



Mega-Trends Transforming Electrical Contracting

ELECTRI **INTERNATIONAL**

Research and Education for the Electrical Construction Industry

Josh Bone
Executive Director,
ELECTRI International
josh.bone@electri.org



The Academy of Electrical Contracting
demanded to have an entity focused on
protecting the future of electrical
contracting in 1986



Mega-Trends Transforming Electrical Contracting

1. The Rise of Industrialized Construction
2. The Evolution of Systems Integration
3. The Importance of Leveraging Data



Industrialized Construction



Industrialized Construction - The industrialization of construction is the process through which construction aims to improve productivity through increased mechanization and automation. The process commonly involves modularization, prefabrication, preassembly, and mass production



Merck has released an initiative for all construction to be 80% fabricated offsite by 2025







Comparing work in the Shop to the Field

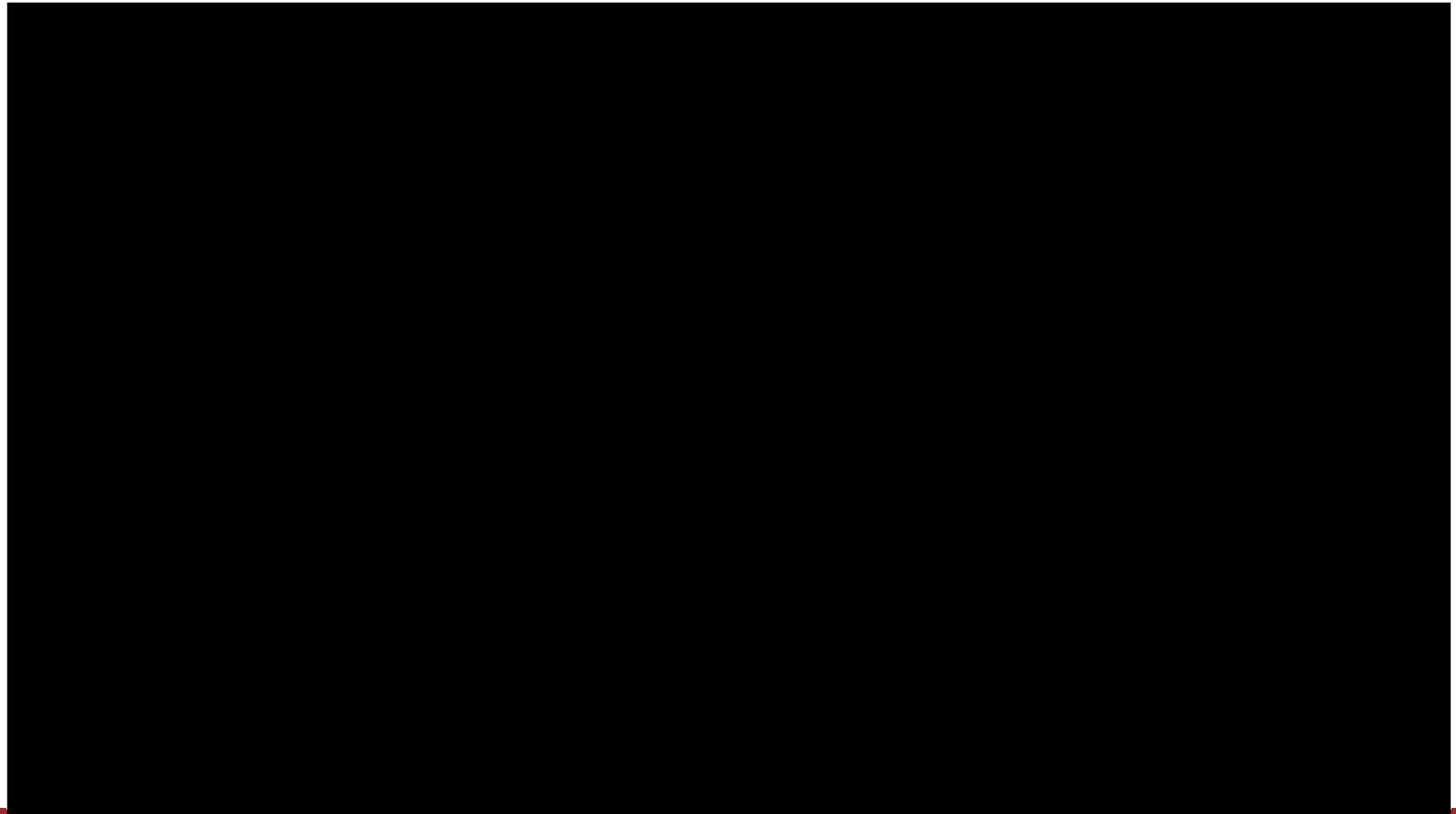


	Shop	Field
Labor Rate	\$75/Hr.	\$110/Hr.
Single Clevis Hanger	3 Minutes	10 Minutes
Single Tier Trapeze Hanger	6 1/2 Minutes	17 Minutes



Advances in Digital Fabrication

TigerStop and RazorGage

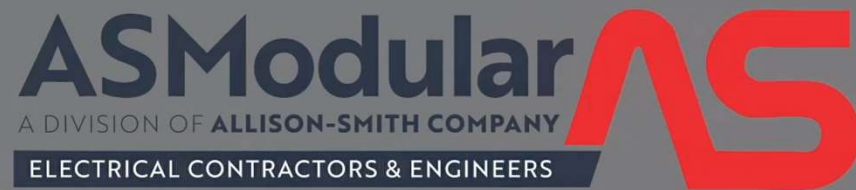


Advances in Digital Fabrication

TigerStop and RazorGage



Standardization evolves into Productization

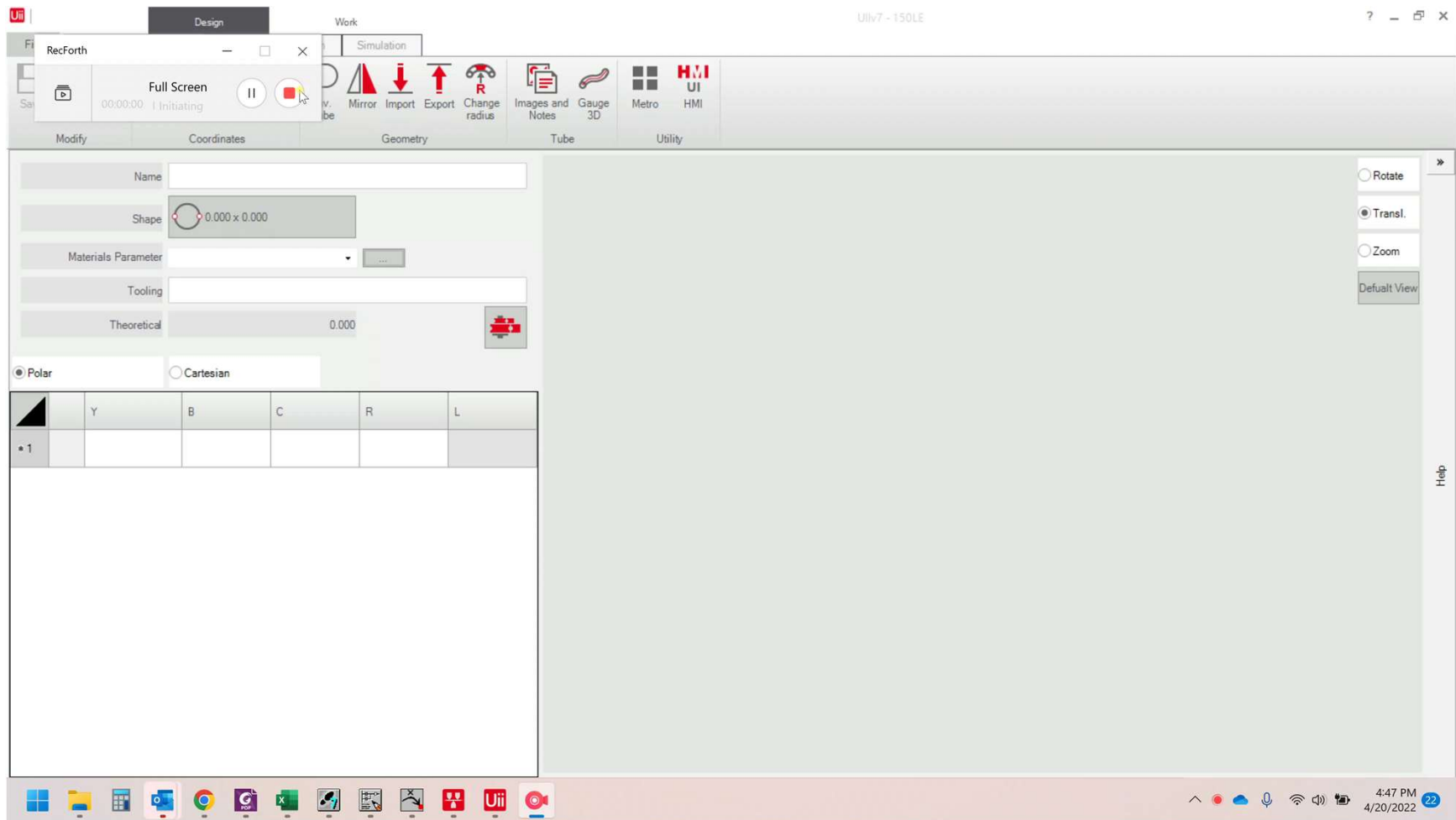


Panel Builder Program



Conduit Bending





Multi-Trade







The Competition is Evolving



RISE Modular

6,359 followers

1h • 🌐



It's always 70 degrees at RISE and we are hiring!

