all stores forward
  - Largest opportunity in refrigeration
- Operations – HQ call center
  - Minor O&M at local store
  - Dispatching local service contractors
  - Typical store hours 8:00 a.m. to 10:00 p.m.

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Energy Use (General)

- Reduced through energy-efficient design and improved equipment
- Energy intensity increasing due to expanded refrigeration
- Growth in energy partially offset from energy retrofits and retrocommissioning.

Energy Use Profile (General)

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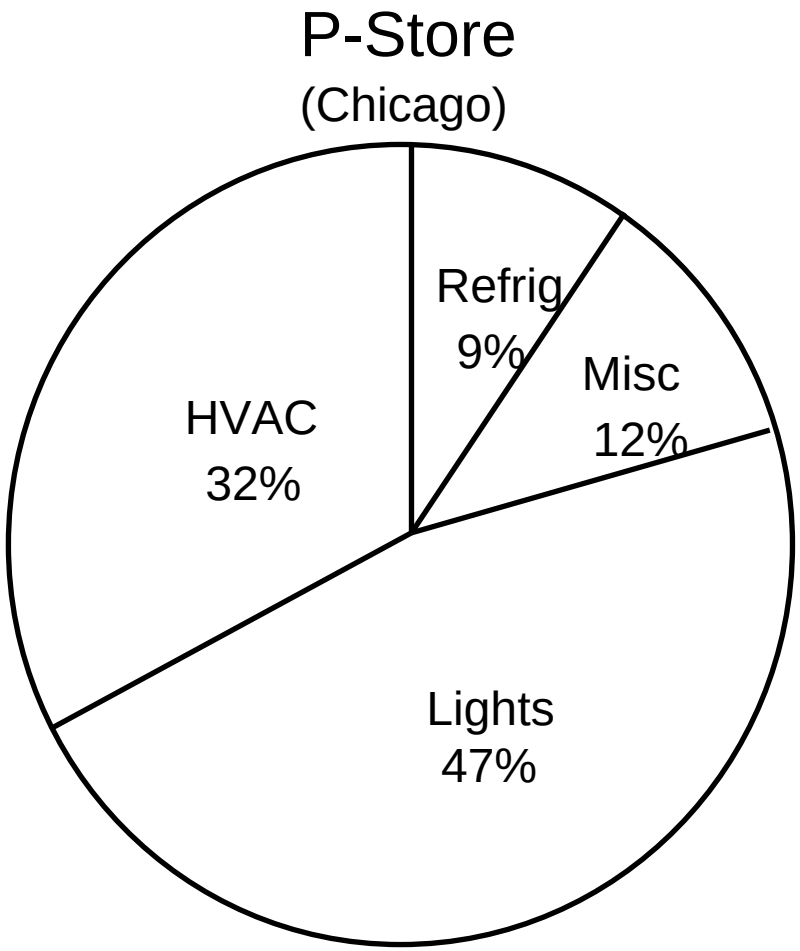

