Manufacturer's Roundtable

Efficient Elevators

April 9, 2025

CEDA California Energy Design Assistance

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WHAT IS CEDA?

CEDA

The California Energy Design Assistance (CEDA) program is the only statewide utility incentive program for new construction and major renovations.

- Promotes **electrification** and **decarbonization**
- CEDA works in collaboration with project teams to reduce energy demand, consumption, and carbon emissions.
- Serves commercial, public, high-rise multifamily, industrial, and agricultural projects in Pacific Gas & Electric (PG&E), Southern California Edison (SCE), SoCalGas (SCG), and San Diego Gas & Electric (SDG&E) service areas.

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WHY PARTICIPATE IN CEDA?

CEDA

- Receive complimentary **decarbonization** analysis tailored to project goals to identify most effective measures to implement

- Gain analysis of **energy costs and paybacks**
- Receive **financial incentives** to help offset the costs of decarbonization measures

- Demonstrate commitment to high performance building practices and design

3

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INCENTIVES

CEDA

- **$4000 Design team incentive** per project as a thank you for participation
- Based on the project measure package the design team chooses for implementation

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HIGH PERFORMANCE MEASURES

CEDA

CEDA aims to exceed California's decarbonization standards by identifying high performance measures and providing educational opportunities to explore use cases and best practices.

This not only advances the market, but also qualifies participants for enhanced incentives through our program.

A current list of eligible high-performance measures can be found on our website here.

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HAVE A PROJECT TO DISCUSS?

CEDA

For more information, please contact our program outreach specialists, visit our website, or fill out an interest form

Scan me to enroll a project

CaliforniaEDA.com

Sean M. Williams | Outreach Specialist
swilliams@willdan.com

Tina Hendrix | Program Outreach Specialist
thendrix@willdan.com
760.585.7577

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Today's Discussion Topics

Agenda for April 9, 2025
10:00 – 11:30 a.m.

- Introduction – Susan Harris
- Overview of elevator technology – Harvey Sachs
- High rise elevators – Jeff Montgomery
- Elevator design and implementation in the PAE Living Building – Craig Collins
- Q & A (15 min) – All

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Today's Panelists & Moderator

Harvey Sachs, Retired, The American Council for an Energy-Efficient Economy

Jeff Montgomery, Full Chain Project Manager, KONE

Craig Collins, PE Senior Associate PAE

Susan Harris, Sr. Technical Communications Advisor, New Buildings Institute

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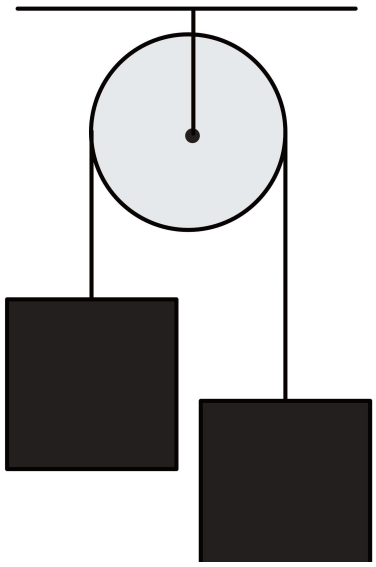
Poll: Do elevators use more energy going up or going down?

Answer:
Elevators use more energy going down.



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A symbol of quality

- Elevators are an extension of the building lobby
- Visuals matter
- “The rest can often be left to code”

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Typical energy use

- Elevators and escalators use 2-7% of the energy required for most buildings.
- There are opportunities to reduce consumption significantly, providing energy and cost savings and a lower carbon footprint.

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Huge technology changes in elevators in recent decades

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Shifts, moved from premium features to std

- From DC motors, generally geared, to gearless permanent magnet motors
- From large sheaves needed for ropes (cables) to flat belts
  - These are driven by much smaller diameter, higher RPM sheaves

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Shift from plain DC motors to gearless permanent magnet motors

- Allows MRL (machine-room-less) installations
  - Single largest change in Elevator industry in recent times
  - Increases rentable space, saves energy and money
- Facilitates advanced controls for flexibility, amenity, and energy savings
- Regenerative drives, once a premium feature, are now common among all traction elevators

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Shift from cables (aka "ropes") to flat belts

- Electro-mechanical cable systems required large sheaves ("pulleys")
- Gearless motors with belts effectively use smaller, higher RPM variable speed sheaves

