

# Specifying Integrated Buildings Using Division 25

**Schneider Intro**

**4 Pillars of a Modern Building**

**Industry Trends**

**Challenges in Design & Construction**

**Use Cases & Examples**

**Connected Room Solution**

**Integrated Electrical & Mechanical**

**Benefits of Early Engagement**



GLOBAL 100

2021

The world's 4<sup>th</sup> most sustainable company is ready to go further, faster

**EcoStruxure™**  
Innovation At Every Level

**EcoStruxure™**  
Innovation At Every Level

**Building**



**EcoStruxure™**  
**Security Expert**

**Andover Controls**  
Controlling Tomorrow's World



**EcoStruxure™**  
**Access Expert**



**invensys®**

**AVEVA™**



# The four pillars of a Modern Building



Sustainability

**~>30%** of  
building  
energy is wasted



Resiliency

**38%** of BMS  
are impacted by  
cyberattacks



Hyper-efficiency

**+1.4%** increase in  
productivity with  
advanced automation



People-centric

**~90%** of our  
time is spent in  
buildings

# The Retirement Tsunami

Population trends affecting every industry

Birth Rate US

6,000,000

5,000,000

4,000,000

3,000,000

2,000,000

1,000,000

0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015



Working Age



Generation



Births

# Two major transformations already underway

## All-digital, all-electric world

### Digitization

**IoT** **50B** connected devices by 2050  
Source: Profit from IoT