If you are a t-shirt wearing drywaller, plumber, electrician, carpenter or an experienced construction tradesperson, RISE may be the place for you.

- Highly competitive wage and benefits package with full healthcare coverage
- \$1,500 signing bonus
- Climate-controlled manufacturing environment
- Safer, healthier work environment
- Ergonomic workstations

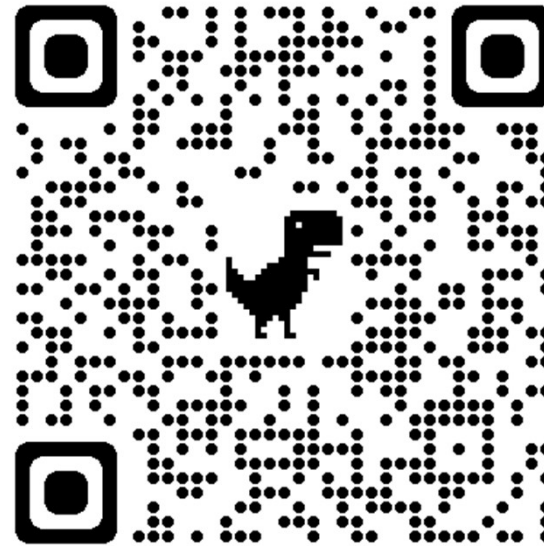
Revolutionizing construction with commercial volumetric modular and YOU!

#WeAreHiring #ConstructionJobs #ManufacturingJobs
#Carpenter #Electrician #Plumber #Journeyman
#FortLiftOperator #HVAC #Painter #Framer #Jobs
#TogetherWeRISE



Key Takeaways

- Yellow Tagging/Labels are critical to their ability to prefab – How do we bring the IBEW and electrical contractors opposed to portability along with us? We are playing with a significant disadvantage.



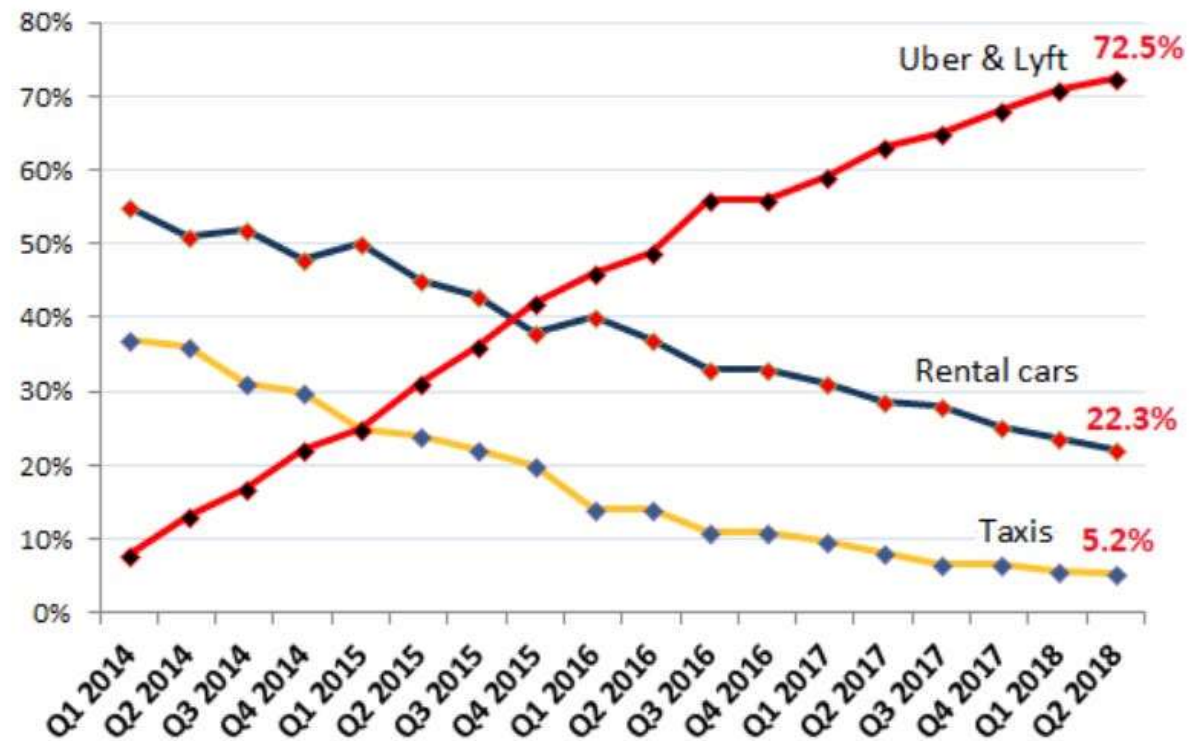
The Evolution of Systems Integration



Disruption or Transformation

Disruption: The Rise of Rideshare Apps

Uber & Lyft Crush Taxis and Rental Cars
% of Ground Transportation Travel Reimbursements