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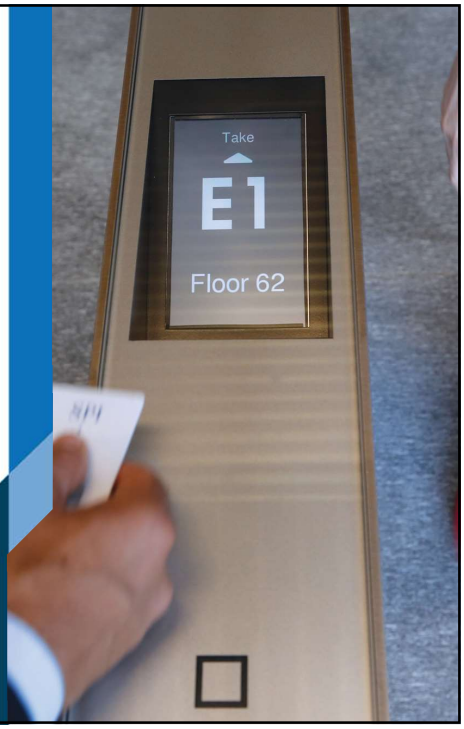
Advanced (and advancing) digital controls

- Especially dispatch with optimum number of on-duty elevators for the load
- Saves energy and cuts trip time
  - Both wait and lift times



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Future opportunities

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Future opportunities

- **Standby energy may still be the best efficiency opportunity.**
  - "Reducing standby power, which can be relatively inexpensive in many cases, dramatically cuts total energy use."
- **New analogy: Automobile**
  - Can engine "Off at stop", widely used today
  - Very fast restart
- **Using European standards as design spec for points in voluntary programs**

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High Rise Elevators

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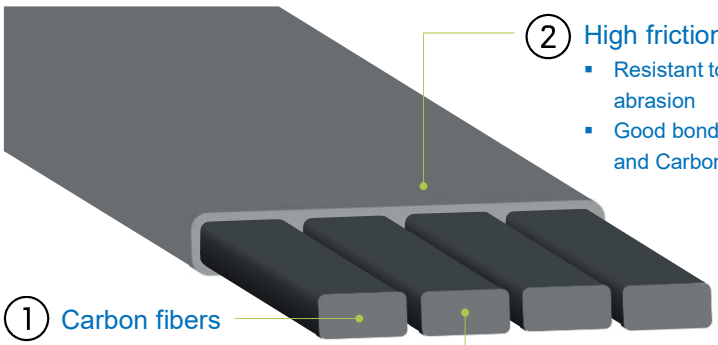
Carbon Fiber Ropes for Ultra High Rise

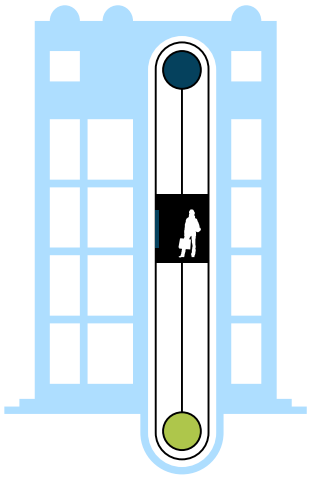
KONE UltraRope™



2 High friction coating
- Resistant to wear and abrasion
- Good bonding with Epoxy and Carbon Fiber

1 Carbon fibers
- High E-Modulus
- High Strength
- Inert to high temperatures

3 Epoxy matrix
- Transfers the tension between Carbon Fibers
- Keeps Fiber Bar in Shape



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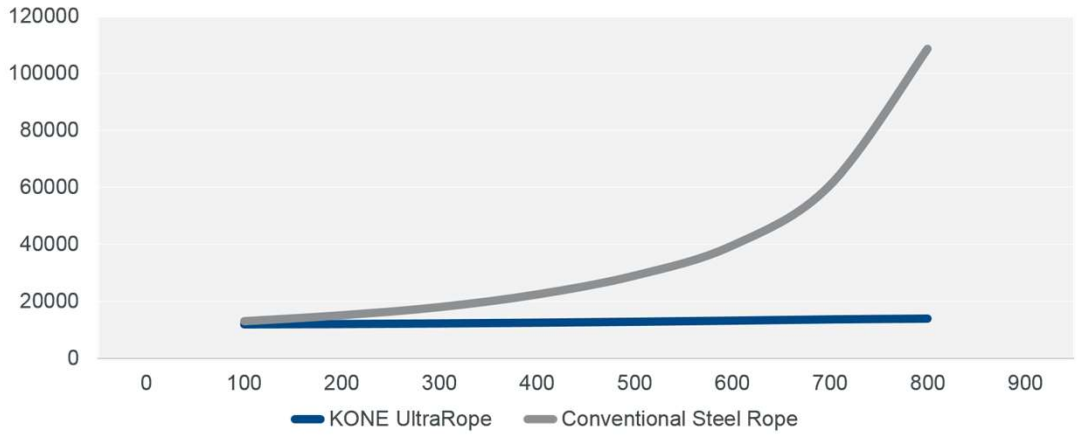
Carbon Fiber Ropes for Ultra High Rise