**Big Data** **+23%** Growth by 2025 (to 175ZB)  
Source: IDC, 2023

**AI** **x6** Increase in AI  
Source: International Data Corporation, 2020

### Electrification

**50%** Renewable energy production by 2050  
Source: Bloomberg New Energy Finance, New Energy Outlook 2019

**30%** Electric vehicle stock by 2040  
Source: Bloomberg New Energy Finance, New Energy Outlook 2019

**x2** Electricity consumption doubles until 2050  
Source: Global Energy Perspective 2019, McKinsey, 2019

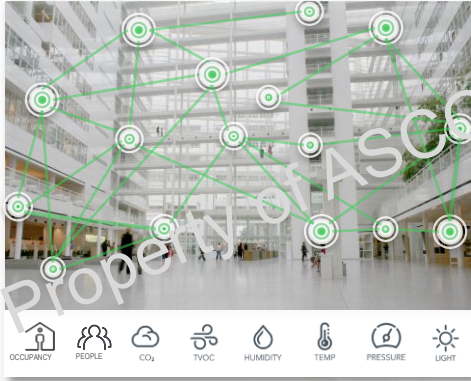


# Typical control room



# Future of connected systems

## Collect



## Select

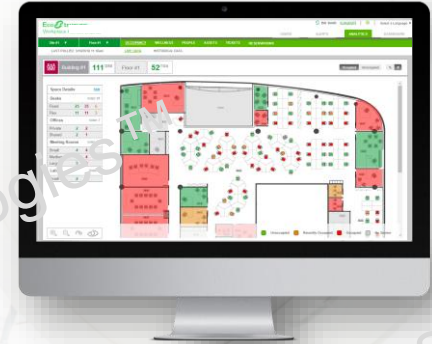


## Integrate



Space  
Optimization  
&  
Compliance

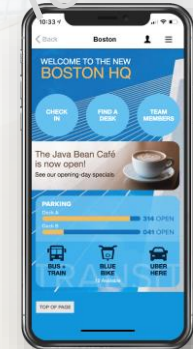
## Advise



## Engage



Improved  
Employee  
Satisfaction



# Challenges in Design & Construction

Leverage digital transformation to deliver outcomes vs products

## Traditional approach

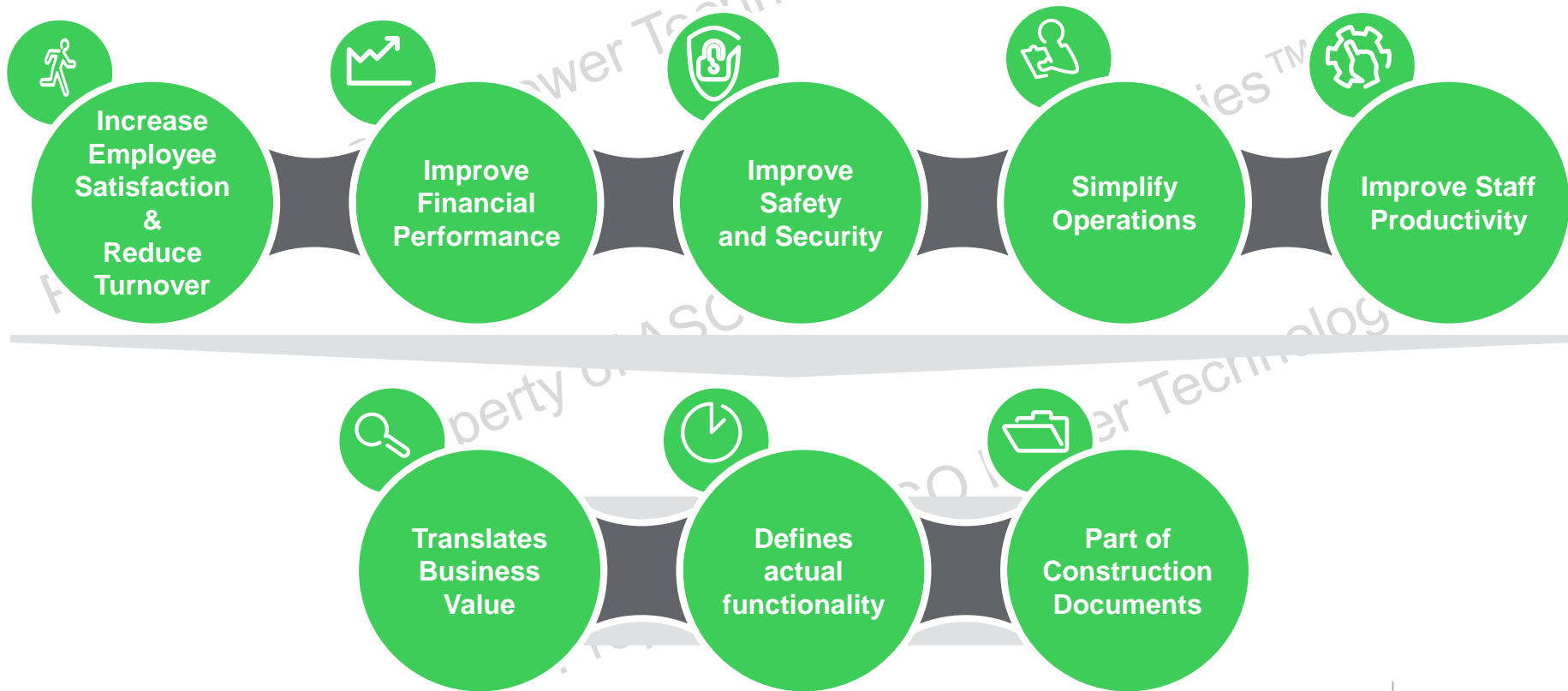


## Outcome Oriented Approach





# Value of a Use Case (Why, How, What)



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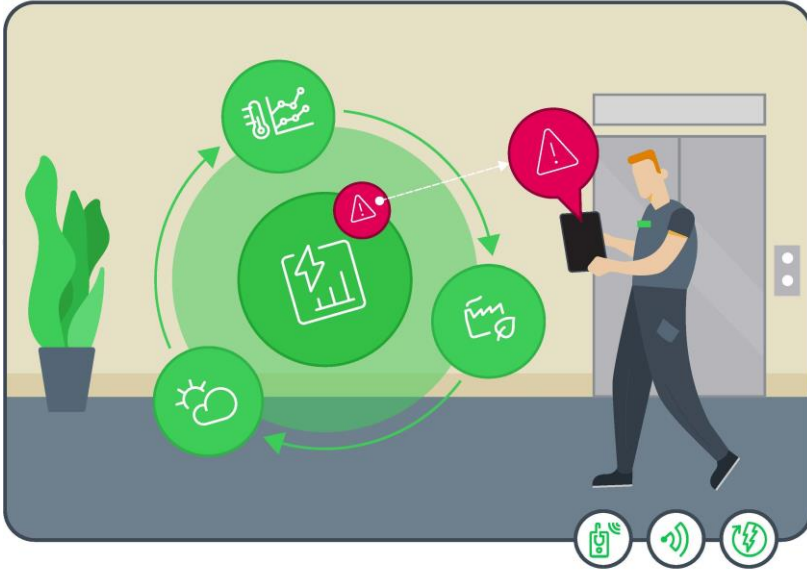
UF3:2

FACILITY MANAGEMENT

## Energy Optimization

Sustainable

Hyper-efficient



The system will optimize energy by incorporating data from external sources and sensors within the building. The building staff is notified of unusual energy consumption-based trends and faults.