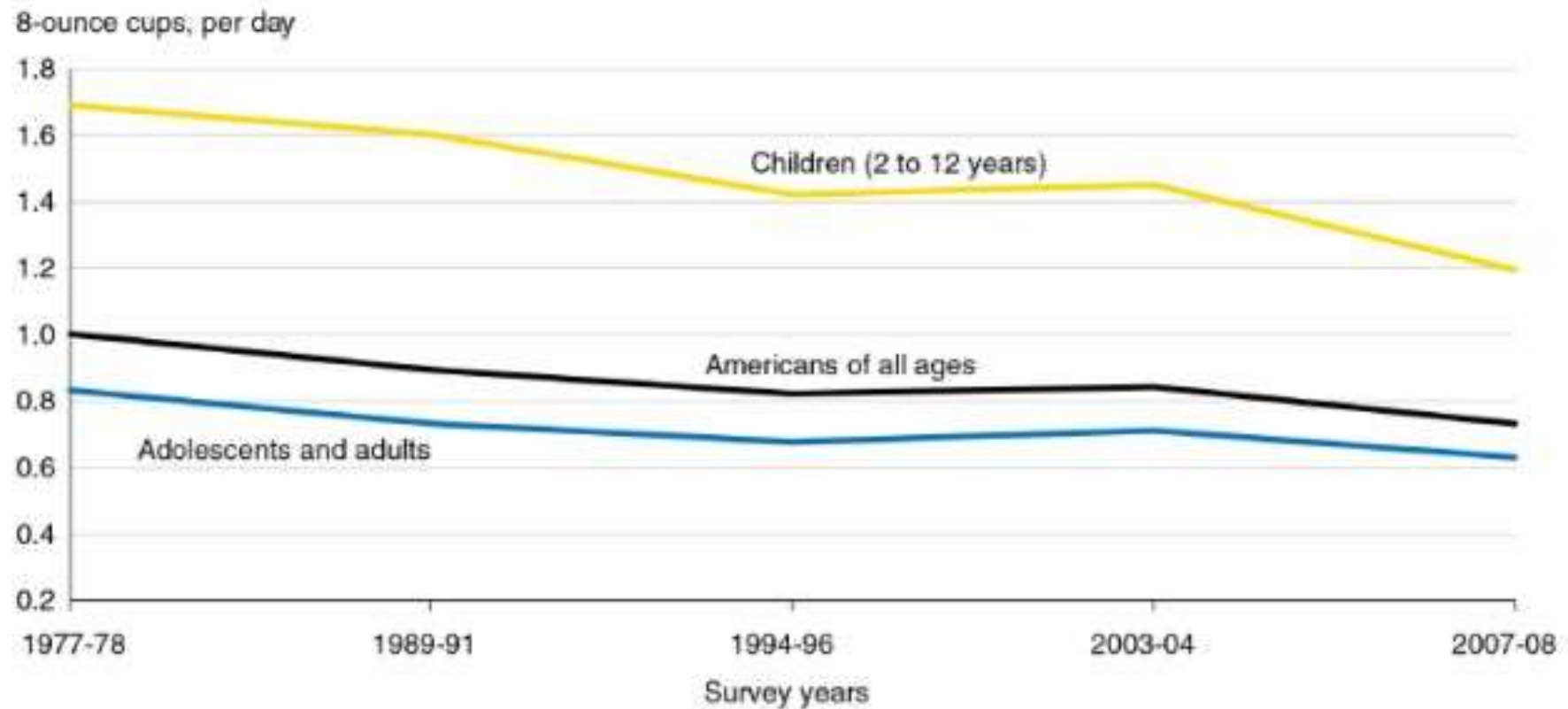
Source of data: Certify

WOLFSTREET.com



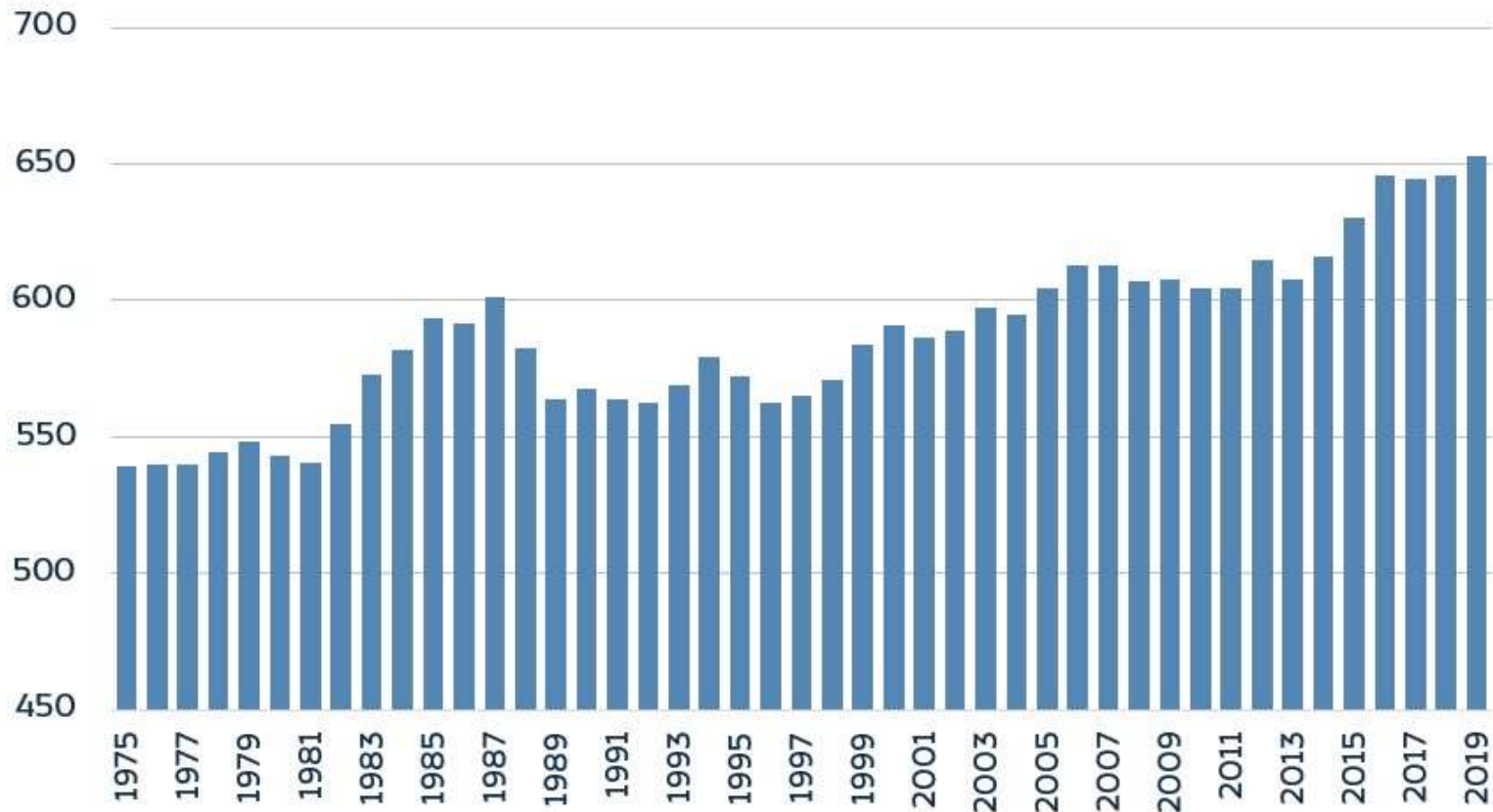
Industry that are Transforming

Figure 2
Fluid milk consumption decreasing in all age groups



Industry that are Transforming

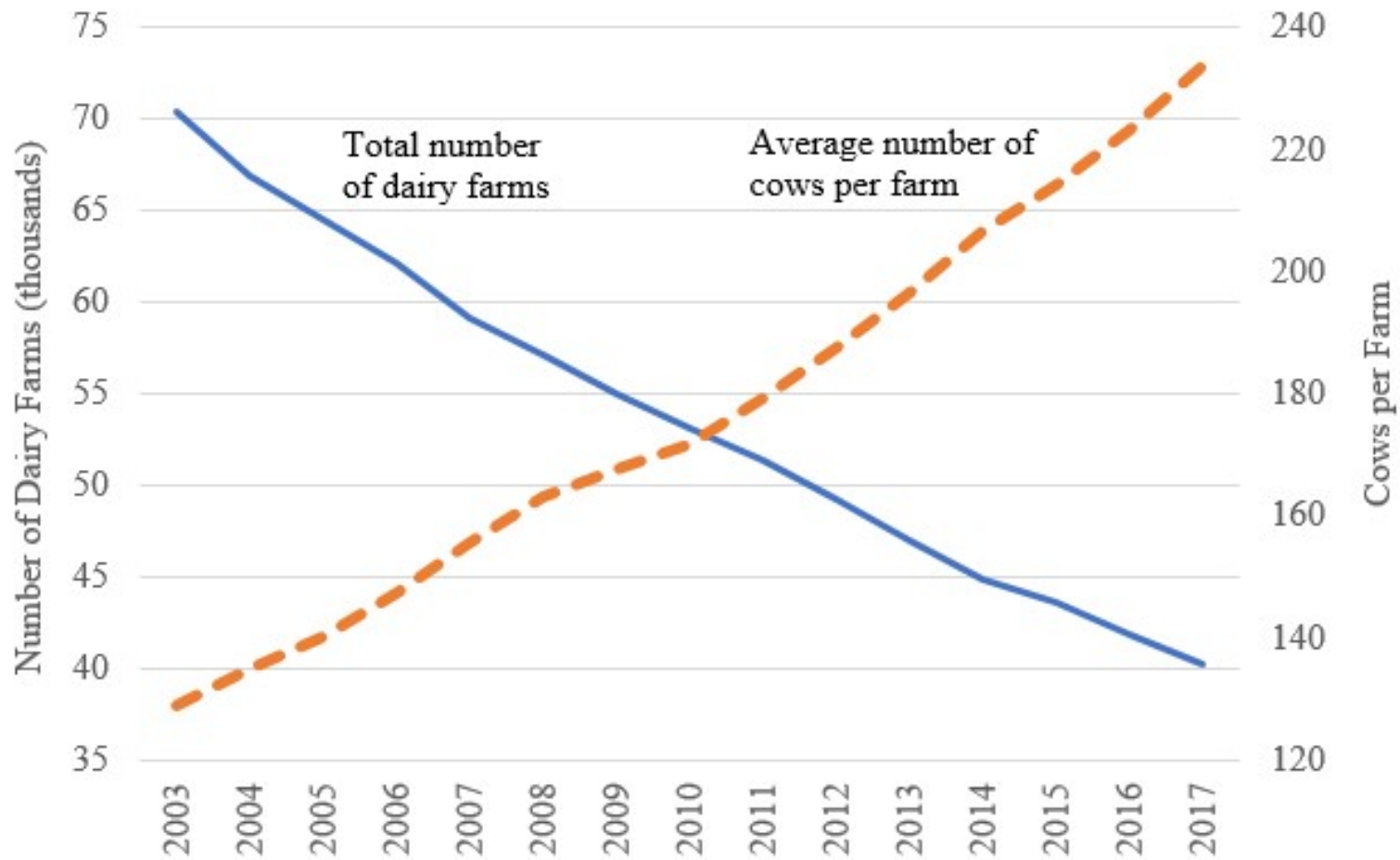
US Dairy Products Per Capita Consumption



All Products, Pounds Per Capita, Milkfat Milk Equivalent Basis; USDA

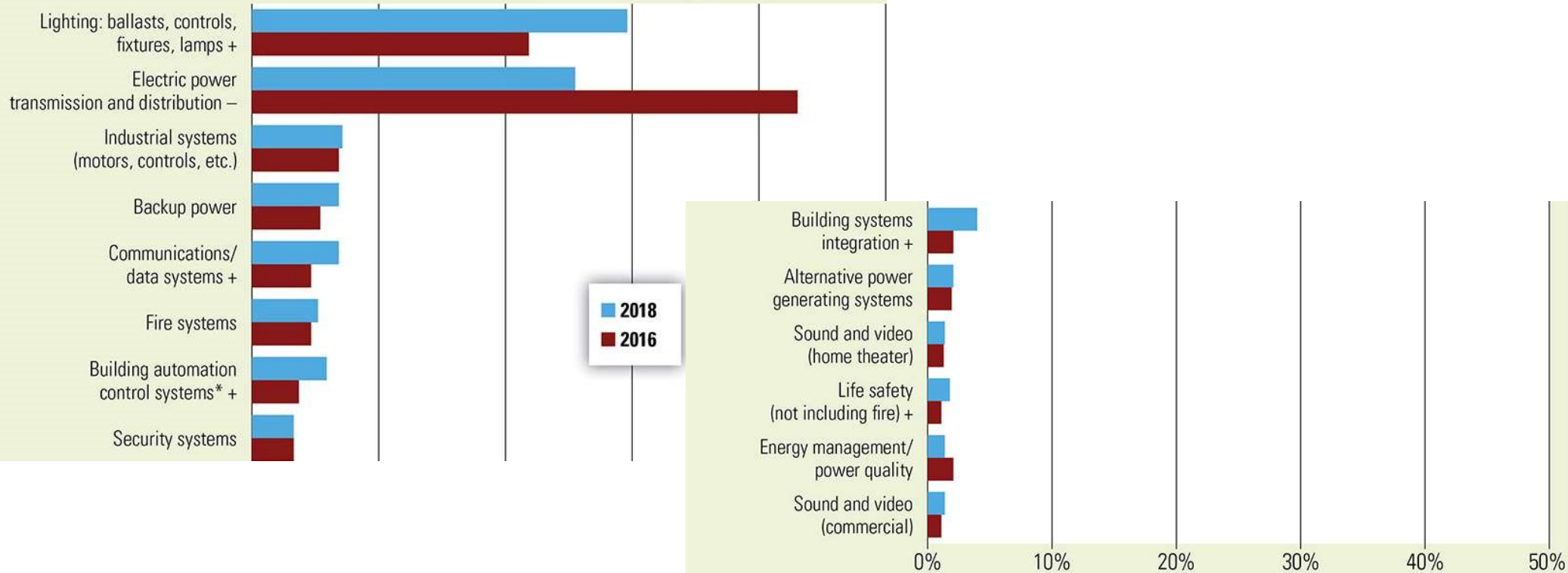


Industry that are Transforming



Diversification of Work

FIGURE 8 Sources of Revenue—Trended (2018 vs. 2016)



The symbols + and – indicate significant changes at the 90 percent level of confidence versus the 2016 Profile study.