KONE UltraRope™



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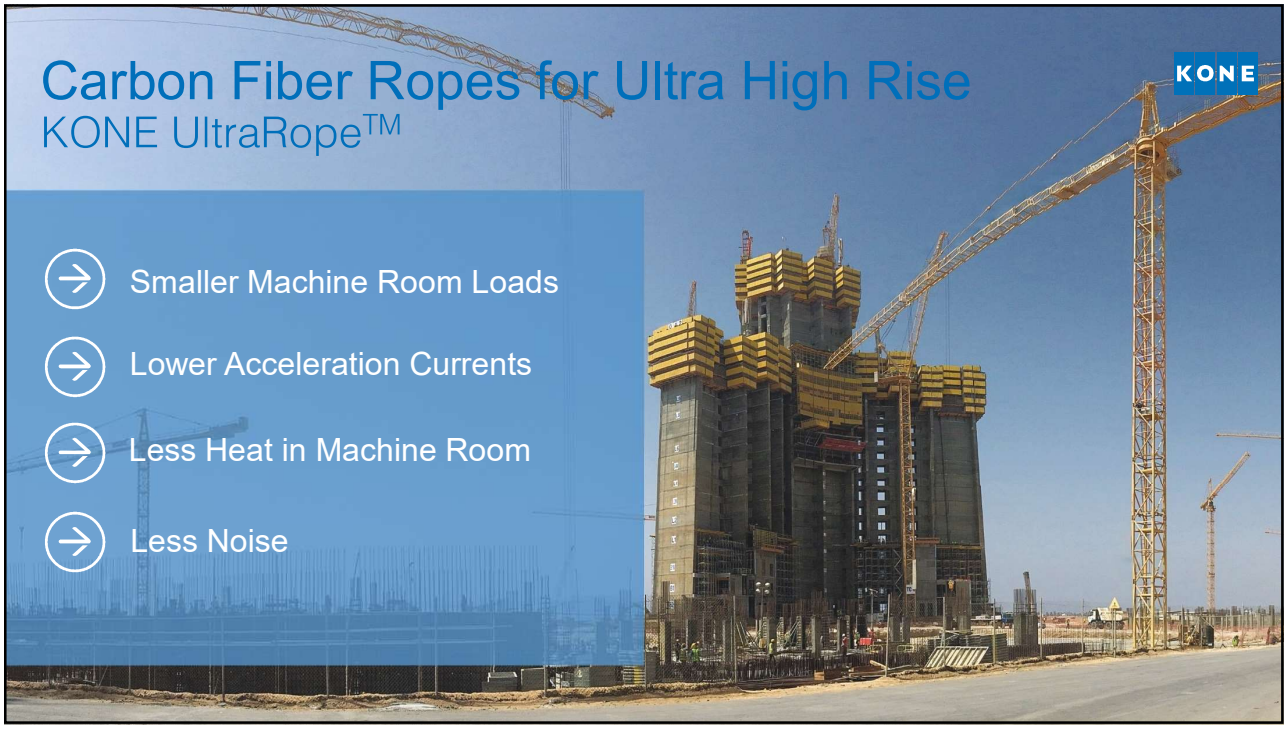
Carbon Fiber Ropes for Ultra High Rise

KONE UltraRope™

- Smaller Machine Room Loads
- Lower Acceleration Currents
- Less Heat in Machine Room
- Less Noise



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Destination Dispatching

1

Select floor / show card

Select your destination floor at the operating panel or mobile app or show your access card at the turnstile.

The display will tell you which elevator you have been assigned to.

2

Find your elevator

Move to the elevator that has been assigned to you.