The system offers recommendations on optimizing energy performance, as well as maintenance and comfort.

UF3:1

FACILITY MANAGEMENT

## Energy Reporting

Sustainable



Allow the building operator to access energy usage data at a floor-by-floor level.

Energy data can be broken down by at least four different consumption groups including heating, cooling, and lighting, along with one of the following: elevators, plug load, and, if applicable, low-carbon energy sources.

UF3:5

EMPLOYEE EXPERIENCE

## Carbon Footprint Engagement

Sustainable



Provide dashboards that have a kiosk mode, allowing for occupant-level data displays on monitors or tablets throughout the building.

Kiosk displays can show carbon footprint reporting for electricity, heating, cooling, and water usage in a gamified format that promotes understanding of scale.

# United Therapeutics – Net Zero Building

Silver Spring, MD

## Customer Challenges

- Construct a corporate HQ that achieves On-Site Net Zero Energy in an Urban Location

## Solutions

### Directly Controlling/Monitoring:

- 100% Outside Air AHUs
- Chilled Beams
- Water-to-Water Heat Pumps
- Geothermal Loop Pumps
- Comprehensive Power Metering
- Office Ceiling Fans
- Motor Operated Windows
- Natural Ventilation
- Free Cooling Labyrinth

### Interface with:

- Solar PV Array
- IP Lighting Control System
- Custom Modern Art Piece
- Electrochromic Glass Tinting
- Geothermal Loop Optimization