* indicates wording change versus 2016 Profile study.



Smart Buildings and Smart Infrastructure

13% of the cost of a building is in design/construction phase

Vs.

87% of the cost of a building is operating and maintaining the building over life span.





Opportunity for Growth

- The global smart building market is projected to grow from \$67.60 billion in 2021 to \$265.37 billion in 2028 at a compound annual growth rate of 21.6%. What's more, these smart buildings are more than just a temporary aberration. They are the present and future of facilities management as new innovations continually advance what's possible. These interconnected solutions represent brand new market opportunities for electrical contractors.

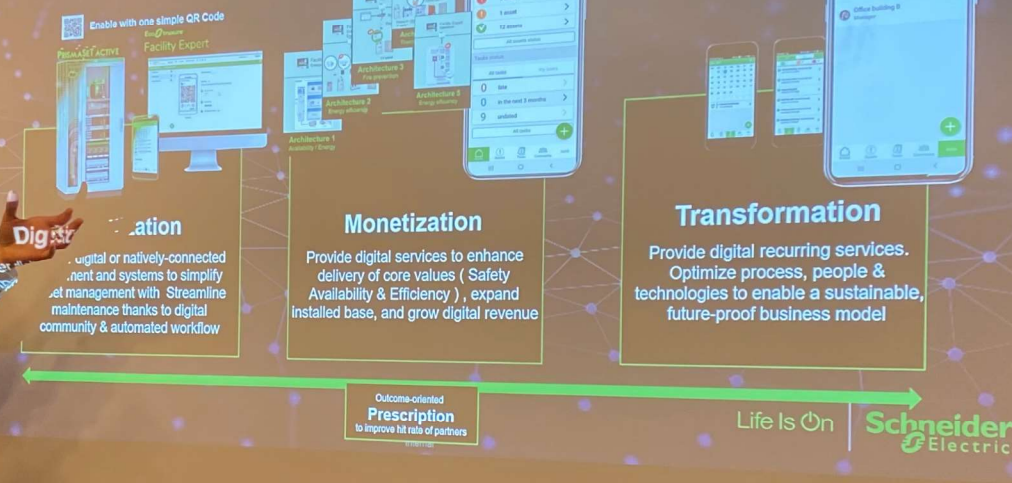
Hartsfield Jackson Airport (ATL)

- Clean and Renewable Energy by 2035
- ACI Net Zero by 2050
- Energy Retrofits, timely maintenance & all-electric building system
- Move to arbnco platform evaluates metered energy data and delivers feedback on conserving energy and load shedding

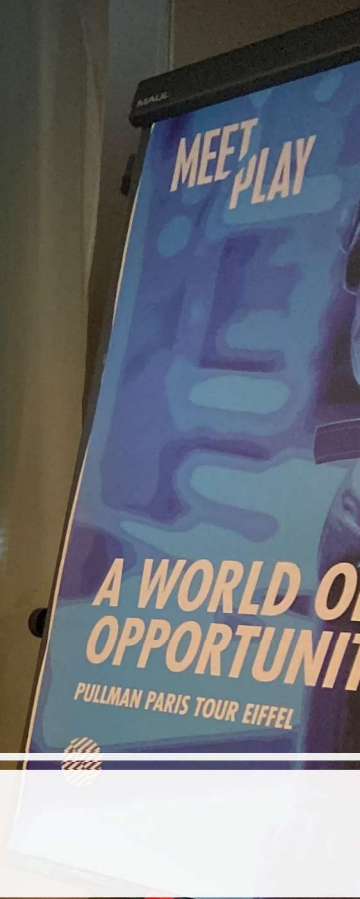


Digital as an enabler for services
Accelerate digital transformation and increase sustainable revenue

Simplified – Open – Digital



Building Lifecycle Opportunities



Life Is On



Building Lifecycle Opportunities

Go digital to boost productivity and grow your business

Despite a wide variety of different jobs electrical contractors perform, their businesses face remarkably similar challenges in the face of accelerating technological change

Recent events have shown us that relentless, even turbulent change, is now the new normal.

Embracing emerging trends, building a relationship of mutual trust, and benefit with clients are ways to boost competitiveness, gain recurring revenue, and grow your company.



Mastering digital tools **establishes you as a service provider** instead of simply their installer



Digital adoption helps overcome construction industry hurdles, without compromising safety



Taking steps to digitize your manual processes can result in **efficiency gains between 14-15%**



ABB Ability Energy & Asset Manager integrates energy and asset management in a single dashboard. Providing remote visibility of asset and electrical-system behavior. Providing insights that help minimize cost and risk and maximize performance and safety across your operations.

A single solution for all your asset and energy management needs

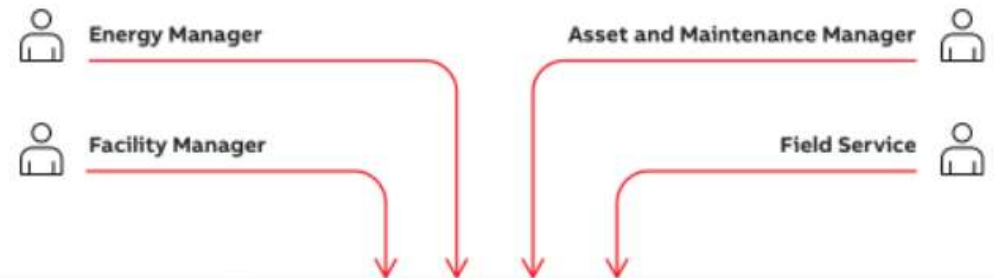


ABB Ability™ Energy and Asset Manager



Energy Manager

- Optimize energy bill
- Avoid energy waste
- Cost allocation



Asset Manager

- Reduce total cost of ownership
- Maximize uptime
- Improve safety



SIEMENS

✉ 🌐 Search

> Literature Download

Edge or Cloud - Your choice now or in the future

Sm@rtGear™ IE allows you to analyze data at the machine or pre-process it quickly for uploading to cloud or another system. Control and configuration can be exclusively local while monitoring and enhanced analytics, regional performance comparisons, fleet management, and more can be cloud based.

Features and benefits:



Safety



Reliability



Connectivity



Flexibility



GE Digital

What is industrial Data Diagnostics?

Industrial Data Diagnostics (IDD) is a premier cloud diagnostic application that provides process and asset data quality analysis, performance benchmarking, and delivers actionable recommendations to continuously optimize O&M program data that are easily scaled throughout the enterprise. Industrial Data Diagnostics seamlessly integrates with GE Digital's Asset Performance Management (APM) software for a streamlined navigation, intuitive user experience, and better business continuity.

Data quality is half the battle – download our guide to diagnose, cure, and sustain your operations and maintenance program

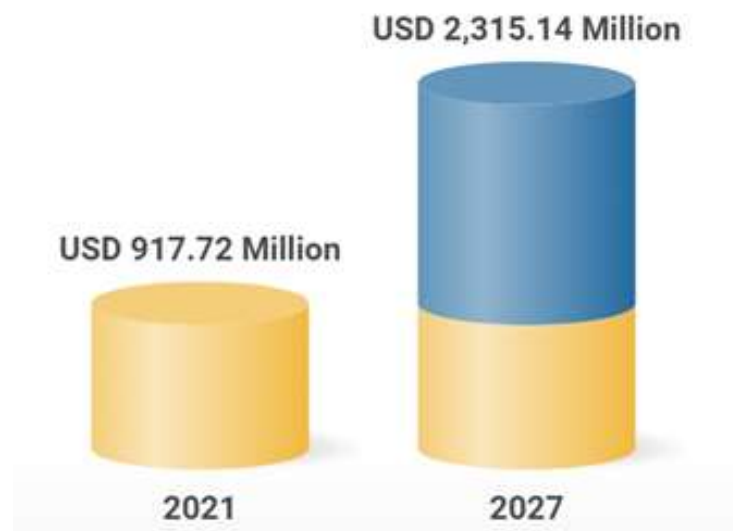
[DOWNLOAD THE INDUSTRIAL DATA WHITE PAPER](#)



Electrical Digital Twin

Global Electrical Digital Twin Market

Market forecast to grow at a CAGR of 16.7%

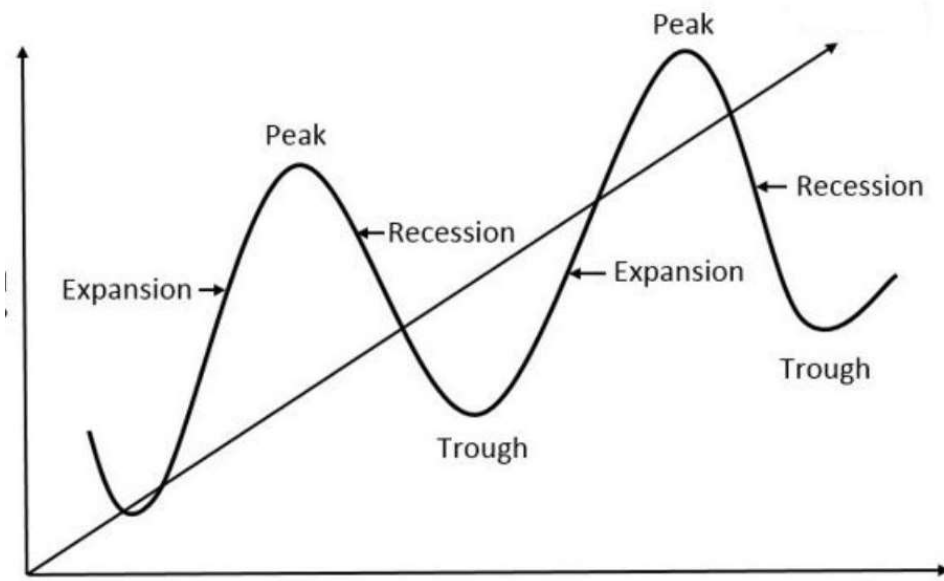


Global Electrical Digital Twin Market Research Report to 2027 - Growing Digitalization in Power Sectors Presents Opportunities - [ResearchAndMarkets.com](https://www.researchandmarkets.com)



Why Change from Installer to Integrator?