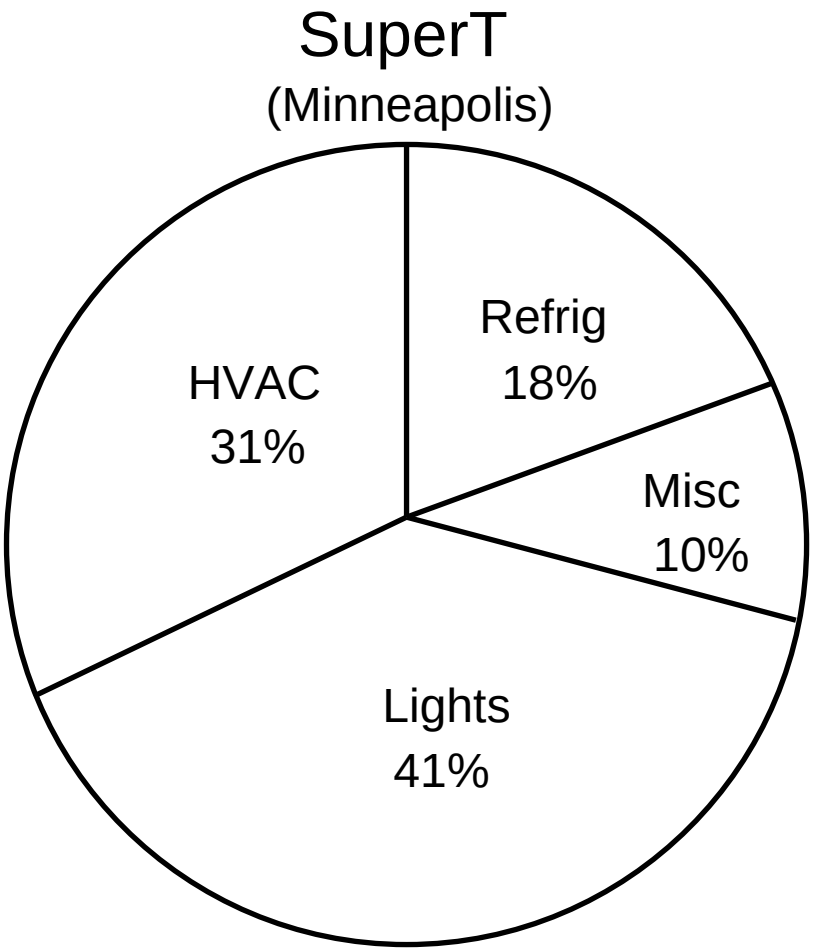

Energy Use by System (in Btu)

Energy Use Profile (General)

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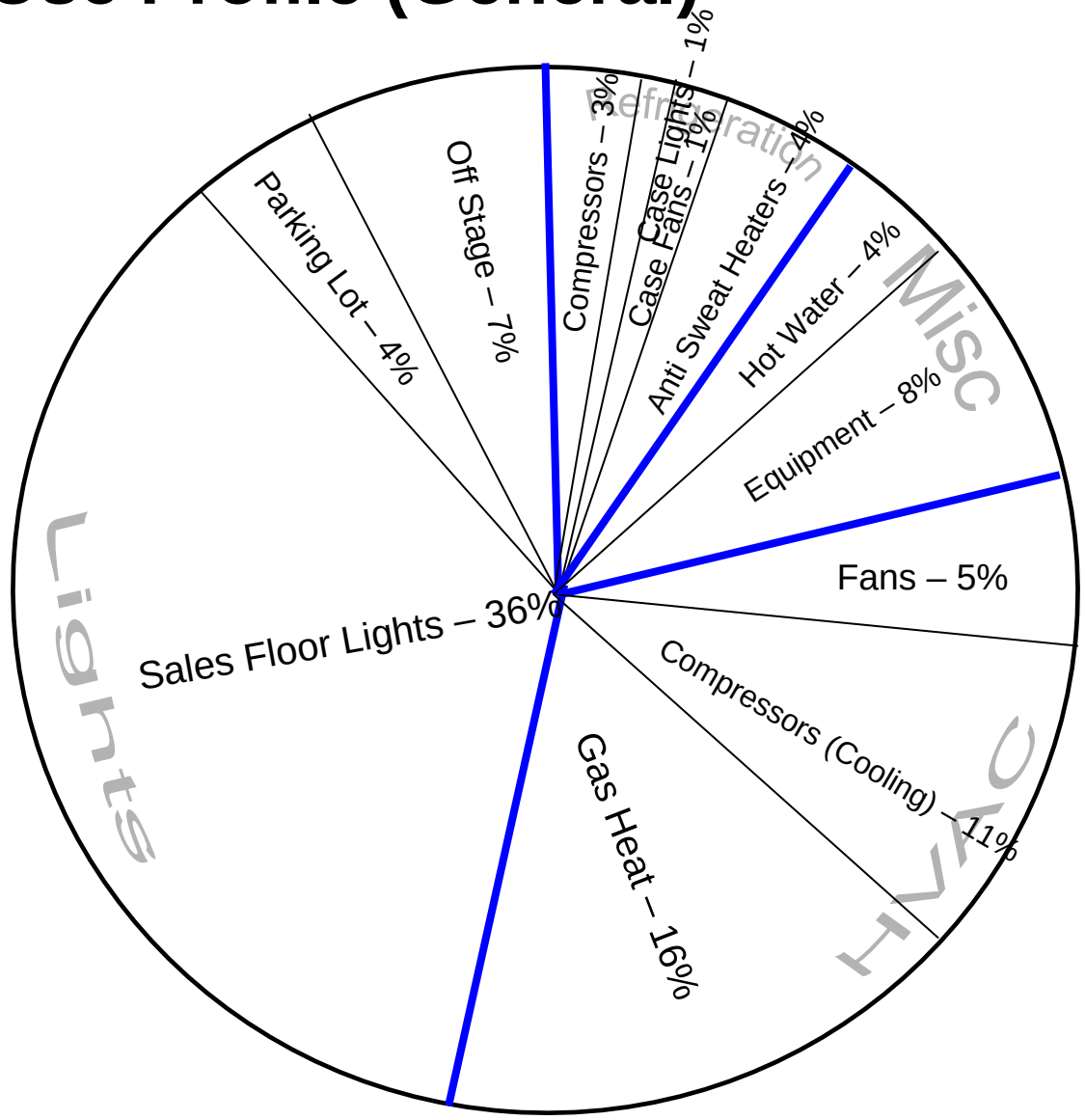