**First Net Zero Certified  
Building in the East Coast**

**6 Story, Class A Office  
Space**

**EcoStruxure™ for Buildings**  
Innovation At Every Level

Apps,  
analytics,  
and services



Edge  
control

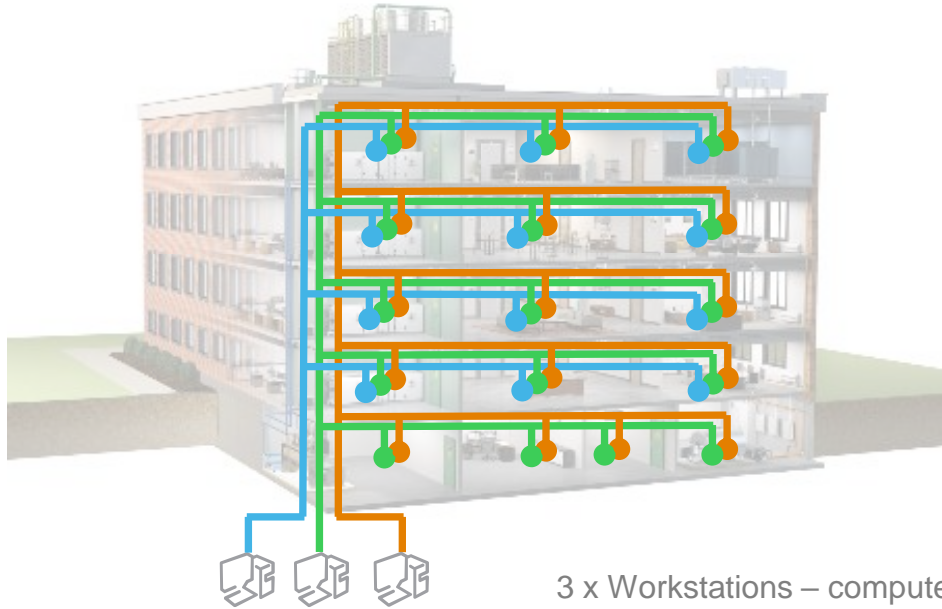


Connected  
products





# Traditional infrastructure



Division 23 — Heating Ventilating and Air Conditioning

Division 26 — Electrical (lighting control)

Division 12 — Furnishings (shade control)



3 x Workstations – computer hardware/software, cyber security, training

3 x Infrastructure – materials, cabling, devices

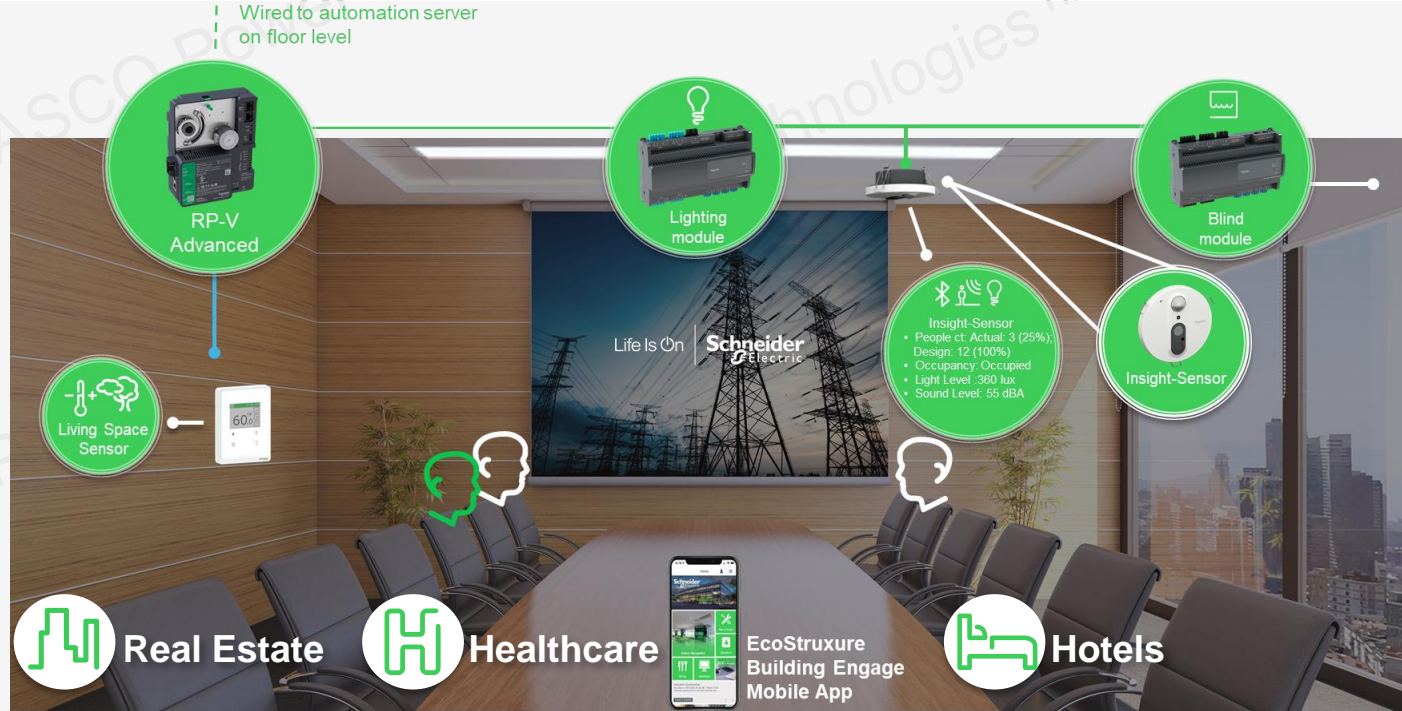
3 x Labor – installation, contracts, coordination