As you approach, you can check which elevator is yours by referring to the identifier above each elevator.

3

Enjoy your journey

Enjoy a fast ride in a non-crowded car.

The next-stop indicator on the car operating panel displays the stops the elevator will make.

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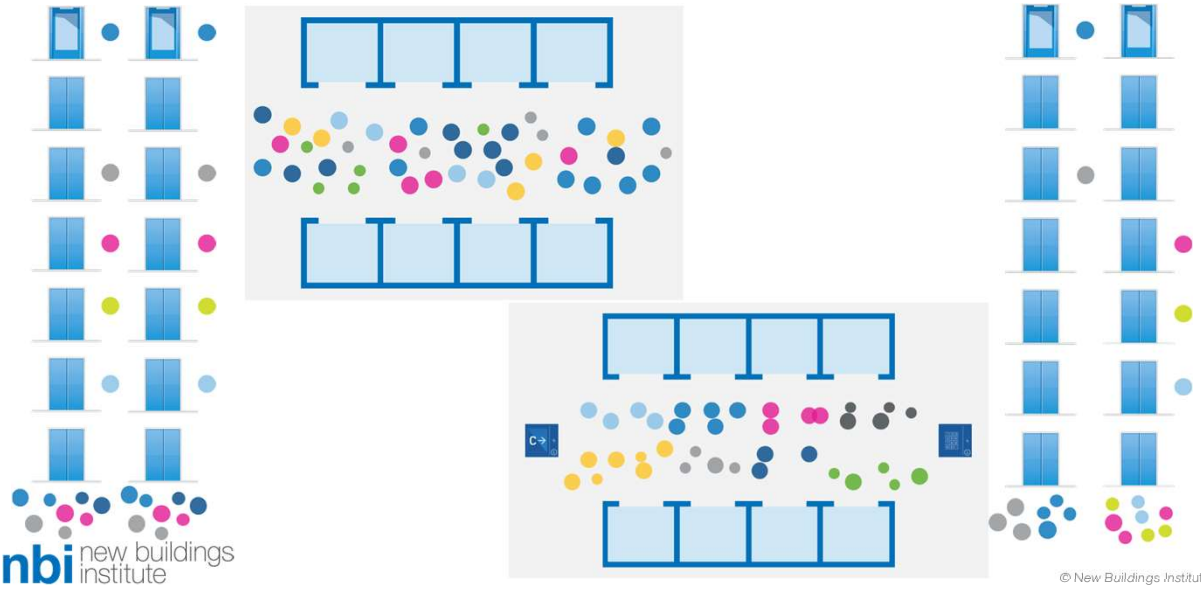
Destination Dispatching



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Destination Dispatching

- **Consolidates users into groups based on destination**
  - Reduces the number of stops for each car
  - Allows greater time at higher speed with less accel / decel
- **Moving from Premium to Standard**
  - Initially was used primarily on high rise Office segment
  - Increasingly seen in residential and hotel due to easy integration with building security, amenity floor access, and occasional public use access (ie ballrooms and event spaces)

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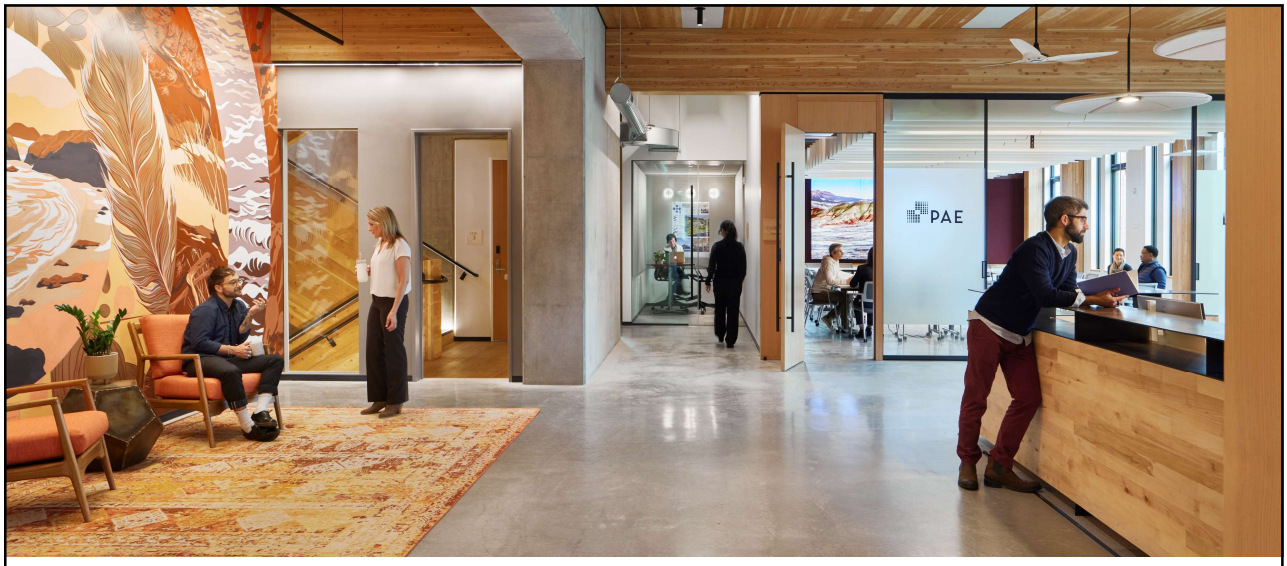