P-Store Energy Use Breakdown (BTU)

Energy Use Profile (General)

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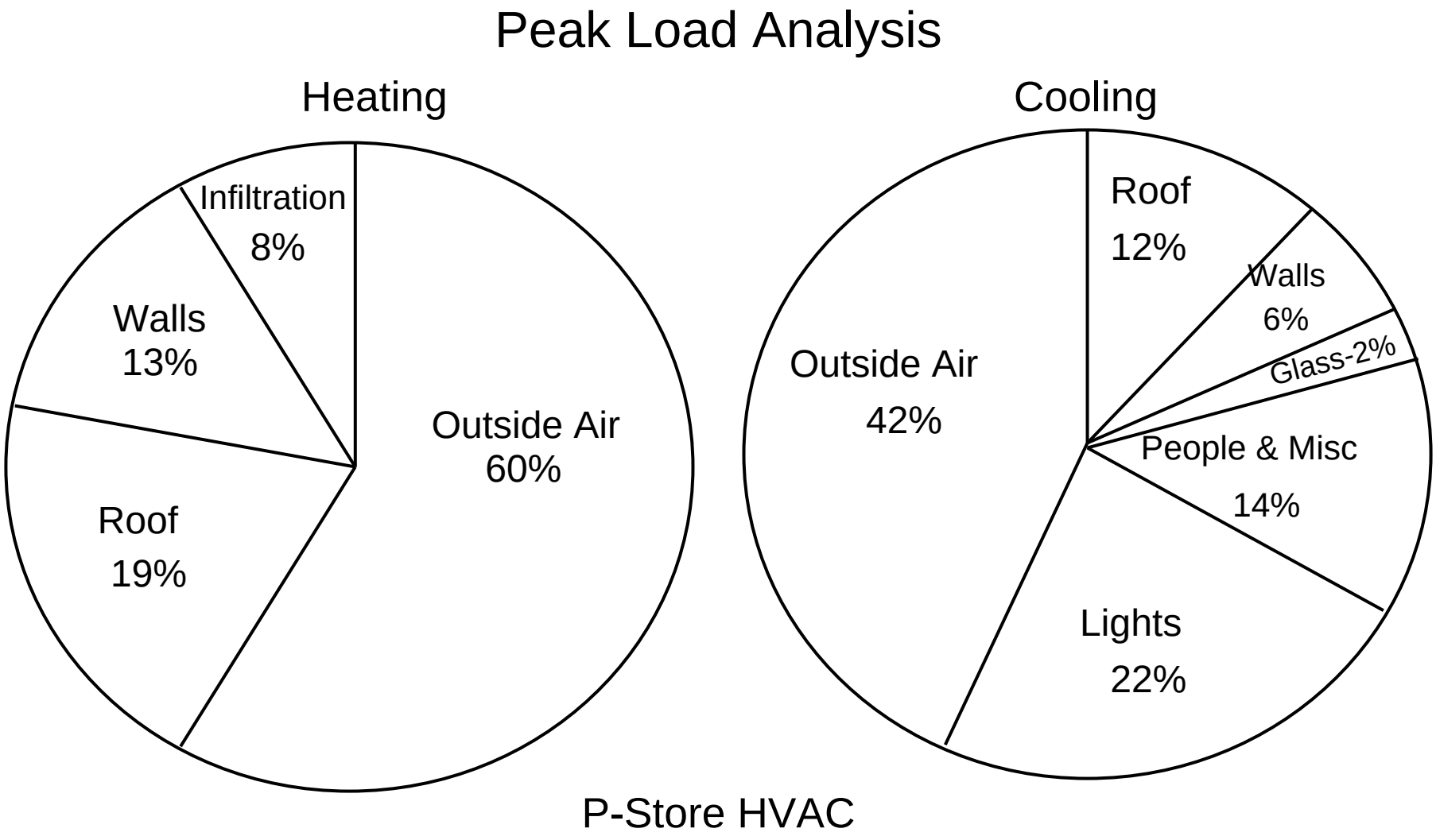

