AGENDA

Houston Methodist Hospital
Innovation Lab

Tuesday, October 17, 2023
2:30 – 3:30pm CST

Attendance:

Murat Uralkan, Director of Innovation, Houston Methodist

John Cauthen, IT Project Manager, Center for Innovation, Houston Methodist

Cliff Switzer, Healthcare Systems Specialist, Lone Star Communications Houston

Regina Wysocki, Informatics Clinical Specialist, Lone Star Communications

Dr. George Taffet, Adjunct Professor of Medicine, Academic Institute, Houston Methodist

Jay Maddock, Professor of Public Health, Texas A&M

Danielle Blanco, Program Manager, Texan by Nature

Dr. Nick Escobedo, Director of Bone Marrow Transplant Unit, Houston Methodist

Alisha Estay, Director of ICU at Houston Methodist The Woodlands

Dr. Kathryn Agarwal, Physician specializing in patient delirium in ICUs.

Jason Fischer, Director of Office of Sustainability, Houston Methodist

Jon & Jennifer Upton, Founders of mate. Circadian Rhythm Lighting

Ryan Walker, New Business Development, mate. Circadian Rhythm Lighting

We welcome a conversational approach to today's topics. Looking forward to exploring how to further encourage and support Circadian Rhythm lighting into Healthcare.

Materials Review:

- What is Circadian Rhythm Lighting
- How does Circadian Rhythm Lighting make a difference in Patient Experience
- Fall Risk Prevention
- Facility Energy Savings
- Integration with Nurse Call
- Utility Energy Use Monitoring & Fixture Replacement

mate.

find your daily rhythm®

Photo: Houston Methodist install

Look for the CLUE

Circadian Rhythm

Low Voltage Lighting

US Manufactured

Energy Savings of 60%

Learn More

- **USA** Designed & Manufactured
- **UL** listed - U667368-1
- **CSA** C22.2 No. 62368-1
- **SGS** 801630
- **Hardwired** Low Voltage
- **5 Year** Warranty
- **Patent Protected** US & Canada
- **Nurse call** direct connection
- **Map2match** industry brands

60%

Energy savings vs. standard LED's

3rd party tested

Circadian Rhythm

Circadian Rhythm is a natural, internal process that regulates the sleep-wake cycle and repeats roughly every 24 hours.

Case Studies

Transforming Life With Light

Healthcare - A Harvard study found that upgrading ambient lighting to incorporate higher intensity blue-enriched white light during the daytime and lower intensity overnight represents an effective, passive, low-cost, low-burden addition to current preventive strategies to reduce fall risk. The CDC reports that over $50 billion is spent in patient fall medical costs.
- IMPACT OF UPGRADED LIGHTING NATIONAL LIBRARY OF MEDICINE

Education - In the classroom, producing light with cooler, bluer color temperatures and higher intensity, mimics the sun's daylight quality that induces dopamine, endorphin and cortisol while suppressing melatonin, which can promote higher visual acuity and mental focus, according to several studies.
- "HUMAN-CENTRIC LIGHTING BRIGHTENS THE WAY TO SUCCESS" TU, JAMES.

Senior Living - Melanie Segar, the ACC Care Center Administrator, stated, "ACC will be incorporating many of the lighting solutions piloted in this project as best practices in terms of fall risk, sleep enhancement, and non-pharmacological approaches for behaviors related to dementia."
- DOE study on "Tuning Light in Senior Care"

www.matecontrol.com/patent • www.matecontrol.com • info@matecontrol.com

Case Studies

mate.
find your daily rhythm™

"The effects and benefits of circadian lighting in healthcare facilities and patient outcomes"

Sleep Research Society 2020. Published by Oxford University Press on behalf of the Sleep Research Society

Website: https://pubmed.ncbi.nlm.nih.gov/32954412/

> "The evening light environment in hospitals can be designed to produce less disruptive effects on the circadian system and improve sleep."

Shine a Healing Light: Circadian-Based Lighting in Hospitals; 2018

Website: https://www.medscape.com/viewarticle/893225#vp_3

> Anders Sode West, MD, clinical associate professor of neurology…Circadian lighting is "a relevant investment as an additional medical treatment for depression and fatigue during long-term hospitalization..." , "This knowledge encourages new ways of thinking by embracing light as a significant contributor to our health."

Effect on nurse and patient experience: overnight use of blue-depleted illumination

Website: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6768337/

> A 2016 survey found that 88% of over 1200 providers felt that poor sleep impacts the quality of patient healing, contributes to longer hospital stays and diminishes treatment responses.

Impact of Light on Outcomes in Healthcare Settings

Website: https://www.healthdesign.org/chd/research/impact-light-outcomes-healthcare-settings

> Light impacts human health and performance by enabling performance of visual tasks, controlling the body's circadian system, affecting mood and perception, and by enabling critical chemical reactions in the body.