PAE Living Building

ELEVATOR SYSTEM CASE STUDY | CRAIG COLLINS

pae-engineers.com | April 8, 2025

PAE

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Craig Collins

PE, SENIOR ASSOCIATE | PAE

PAE Living Building | Lead Electrical Engineer

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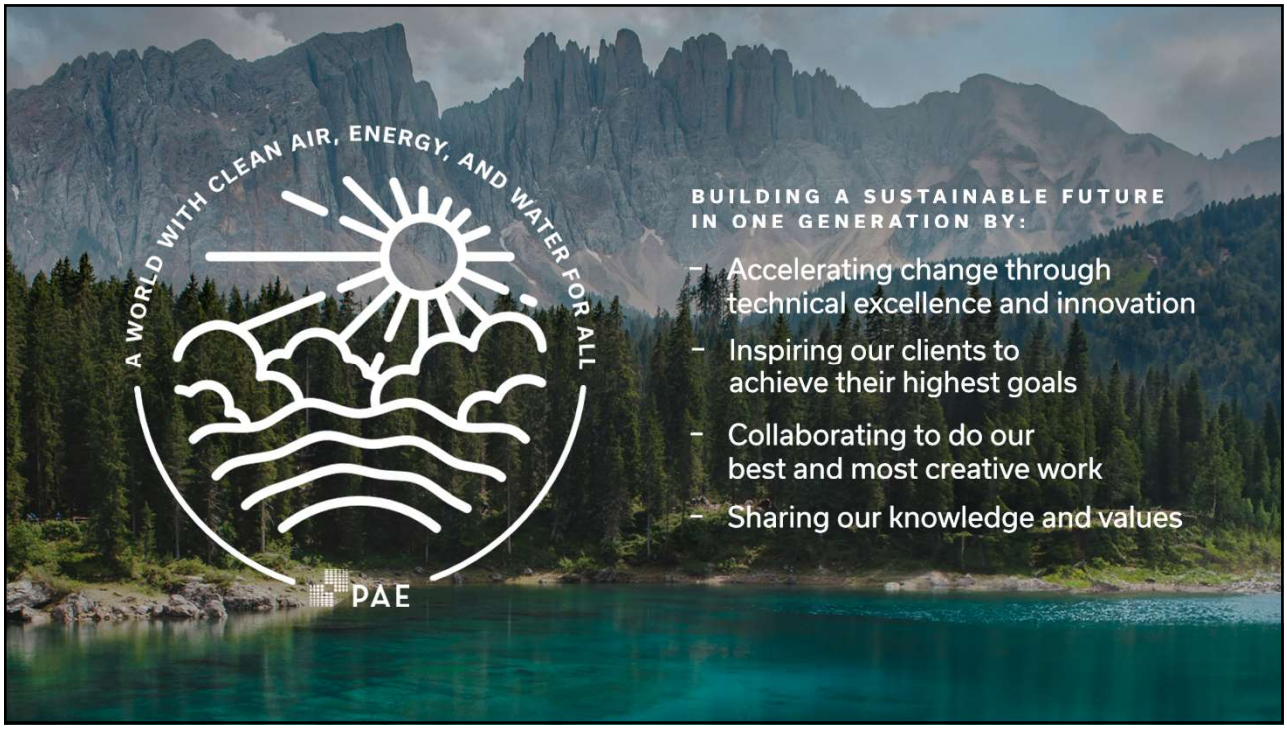