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Goals

- In an ideal world, what does your most energy-efficient building look like?
  - Low or zero net energy where practical
  - Minimal impact on permitting and construction
  - Guest friendly environment
  - Flexibility in merchandise offerings
  - Simple to operate and maintain

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Current Energy-Efficient Mortgages in Place (General)

- Good engineering incorporates energy efficiency
- Energy life cycle costs part of purchasing decision
- Retrofit energy efficiency into existing stores
- Commitment to REA
  - Compete on price, fashion, presentation, convenience
  - Corporate responsibility to energy and environment
  - Share best practices
  - Manage retail energy footprint

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New Opportunities (General)

- Regional opportunities for specific energy technology
- Roll new technologies into existing stores
- Assist suppliers in creating a market for new technology
- Whole building integration of energy solutions

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Inhibitors (General)

- Poor performance of past energy saving measures
- High capital cost of new technology
- Increased complexity of installation and operations
- Decreasing technical capability of service personnel
- Manufacturing capability to meet demand
- Life cycle cost of technology must meet financial benchmarks

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Energy Use by Technology: Lighting

- General technology need:
  - Fluorescent general lighting throughout store
  - LEDs in exterior building signage
  - LED refrigerated case lighting (2009)
  - Metal halide parking lot lighting
  - DC – HID lighting (under review)

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Energy Use by Technology: Lighting

- Current lighting projects
  - Sales Floor Lighting
    - Year 2000 75 FC = 1.19 w/ft² - 4 lamp
    - Year 2005 75 FC = 1.01 w/ft² - 3 lamp
    - Year 2007 75 FC = .92 w/ft² - 2 lamp
    - Retail Design Guideline 1.9 w/ft²
- Photovoltaic Solar Panels
  - 18 operational by the end of 2008
- Skylights
  - Suspended ceilings
  - Several stores under review
- Automated Demand control
  - Reduced lighting levels

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Energy Use by Technology: Lighting

- Efficiency Goals/Inhibitors
  - Maintain lighting quality/level at reduced energy usage
  - Dimming system loss of efficiency at full output.
  - High cost of dimming
- Looking to suppliers – What should the R&D focus be based on, considering the above?
  - Light quality
  - Demand control opportunities
  - Combine energy and operational savings of extended life
  - Occupancy sensors to reduce need for field adjustment
  - Exterior LED lighting

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Energy Use by Technology: Envelope

- General technology need:
  - Wall and roof profiles
    - Insulation
    - Air barriers
    - Wall and roof panels
    - Reflective materials
  - Entry doors/dock doors
  - Windows
  - Insulation
  - Cool roofs

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Energy Use by Technology: Envelope

- Current building envelope projects
  - Regional insulation strategy
    - Typically code driven
  - Improved details of wall construction/ insulation/vapor barrier
  - Entry vestibule (partial) in most markets
  - Light color/reflective roof membrane
  - Green roofs

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Energy Use by Technology: Envelope

- Efficiency goals/inhibitors
  - High cost/ benefit of added insulation
  - Limitations due to aesthetic issues
  - Green roofs
  - Construction schedule impact of more complex envelopes