Factors Influencing Patients' Sleep in the Intensive Care Unit: Patient and Clinical Staff Perceptions

Website: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5559223/

Researchers at Yale University explored the use of circadian light to reduce delirium in patients admitted to the intensive care unit after cardiac surgery. After 14 days, patients who received light/dark-patterned light reported better sleep and reduced fatigue.

Tailored lighting intervention improves measures of sleep, depression, and agitation in persons with Alzheimer's disease and related dementia living in long-term care facilities

Website: https://www.researchgate.net/publication/266026411_Tailored_lighting_intervention_improves_measures_of_sleep_depression_and_agitation_in_persons_with_Alzheimer's_disease_and_related_dementia_living_in_long-term_care_facilities

"...lighting intervention tailored to maximally entrain the circadian system has been shown to significantly improve sleep quality, depressive symptoms, and agitation behavior in patients with Alzheimer's and dementia."

Hospital lighting and its association with sleep, mood and pain in medical inpatients

Website: https://onlinelibrary.wiley.com/doi/abs/10.1111/jan.12282

"Medical inpatients… light exposure was associated with less fatigue and lower total mood disturbance in participants with pain"

The effect of artificial lighting and controls on patient outcomes in behavioral health facilities

Website: https://scholar.google.com/scholar?hl=en&as_sdt=0%2C44&as_vis=1&q=effects+and+benefits+of+circadian+lighting+in+healthcare+facilities+and+patient+outcomes&btnG=

"Exposure to daylight or blue-rich light has been shown to have benefits on recovery, length of stay, delirium, depression, anxiety, and reduction in the use of pain medication"

New Study Shows Innovative LED Lighting System Cuts Risk of Seniors Falling in Long-term Care Facilities by 43 Percent

Website: https://www.prnewswire.com/news-releases/new-study-shows-innovative-led-lighting-system-cuts-risk-of-seniors-falling-in-long-term-care-facilities-by-43-percent-301603842.html

"Fall prevention is a major public health priority given our aging population, and we know that the right lighting at the right time of day can improve alertness, cognition, and sleep, leading to fewer falls,"

National Library of Medicine
National Center for Biotechnology Information

Impact of Upgraded Lighting on Falls in Care Home Residents.

Grant LK(1), St Hilaire MA(1), Heller JP(2), Heller RA(2), Lockley SW(1), Rahman SA(3).

Author information:
(1)Division of Sleep and Circadian Disorders, Departments of Medicine and Neurology, Brigham and Women's Hospital, Boston, MA, USA; Division of Sleep Medicine, Harvard Medical School, Boston, MA, USA.
(2)Midwest Lighting Institute Inc., Cottage Grove, WI, USA.
(3)Division of Sleep and Circadian Disorders, Departments of Medicine and Neurology, Brigham and Women's Hospital, Boston, MA, USA; Division of Sleep Medicine, Harvard Medical School, Boston, MA, USA.
Electronic address: sarahman@rics.bwh.harvard.edu.

Abstract

Objectives: Falls in care home residents have major health and economic implications. Given the impact of lighting on visual acuity, alertness, and sleep and their potential influence on falls, we aimed to assess the impact of upgraded lighting on the rate of falls in long-term care home residents.

Design: An observational study of 2 pairs of care homes (4 sites total). One site from each pair was selected for solid-state lighting upgrade, and the other site served as a control.

Settings and participants: Two pairs of care homes with 758 residents (126,479 resident-days; mean age (±SD) 81.0 ± 11.7 years; 57% female; 31% with dementia).

Methods: One "experimental" site from each pair had solid-state lighting installed throughout the facility that changed in intensity and spectrum to increase short-wavelength (blue light) exposure during the day (6 am-6 pm) and decrease it overnight (6 pm-6 am). The control sites retained standard lighting with no change in intensity or spectrum throughout the day. The number of falls aggregated from medical records were assessed over an approximately 24-month interval. The primary comparison between the sites was the rate of falls per 1000 resident-days.

Results: Before the lighting upgrade, the rate of falls was similar between experimental and control sites [6.94 vs 6.62 falls per 1000 resident-days, respectively; rate ratio (RR) 1.05; 95% CI 0.70-1.58; P = .82]. Following the upgrade, falls were reduced by 43% at experimental sites compared with control sites (4.82 vs 8.44 falls per 1000 resident-days, respectively; RR 0.57; 95% CI 0.39-0.84; P = .004).

Conclusions and implications: Upgrading ambient lighting to incorporate higher intensity blue-enriched white light during the daytime and lower intensity overnight represents an effective, passive, low-cost, low-burden addition to current preventive strategies to reduce fall risk in long-term care settings.