Installing is Cyclical



Integrator Growth



Smart Building – Systems Integrations



Nursing informatics specialist

Nursing informatics specialists—also known as nurse informaticists—**bring medical knowledge into the IT realm**. It's a type of nurse skilled in both the delivery of healthcare and the development and utilization of healthcare technology.



Smart Building – Systems Integrations

Primary System's prides itself on its Consultative Services, staffed with Registered Nurses (RN's) with over 30 years of combined bedside workflow design and management experience. Our staff is experienced in adapting with you as you adapt to the impacts of the everchanging healthcare arena. By optimizing and leveraging your clinical technology and data, we create solutions to support communication and workflows in a patient centric environment.

Expertise:

Primary Systems will provide your facility with an on-going support model that ensures quarter-over-quarter and year-over-year sustained results after the implementation is complete. We structure our team of Registered Nurses (RNs) with real world bedside experience to analyze your clinical operations workflow and evaluate current performance through data, time, and motion studies. This allows us our team to make recommendations based on years of clinical experience to boost productivity and increase staff satisfaction resulting in increased staff retention and better patient care.



Smart Building – Systems Integrations

CVE IoT Solutions Capabilities



- > IoT device installation and management
- > Smart exit signs
- > Web-connected devices
- > Location tracking
- > Integration and storage
- > Managed services

CONNECT WITH CVE IOT
SOLUTIONS



Managed Cloud

Gain access to a team of cloud experts when you need them.

We understand that finding and retaining cloud talent can be difficult, which is why we've put together a team of dedicated experts for you. With our managed cloud, you get access to an entire team of specialists in Engineering, Architecture and Security. With eight hours of professional services included in each month (discounted hourly rates after that) and quarterly architecture reviews, you will be sure that you are getting the most out of your cloud while keeping costs to a minimum.

- Cost Control
- Best Practices
- Security & Compliance
- Professional Services

Smart Exit Signs

Increase Workplace Safety & Compliance Solution All in One with the Willard Smart Exit™

Willard
**SMART
EXIT**

IBM

Willard Smart Exit™ meets NFPA regulations, as well as regulations established and overseen by the Joint Commission on Accreditation of Healthcare Organizations. Our Smart Exit Sign is powered by the IBM Cloud. Additional value is provided by utilizing device omnipresence and known location.

CVE Managed Services and Help Desk

We can design, build, implement, and manage a custom managed services or help desk solution so you can focus on delivering value to your business.

Cache Valley Electric has the resources, expertise, and experience to provide turnkey managed services and help desk solutions for businesses of any size. As a managed services provider (MSP), CVE provides ongoing monitoring, support, and active administration through our network operations center.



The Power of Data and Digital Transformation



Data is the new Oil



Digital Tools



- A tool, NOT a gadget!
- Do not view these tools as only overhead cost
- Real time field workflows
- Save money on printing cost
- Reduce rework costs
- Generate turn over documents
- Reduce Redundancy

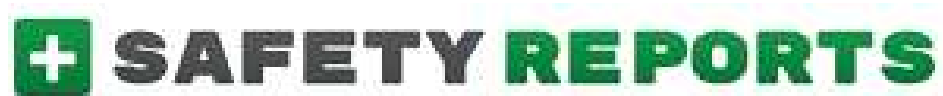


**What is your mindset when it
comes to investing in
Technology?**

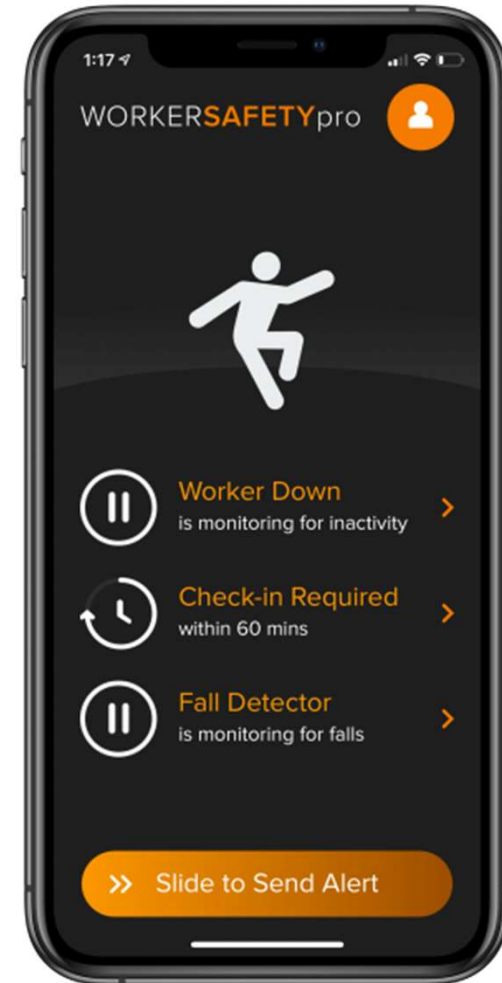
**We are in the business of...
Making Money or Saving Money**



Safety Apps



StriveZero™



Custom Digital Forms

go canvas

 fastfield

PRONTOFORMS[®]



 SHEETS

 Device Magic

Daily Reports



Text Message
Today 11:30 am

Hi I'm Nyfty.ai bot, Matt from NYFTY.AI needs the manpower for San Francisco Exchange on Aug 27 2019.

I can log it for you, just reply something like "we had # people for # hours doing ###".



360 Cameras



Insta360 ONE X = \$400



Ricoh Theta V = \$349



Garmin Virb 360 = \$799



LG 360 = \$99



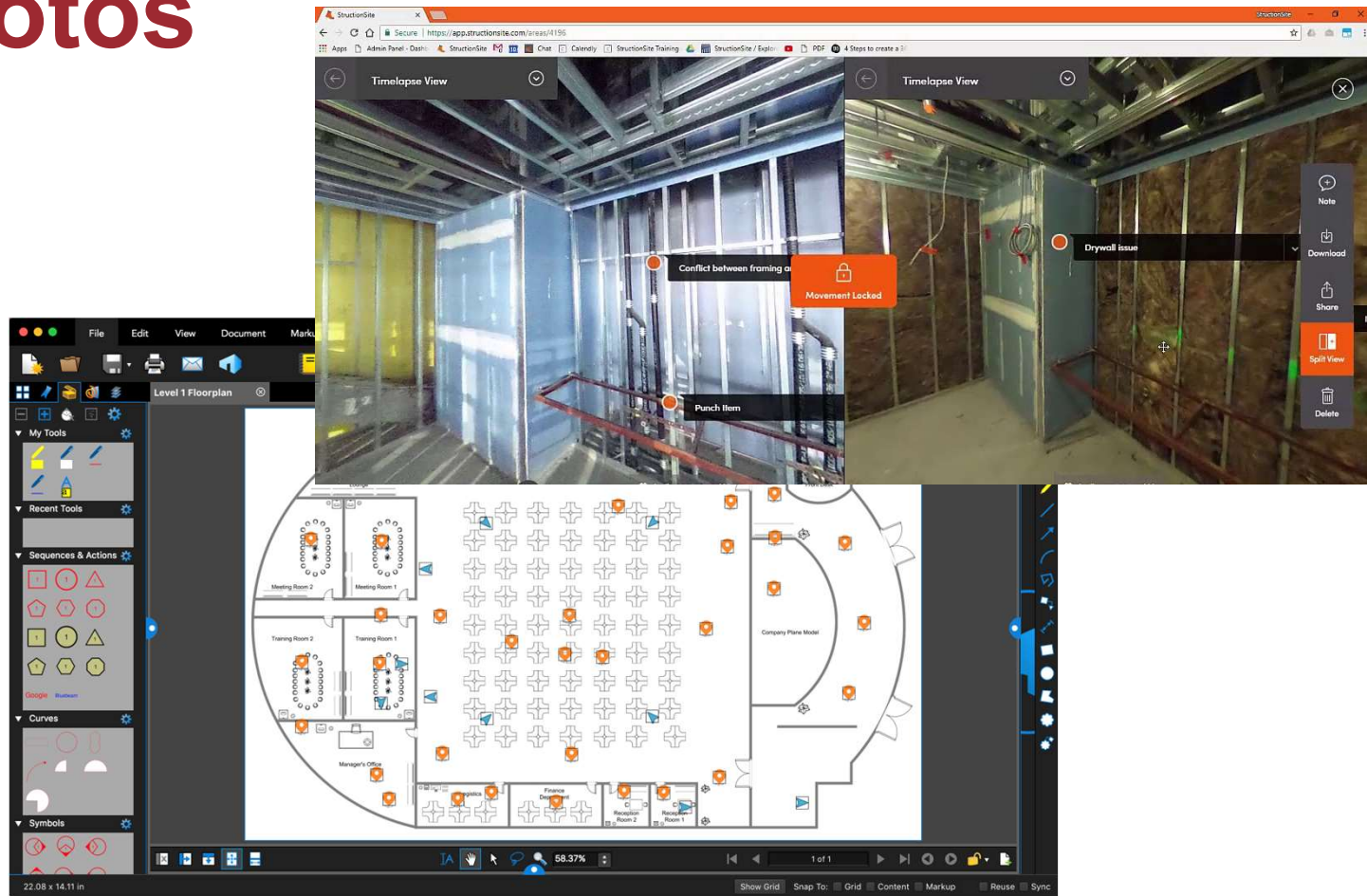
Jobsite Photos



STRUCTIONSITE

HOLBUILDER

OPENSOURCE



You can't measure what you can't see...