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Energy Use by Technology: Envelope

- Looking to suppliers – what should the R&D focus be based on, considering the above?
  - Super insulated panel (concrete or metal) factory made
  - Flexibility in finishes
  - Consistency in finishes
  - Integration of envelope as part of whole building design approach
    - Radiant floor for heating and cooling
    - Building mass for thermal storage
    - Roofs to gather rain water/night radiant cooling
    - Integrated water thermal storage
    - Integrated water reuse

Energy Use by Technology: Refrigeration

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- General technology need:
  - P-Store Market refrigeration
    - Enclosed cases
    - Rooftop refrigeration rack
    - Compressor condenser units
  - SuperTarget
    - Open and enclosed cases
    - Compressor room

- Current refrigeration projects
  - Control of anti-sweat heaters
  - Rooftop rack on P-stores
  - Central automation and control
  - Turnover commissioning of all refrigeration systems
  - Glass door case in food service versus open case

Energy Use by Technology: Refrigeration

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- Efficiency goals/inhibitors
  - Refrigerant reduction, material reduction
  - Merchant needs in display options
  - Refrigerant regulations

- Looking to suppliers – What should the R&D focus be based on, considering the above?
  - Enhanced anti-sweat heater control
  - Balance refrigeration/HVAC energy
  - Merchant acceptable enclosed cases
  - LED lighting in open cases
  - Alternate refrigeration systems
    - CO_2
    - Glycol/water
  - Evaporative Condensing

Energy Use by Technology: Water

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- General technology need:
  - P-store – typically point of use electric heaters
  - SuperTarget – heat recovery from refrigeration, gas supplemental, and point of use electric
- Current water projects
  - Low flow urinals
  - .5 gpm aerators on hand wash
  - Point of use heaters
  - Sensor faucets

Energy Use by Technology: Water

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- Efficiency goals/inhibitors
  - Acceptance of no flush urinals – code and maintenance concerns
  - Point of use water heater – minimum flows
  - Improved water-intensive kitchen equipment (e.g., low-flow washers)
- Looking to suppliers – What should the R&D focus be based on, considering the above?
  - Heat recovery opportunities from refrigeration
  - Effective instantaneous heaters
  - Water treatment to avoid backwash and waste

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Energy Use by Technology: Controls

- General technology need:
  - All stores have BAS monitored at HQ
  - One system for building, one for refrigeration
  - Lights and temperature scheduled based on occupancy
  - 2006 – Web based BAS allows more tracking and site-specific strategy
- Current controls projects
  - Performance testing
  - Automatic fault diagnostics
  - Increased diagnostics
  - Sub metering power
  - Improved trending

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Energy Use by Technology: Controls

- Efficiency goals/inhibitors
  - Systems that cannot “talk” to each other
  - Complexity of programming
  - Global changes to 1600 locations
- Looking to suppliers – What should the R&D focus be based on, considering the above?
  - Open protocols (auto doors, V-Trans, generators, switchgear)
  - Wireless
  - Auto fault diagnostics
  - Unit specific smart operator
  - Embedded sub metering
  - Accurate/long life air quality sensor for ventilation control

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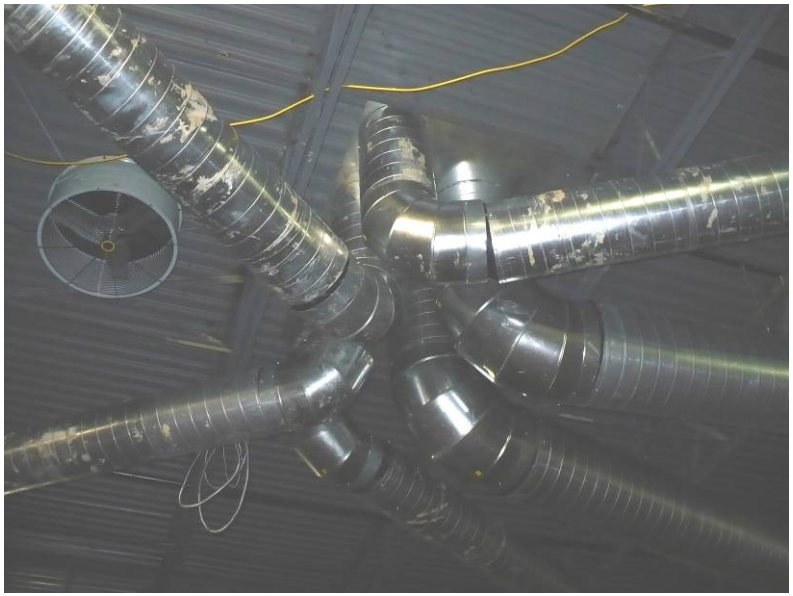
Energy Use by Technology: HVAC