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COMMERCIAL OFFICE

PAE Living Building

PORTLAND, OR

QUICK STATS

OWNER	Multiple Owners
ARCHITECT	ZGF Architects
PROGRAM	Commercial + Corp. Office
PAE SCOPE	Mechanical, Electrical, Plumbing, Technology Design, Building Performance Analysis, Renewable Energy Systems, Greenhouse Gas Consulting, Commissioning, Architectural Lighting Design (via LUMA)
DELIVERY	CMGC
SIZE	58,000 sf

Living Building

19 Energy Usage Intensity

Net-Zero Energy

99 Walk Score OUT OF 100

Net Zero Water

29

30


PAE Living Building Elevator Statistics
PAE Living Building| Portland, OR
5
STORY
1
ELEVATOR CAR
3,500 LB CAPACITY
80
AVERAGE DAILY OCCUPANY
30R
HORSEPOWER
25
KVA UPS
20 KWH BATTERY
6,700
KWH ANUALLY
2024

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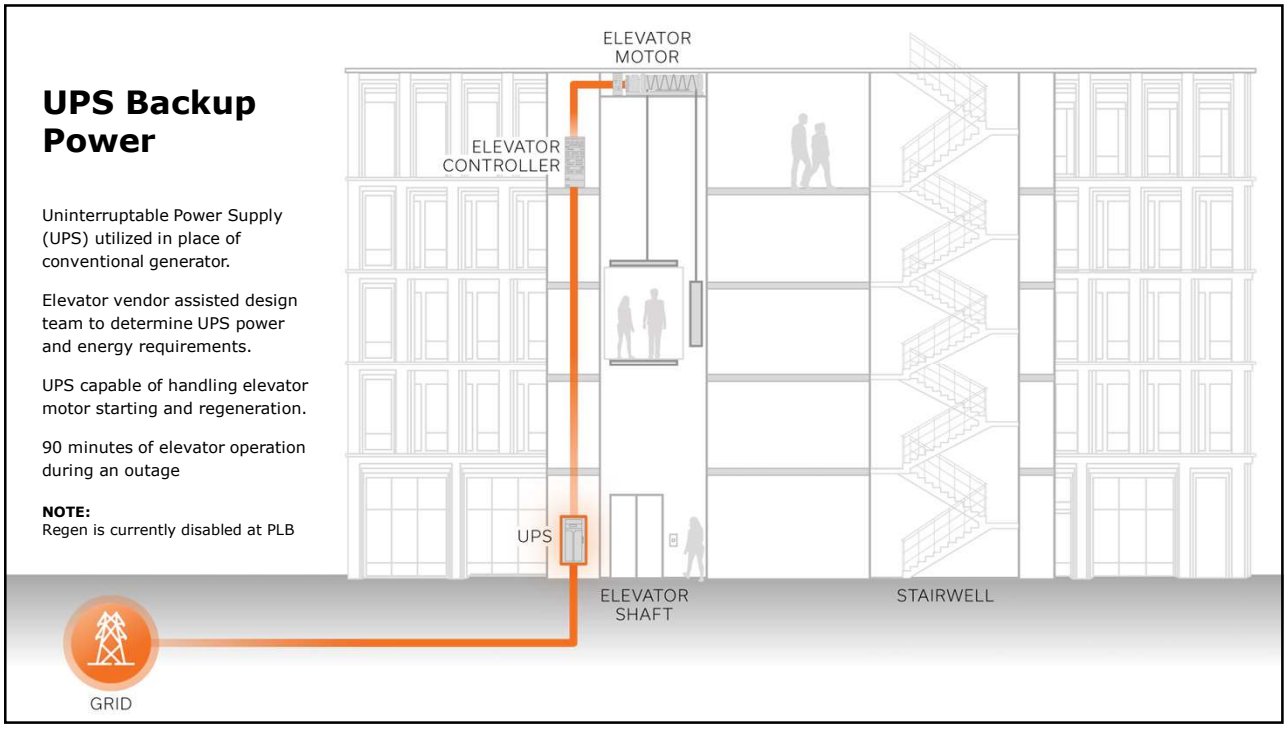
UPS Backup Power
Uninterruptable Power Supply (UPS) utilized in place of conventional generator.
Elevator vendor assisted design team to determine UPS power and energy requirements.
UPS capable of handling elevator motor starting and regeneration.
90 minutes of elevator operation during an outage
NOTE:
Regen is currently disabled at PLB
ELEVATOR MOTOR
ELEVATOR CONTROLLER
UPS
ELEVATOR SHAFT
STAIRWELL
GRID