40%

of labor on a jobsite is spent on nonproductive activities.

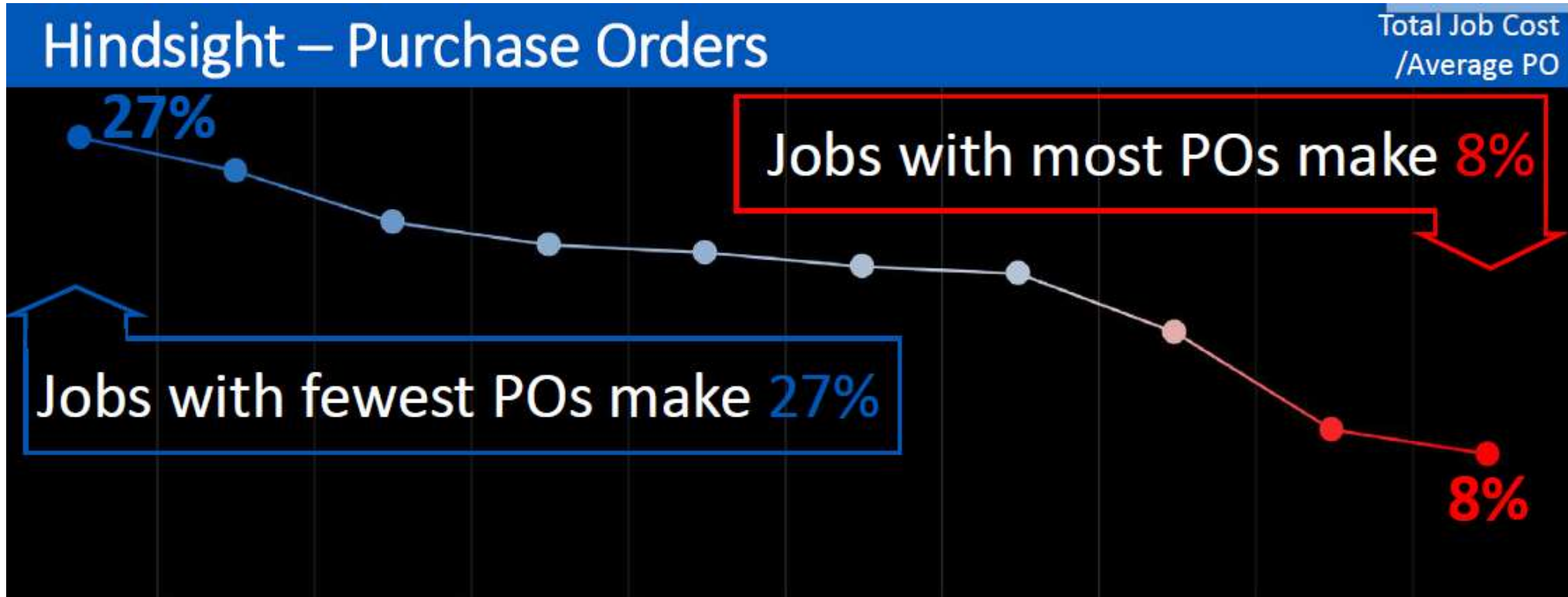
The average cost to process one PO for and EC is \$68

The average foreman spends 8 hours per week managing materials

Digital Procurement



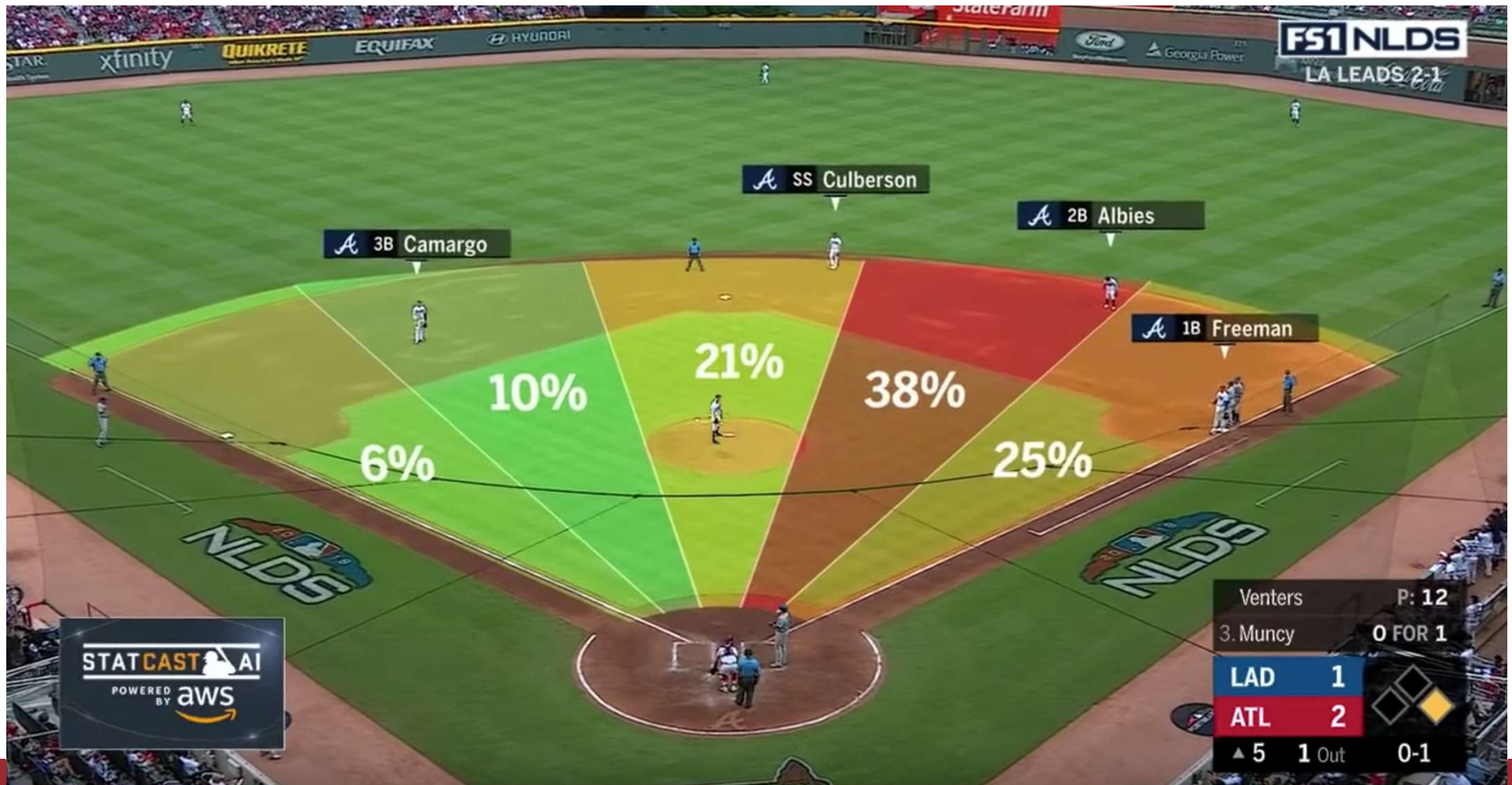
Analytics Driving Your Business



We need to start leveraging the
DATA.



It's all about the Data



Becoming a Moneyball Contractor

What can data do for us in Construction?

- Lower Project Risk
- Accurate Budget Estimates
- Make the Right Choice
- Keep Track & Better Manage

Shift from a Commodity to a Consultant – Opportunity in Building Lifecycle



Key Performance Indicators - are the critical (key) indicators of progress toward an intended result. KPIs provide a focus for strategic and operational improvement, create an analytical basis for decision making and help focus attention on what matters most.

Benchmarking - Benchmarking is a process of measuring the performance of a company's processes against those of another business considered to be the best in the industry, aka "best in class."