- General technology need:
  - Typically packaged RTU single zone with gas heat.
  - Grocery area of SuperTarget w/ larger custom RTU
  - VAV in front of house – offices, pharmacy, etc

- Current HVAC projects
  - A.C. RTU sourcing based on life cycle cost
  - Optimized outside air based on air quality study
  - Reduced supply airflow by 20% since 1998
  - Balance humidity control needs of refrigerated cases



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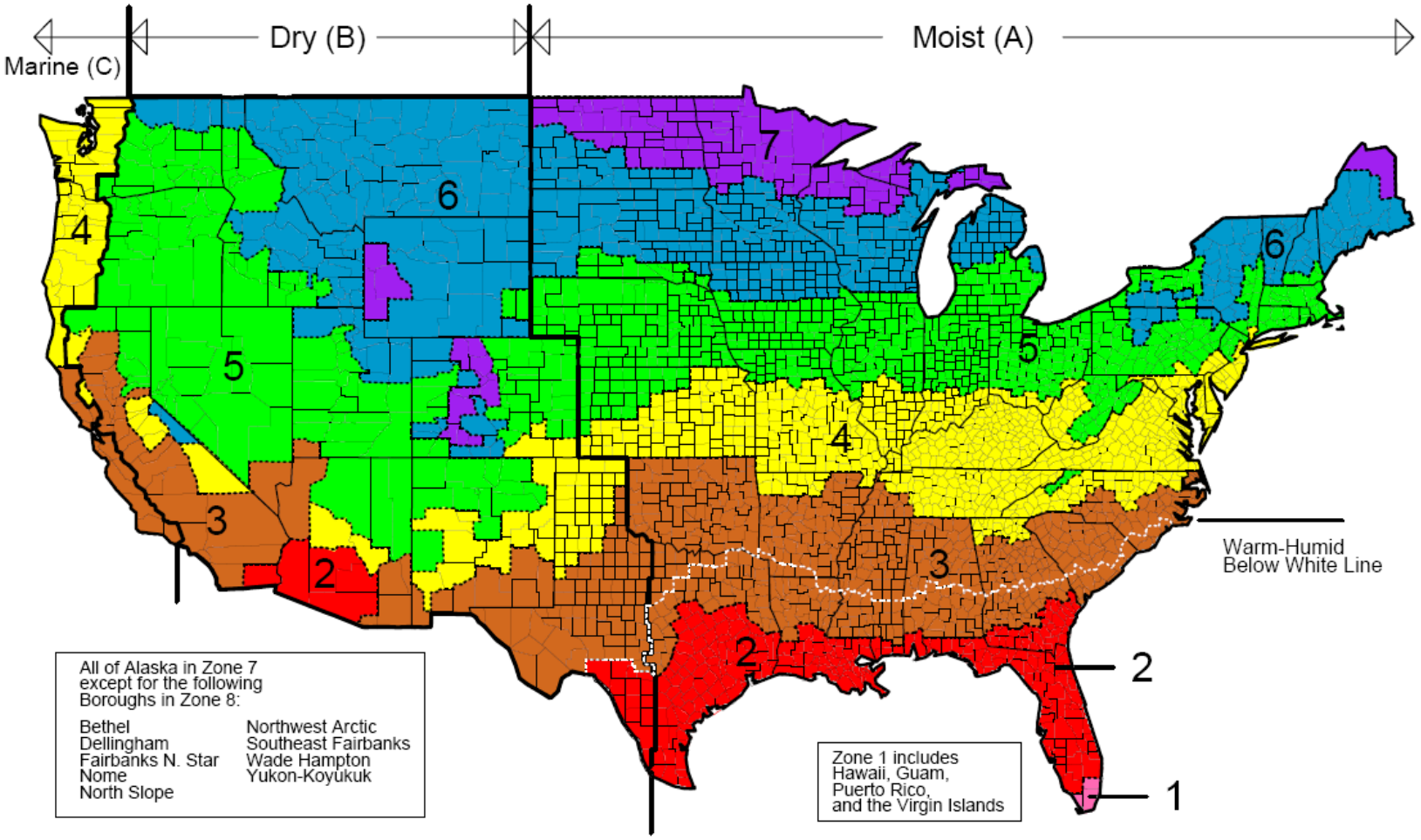
Map of DOE's Proposed Climate Zones