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# EcoStruxure™ Connected Room Solutions **creating** the Room of the Future – now with RP-V Advanced

- Controller at the room level that creates a truly connected room
- Enables variable air volume (VAV) ventilation schemes for air circulation
- Integrated light, blinds, temperature control, and room sensors
- Ability to integrate with occupant apps and workplace management software



# Insight-Sensor

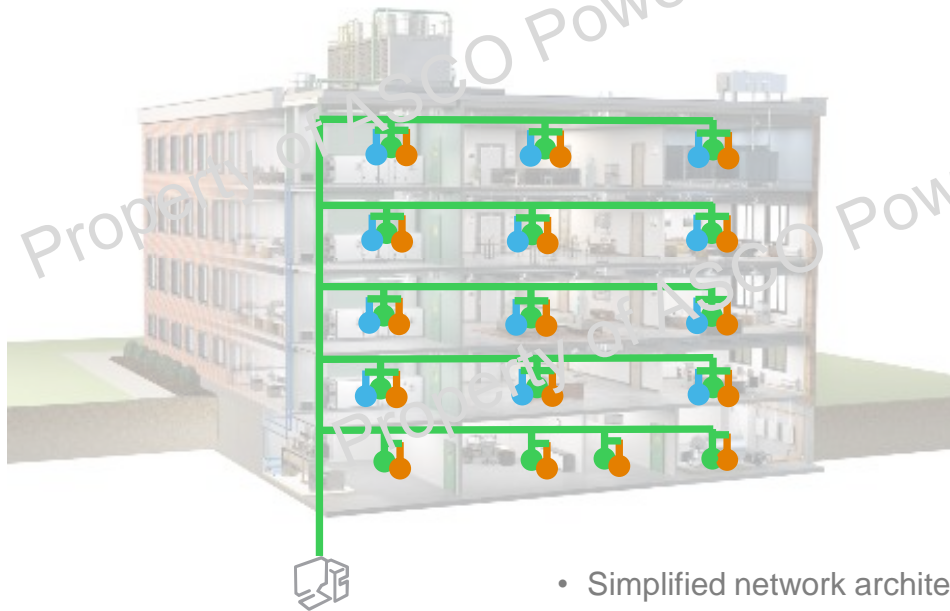
6 sensing technologies in one device



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# Connected Room Solution



## Division 25 — Integrated Automation

HVAC Control

Lighting Control

Shade Control



- Simplified network architecture
- Simplified user interface
- Lower first install cost and lifecycle maintenance

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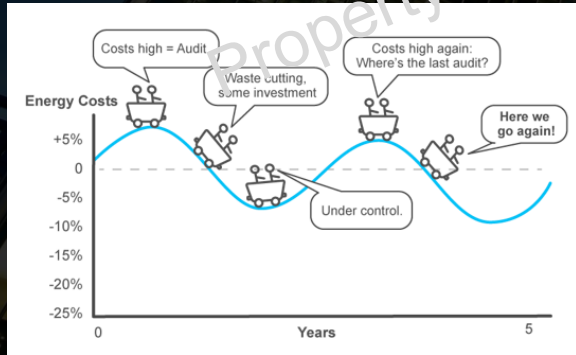
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# Energy Monitoring