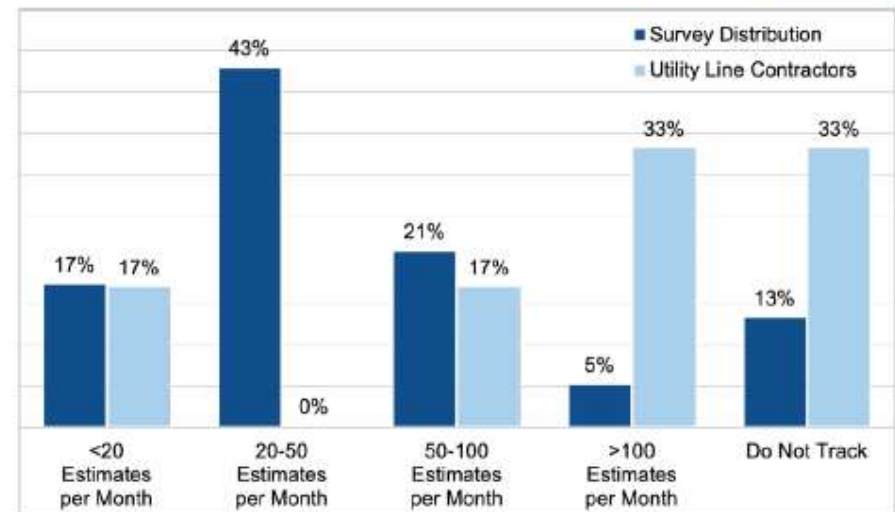
ELECTRI KPIs Research

KPI: Estimate Bid Velocity

Functional Area: Estimating/Detailing/CAD/BIM

Definition	Total number of estimates produced relative to the number of working days for the last 12 months
Calculation	$(\text{Number of Estimates for the last 12 months}) \div (\text{Working days in last 12 months})$
Impact	Tracks Bids Completed per Day – Drives Revenue Growth
Target	Create a historical monthly basis and validate the performance is equal to or higher than historical performance.

KPI Complexity
MEDIUM



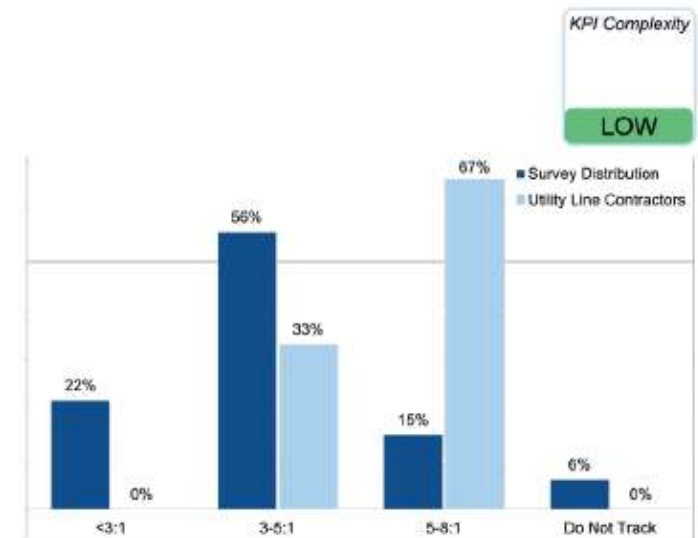


ELECTRI KPIs Research

KPI: Field to Office Ratio

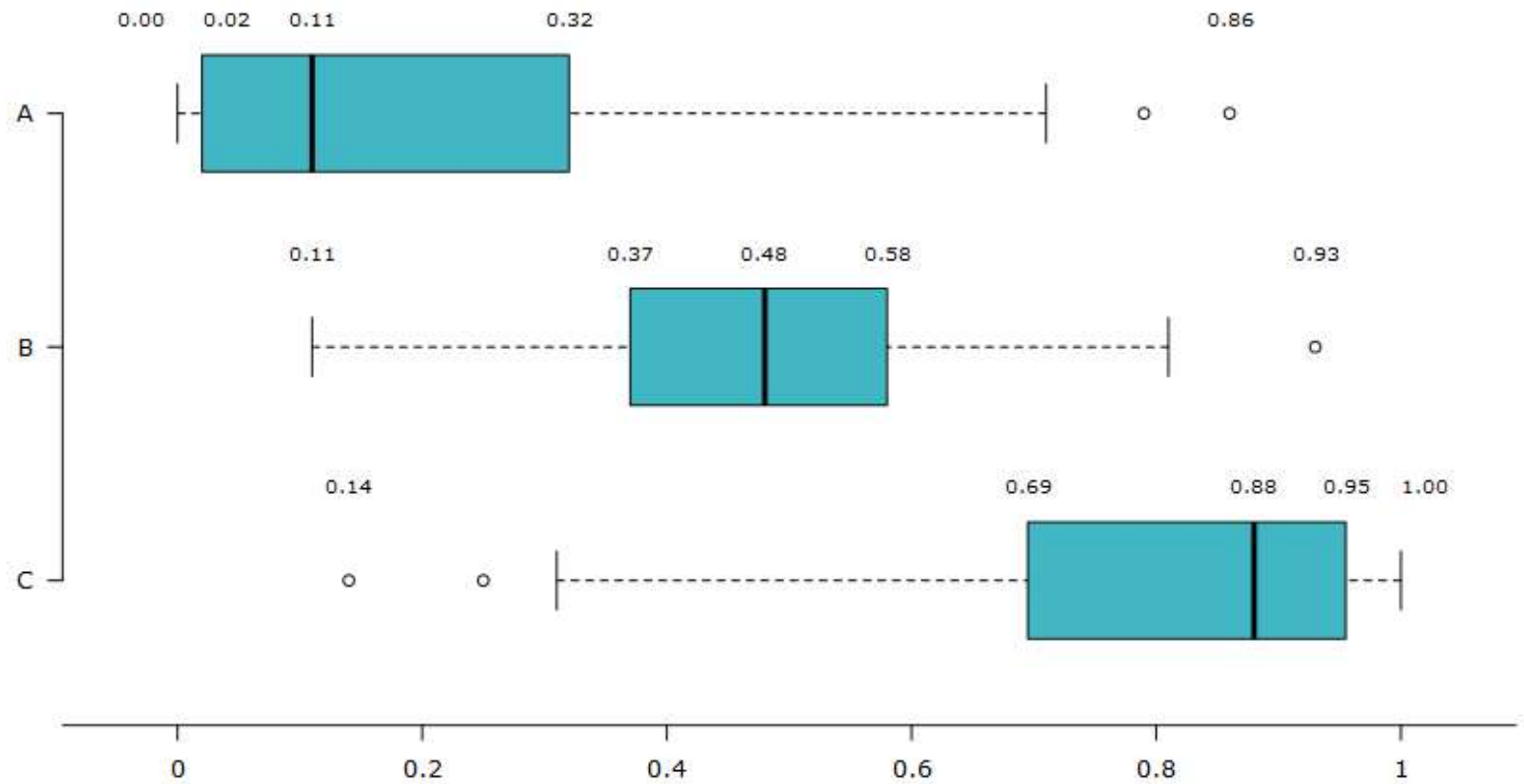
Functional Area: Finance

Definition	How many field employees to supporting office employees
Calculation	Number of Field Employees ÷ Number of Supporting Office Employees
Impact	Cost Reduction/Control
Target	5.5:1 – 8:1

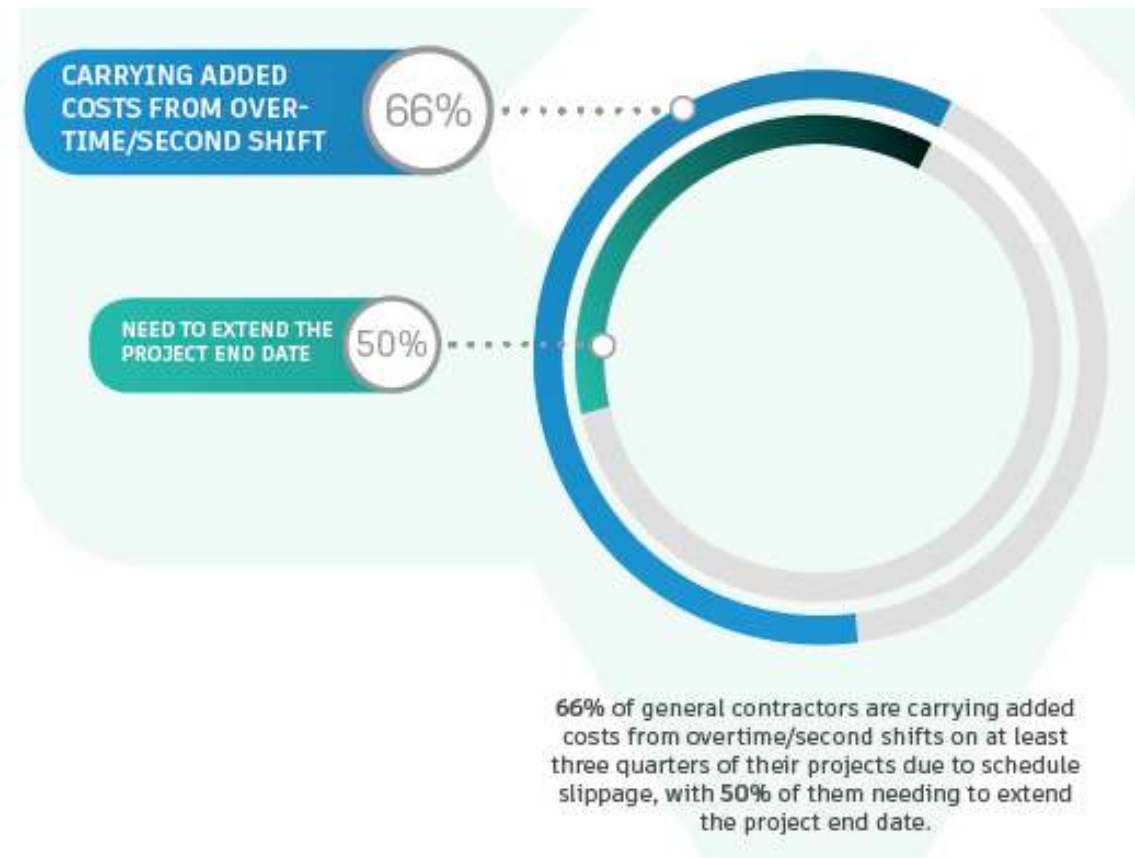
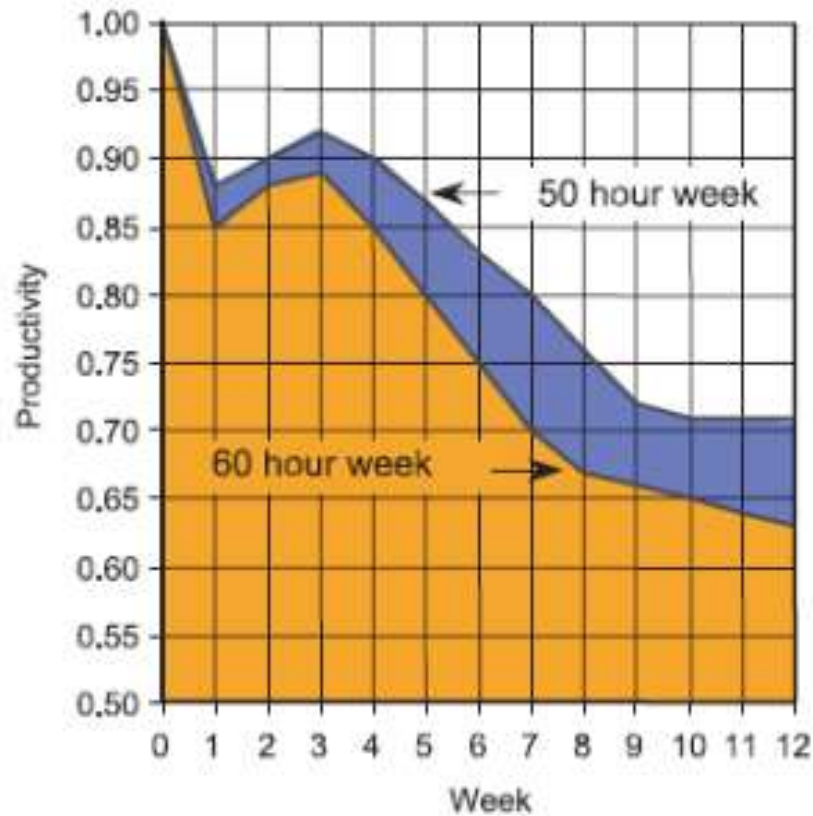