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Energy Use by Technology: HVAC

- Efficiency goals/inhibitors
  - Dehumidification
  - Energy-efficient HVAC distribution systems (e.g. EE fans)
  - Reduced loads = lower airflow
  - Water treatment concerns
  - More efficient kitchen exhaust hoods

- Looking to suppliers – What should the R&D focus be based on, considering the above?
  - Climate-specific optimization
  - Water-based options for heating and cooling
  - Integrated refrigeration heat recovery and use of recovered energy
  - Evaporative condensing
  - Automated commissioning
  - Variable speed drives on fans
  - Low energy feature for auto demand control
  - Integrated HVAC/refrigeration packaged RTU

Energy Use by Technology: Plug Loads

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- General technology need:
  - Pop coolers
  - Computers
  - Electronics
  - Kitchen equipment
  - Battery charging

- Current plug load projects
  - Shut down pop coolers at night
  - Challenge pop vendors to improve display case performance
  - Education of team members to shut down equipment
  - Submeter plug loads

Energy Use by Technology: Plug Loads

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- Efficiency goals/inhibitors
  - Profile of plug load technology/use
  - Improved energy-efficient kitchen equipment
  - Reduced display plug loads (e.g., televisions)
  - Energy-efficient office/warehouse equipment

- Looking to suppliers – What should the R&D focus be based on, considering the above?
  - Provide realistic energy performance along with available options to increase performance; i.e., premium efficiency motors
  - Control features to allow nighttime shutdown and demand control reduced power operation
  - Self diagnostics including energy efficiency
  - Interoperative controls with EMS

Energy Use by Technology: O&M

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- General technology need
  - Refrigeration
  - HVAC
  - Vertical transportation
  - Doors and operators
  - Electrical
- Current O&M projects
  - Commissioning and retrocommissioning
  - Work order tracking
  - Fault diagnostics
  - Sub metering electricity

Energy Use by Technology: O&M

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- Efficiency goals/inhibitors
  - More complex systems
  - Decreasing availability of skilled technicians
  - Reduced O&M budgets
  - Streamline predictive maintenance processes

- Looking to suppliers – What should the R&D focus be based on, considering the above?
  - Simple to install
  - Plug and play startup
  - Simple to operate
  - Self diagnostics

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Procurement Process

- Financial and business aspects of company critical
- Ability to deliver equipment as promised
- Good capital cost is important, but sell life cycle costs
- Need dedicated support that understands client needs
- Competitive yet fair procurement events

Conclusion

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- What can the suppliers do?
  - Determine ways to bring energy efficiency into mass production
  - Better understand retailer energy profile and realistic opportunities
  - Provide additional flexibility in mass production of equipment using regional accessories
- How are you willing to work with and support the suppliers to address these challenges?
  - Share energy profiles
  - Partner for pilot tests
  - Continue to emphasize energy and operation cost as part of life cycle purchase decisions

Conclusion

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- What strategies can we implement to move these technologies into the marketplace?
  - Determine technology cost based on mass production
  - Alternate designs – skylights, heat recovery, etc. are very location dependent
  - Provide realistic performance information
- How can DOE help verify the success of these measures?
  - Assist with technology assessment using national laboratories and technical societies
  - Help fund pilot tests for new technology removing some risk from retailers