## Reduce Energy Usage & Costs

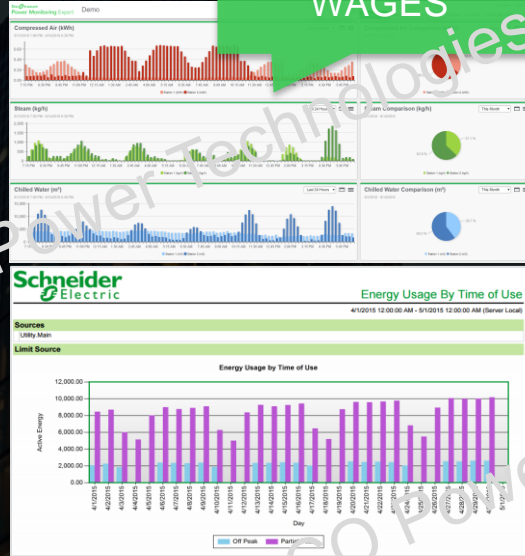
- Identify energy conservation initiatives
- Understand energy usage patterns & energy waste
- Analyze factors contributing to energy usage including HVAC systems and processes



Without visibility into energy, trying to conserve it can feel like a roller coaster

Monitor all  
WAGES

Identify  
energy  
consumption  
anomalies



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# Power Quality Monitoring

## Help Prevent Downtime from Power Failures

- Monitor electrical disturbances such as harmonics, unbalance, flicker & over/under voltage conditions
- Capture & study event details such as waveforms
- Patented Disturbance Direction Detection to locate the directionality of events
- Trend & report to facility operations on power quality issues
- Gain recurring expert advice with analytics advisory services to correct issues & improve performance across the system.

### Symptoms of poor PQ

#### Data loss

Unexpected equipment shutdown

#### Circuit board failures

Reduced electrical system capacity

#### Contactors dropping out

Network communication issues

Flickering lights

#### Circuit breakers tripping

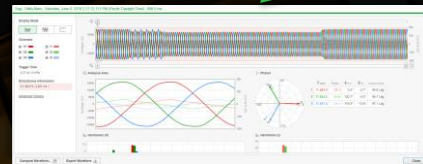
Malfunction of controllers

#### Transformers humming

Electrical cables running hot

#### Premature motor failure

PQ issues to detailed waveform analysis





# Power Events Analysis

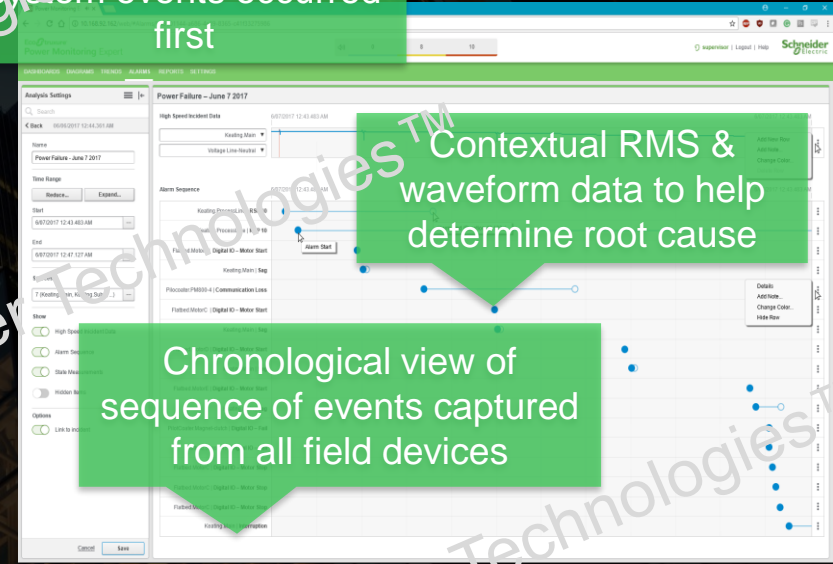
## Help Prevent Downtime from Power Failures

- High resolution, high accuracy event sequence recording to find origins of fault
- Cross system event correlation to help reconstruct sequence of events
- Speed diagnosis by creating visual timelines of events, waveforms, & trends.
- Gain insight about the cause & impact of an incident by seeing a visual timeline before, during, & after the incident