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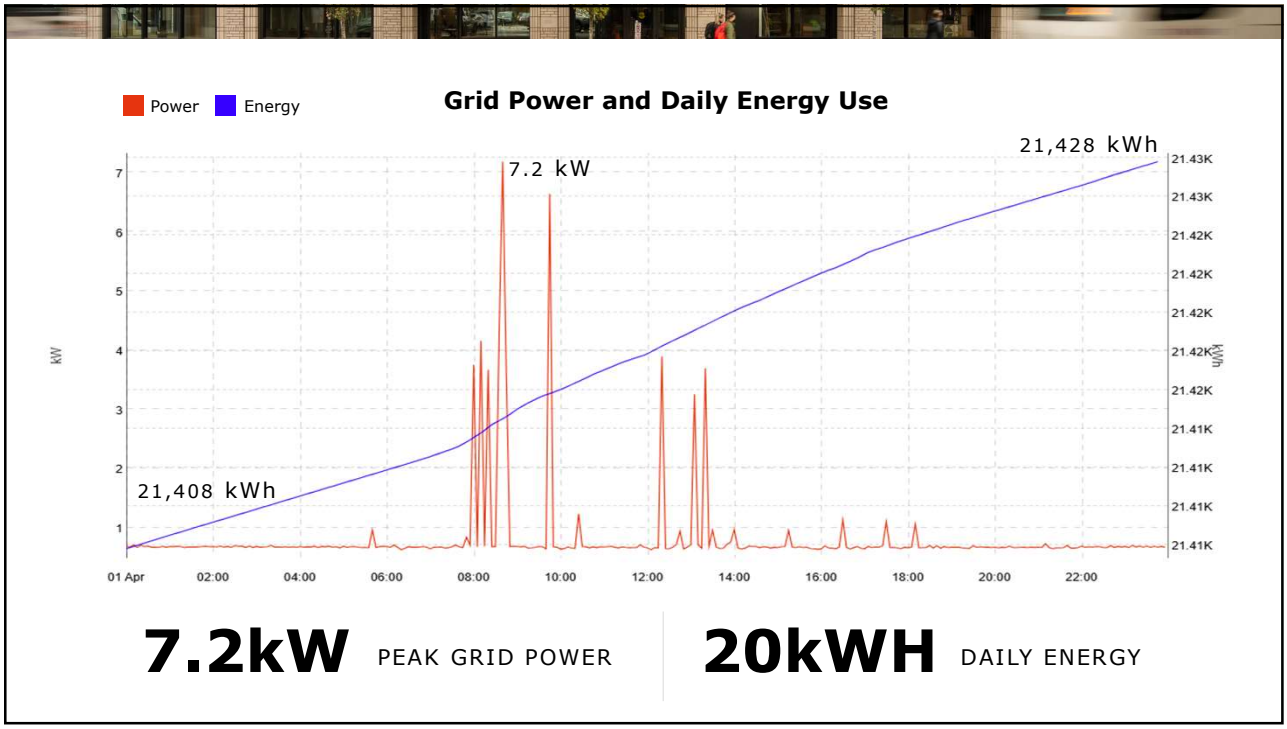

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UPS Considerations

Backup Power

PROVIDES CONTINUOUS POWER DURING OUTAGES AND MICROGRID SWITCHING EVENTS

Grid Harmonized

BUFFERS ELEVATOR MOTOR PEAK POWER DEMANDS

Cost

SIGNIFICANTLY MORE EXPENSIVE THAN A BACKUP GENERATOR

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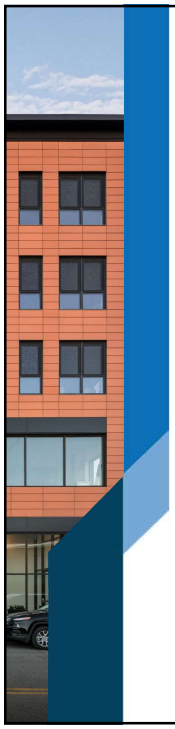

In summary

There are a lot of great opportunities for efficiency in elevators. We covered a lot today and will share links to the recording and presentation slides.

Questions?

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Thank you for your interest!

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