Copyright © 2022 AMDA – The Society for Post-Acute and Long-Term Care Medicine.
Published by Elsevier Inc. All rights reserved.

DOI: 10.1016/j.jamda.2022.06.013
PMID: 35850166 [Indexed for MEDLINE]

ISSUED REPORT
OF REDUCED ENERGY USAGE

THIS 3RD PARTY REPORT STATES:

mate control

has implemented energy-efficient lighting control measures resulting in significantly reduced energy usage. Reflected in Exhibit A, these measures have achieved a reduced energy usage of nearly 60% per 24 hours in comparison to a static LED light fixture.*

RPX TECHNOLOGIES

February 15, 2023
DATE

**The savings generated may vary between hospitals, and can be influenced by the unique characteristics and operational practices of each facility.*

RPX TECHNOLOGIES

EXHIBIT A

RPX Test Report

Technician: Craig Aker

Test Date: 2/13/23 - 2/15/23

REPORT BRIEF AND PURPOSE

The purpose of this test is to perform energy consumption comparison delivered to a fixed light fixture when comparing a steady drive signal versus the Mate variable control signal. The test is to be performed over a period of 24 hours.

PROCEDURE

Systems to be tested were powered through a REED R5090 power meter (NIST certified hardware was used for measuring). At the beginning of the test, the system is powered on, and the R5090 timer and energy accumulation is reset to zero. The system is then left to run continuously for 24 hours. At the end of the 24-hour period as indicated by R5090, the energy consumption is recorded.

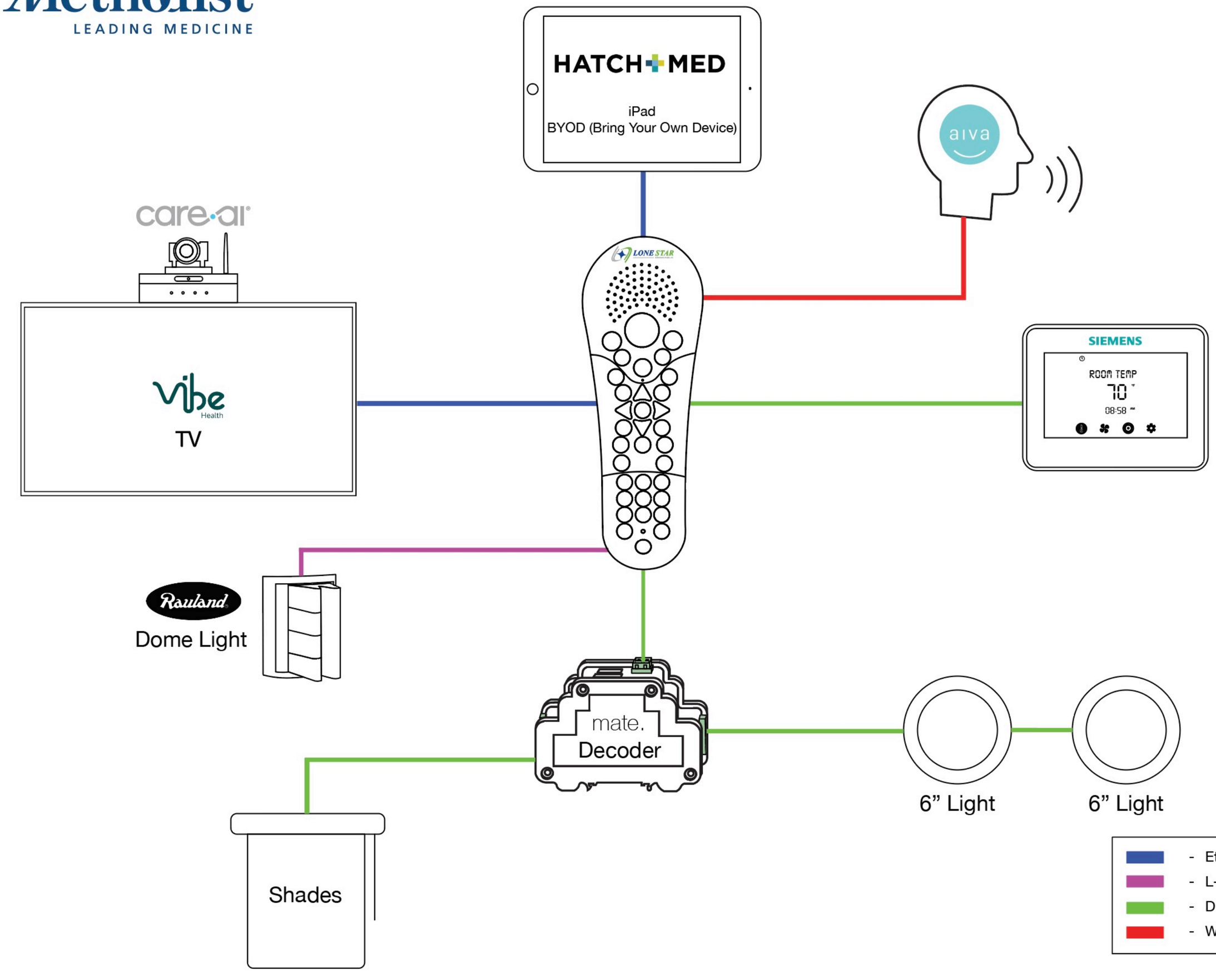
This procedure is performed once for each piece of equipment. The equipment evaluated were:

1. Factory Power Supply with switches set to 4000 lumens / 4000K
2. The Mate V2 demo case running Show #1

RESULTS

	Energy used in 24 hours
Factory Power Supply	792 Watt*hrs
Mate	218 Watt*hrs

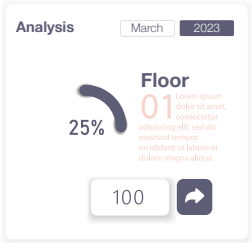
HOUSTON Methodist
LEADING MEDICINE

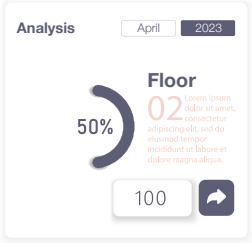


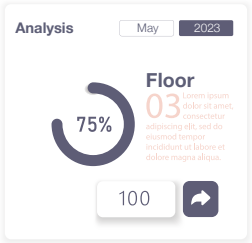
System Dashboard Monitoring

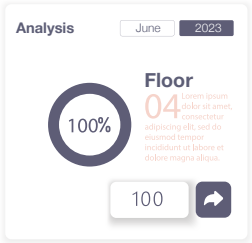
Dashboard
July 25, 2023

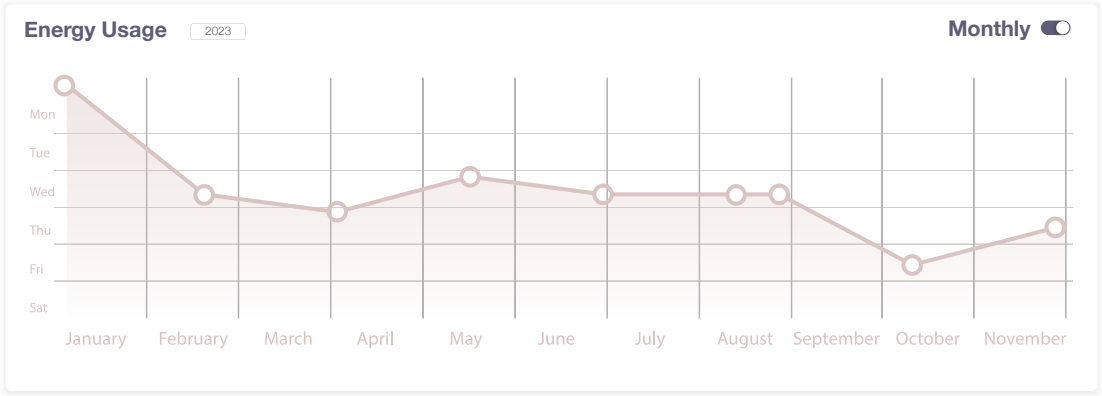
mate.
find your daily rhythm®

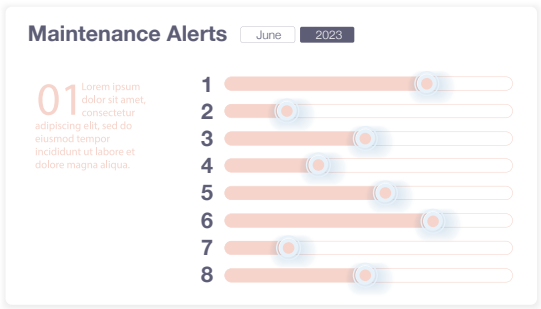


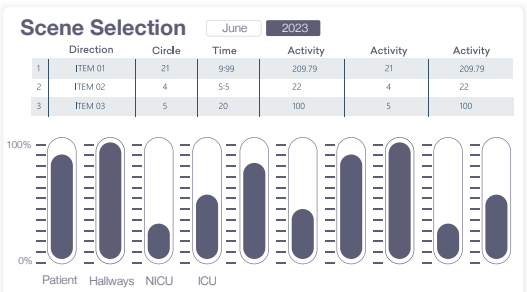












- Energy Usage
- Cost Savings
- Scene Selections
- System Performance
- Occupancy Detection
- Alert and Outage Detector