Determine which power system events occurred first

Contextual RMS & waveform data to help determine root cause

Chronological view of sequence of events captured from all field devices



Edge Control Software



Connected Products

## Reduce Energy Usage & Costs

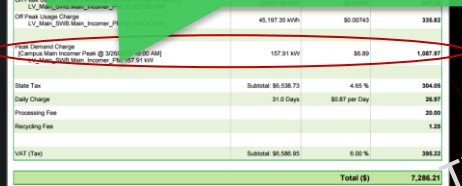
- Revenue grade monitoring of energy use
- Compare internally generated “shadow bill”
- Identification of utility bill errors over several billing periods
- Understanding billing “levers” to help change behaviour (peak shaving, demand response)

**Power  
Monitoring &  
Control  
Software**

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### Monthly Shadow Bill

Compare locally generated utility bill with utility provided bill to find discrepancies



## Shadow Billing Meter

## PowerLogic ION9000

ABC Electric Utility Co

[illegible]

# Billing mistake found!

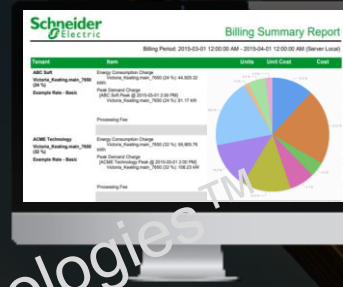
## Utility Billing Meter



# Cost Allocation

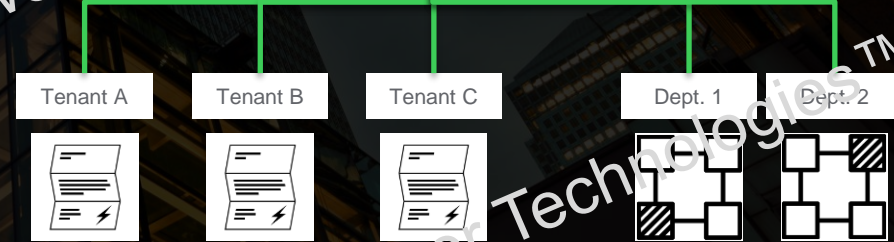
## Reduce Energy Usage & Costs

- Measure energy costs using standalone or embedded metering
- Measure & allocate energy costs by business unit, department, area, floor or building and affecting behavioral change
- Rank opportunities by load type, business unit, area, floor or building by greatest opportunity savings



Edge Control Software

Energy Data



Connected Products

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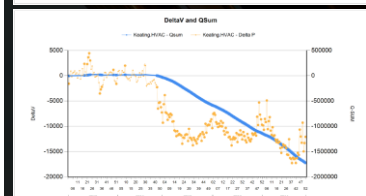
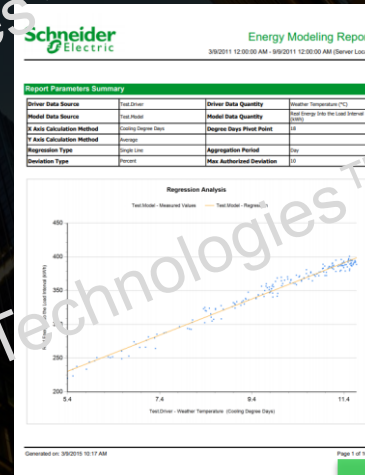
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# Energy Modeling & Verification

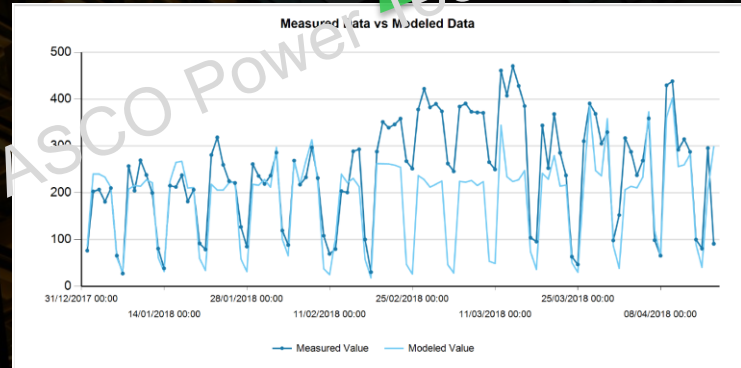
## Reduce Energy Usage & Costs

- Define heating/cooling degree days and other parameters that effect energy consumption.
- Track actual against expected energy usage
- Verify energy savings as a result of specific conservation measures
- Continuously track improvements.
- Forecasted weather service information can provide more efficient HVAC control.

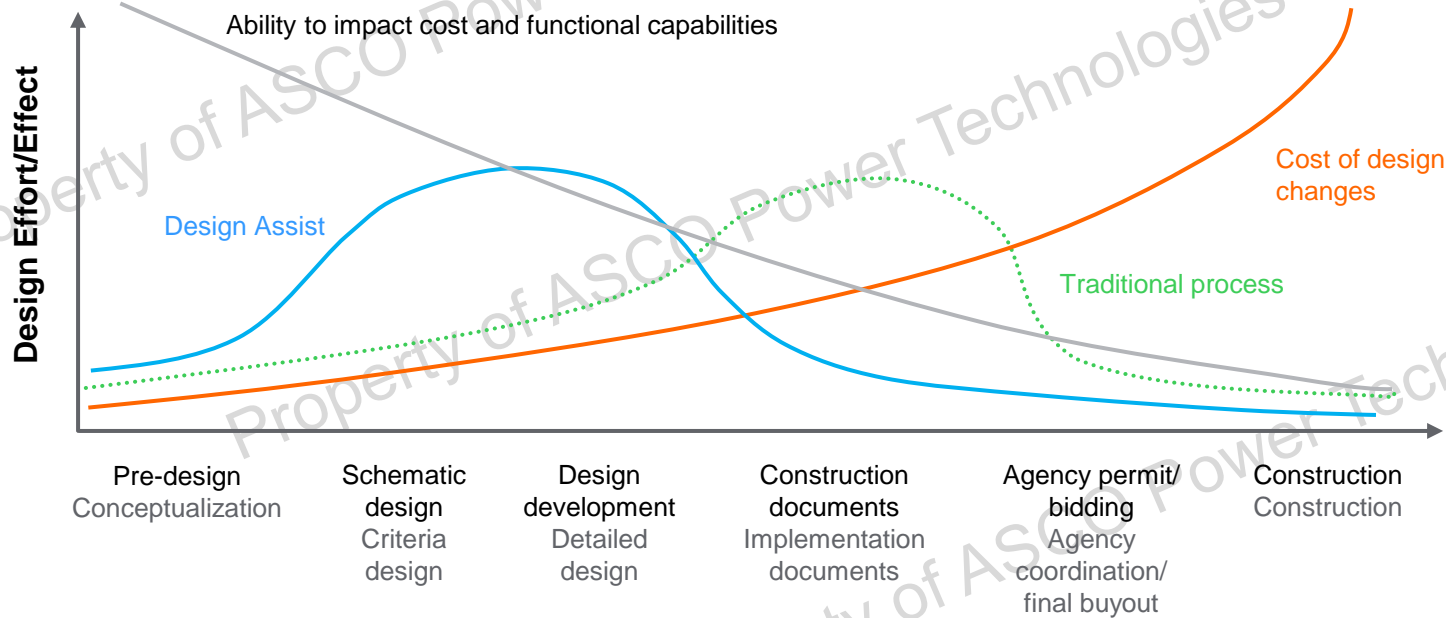
Compare  
measured vs  
expected usage



What happened  
this week



# Benefits of Early Engagement



**Engage a specialist early to reduce waste and risk!**

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