ELECTRI KPIs Research

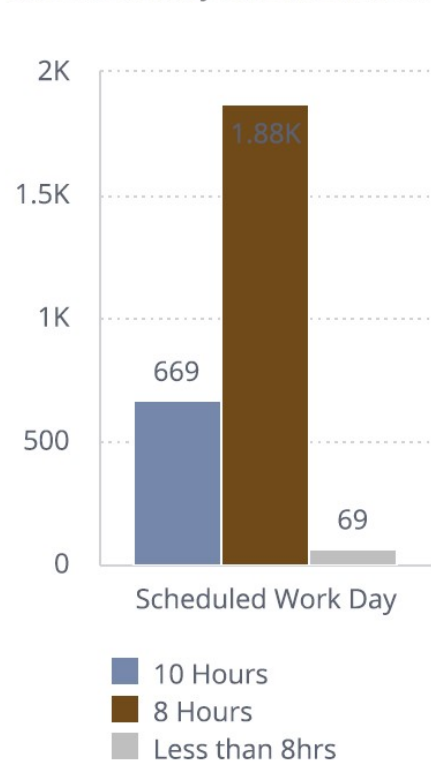


They say the devil is in the details. I believe the margins are in the data.



Dashboards & Analytics

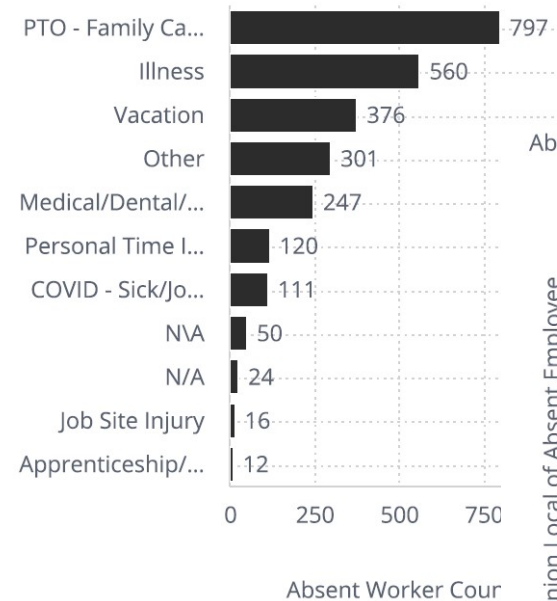
Absenteeism by Scheduled Work Day



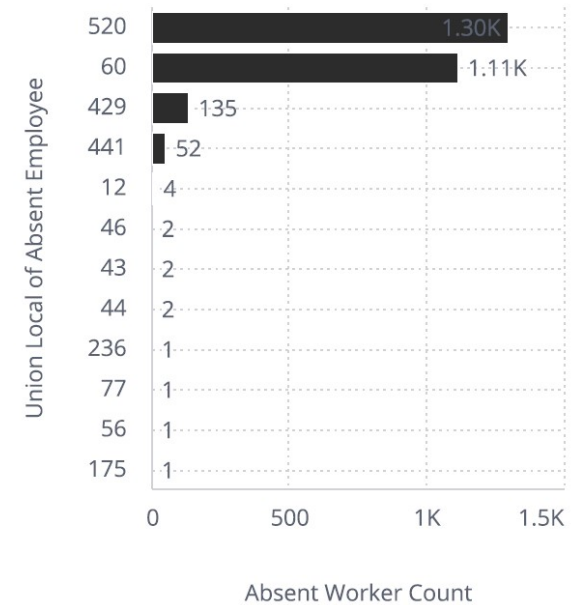
Day of Week Statistics

Day of Week	Attendance Rate
friday	97.71%
monday	96.61%
saturday	100%
thursday	98.37%
tuesday	98.05%
wednesday	98.28%

Absent Worker Count by Reason



Absent Worker Count by Local



Own the Waste

Do you see this as a threat or an opportunity?



The United Rentals' Worksite Performance® platform includes Total Control® a cloud-based worksite management solution that helps you make the most of your equipment fleet—rented and owned.

This comprehensive, integrated suite of tools and services makes it easy to streamline your processes and cut your annual rental costs by up to a third



Shared Market Metrics

Monthly KPI Report (Employer)

Local Union No.: [REDACTED] Email: josh.bone@necanet.org Date: 05/31/2022
Employer: [REDACTED]

Requisitions

(To be completed by Employer)

	Filled	Unfilled	Total Calls
Journeyman			0
Apprentice			0
CW/CE			0

Ratios

Employee Type	Total Labor-Hours	Total Number of Employees
General Foreman		
Foreman		
Journeyman Wireman		
Apprentice		
CW/CE		
Totals	0	0

Attendance (hrs. missed due to absenteeism)

Employee Type	Total Labor-Hours Missed
JW, Foreman, General Foreman	
Apprentices, CW, CE	
Total	0

Turnover

Reason for End of Employment	Total Number of Employees
Quits	
Layoff	
Terminations	
Total	0

Monthly KPI Report (Local)

Local Union No.: [REDACTED] Email: josh.bone@necanet.org Date: 05/31/2022

Labor Pool

Total Journeyman:

Total # of Journeyman	
Total Licensed Journeyman	

Total Laborers By Position and Step:

	1st	2nd	3rd	4th	5th	6th
Apprentices						
CW's						
CE's						

Total Available for Employment:

Total # of Journeyman	
Total Licensed Journeyman	

	1st	2nd	3rd	4th	5th	6th
Apprentices						
CW's						
CE's						

Attrition & Acquisitions

(To be completed by the Local Union, JATC and/or Employer)

	Total
Retirement	
Left trade or bargaining unit work	
New bargaining employees	



Local/Chapter Bid Tracking

- Project Name
- Bid Close Date / Project Start Date
- Market Sector – Commercial, Multifamily, Hospitality, Healthcare, Institutional, Industrial, Mission Critical, Manufacturing, Warehousing, Retail
- Location
- Public or Private
- Client
- Project Value
- Project Type – DBB, DB, CM at Risk, IPD
- Pre-Qual?
- Market Recovery Project
- Successful Bidder – Signatory, Non-Union
- Did a NECA Contractor submit bid? If not, why?

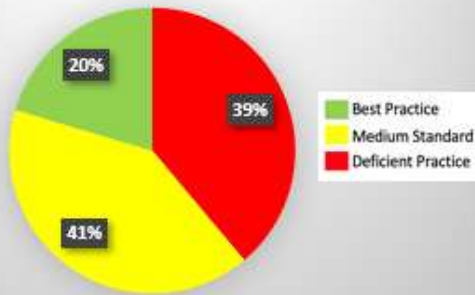


Ongoing Research

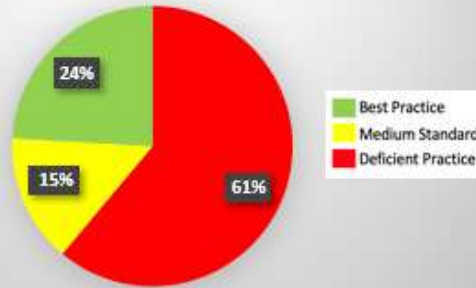
- Growing Trade Partners Use of Lean Construction
- Determine the Impact of Support & Culture on Contractors Bottom Line
- Pre-Development of an Electrical Contracting Industry Career-Mapping Tool
- CMMC – Training and Education
- Outside the Gate Research
- Change Order Guide
- Continuous Improvement Research



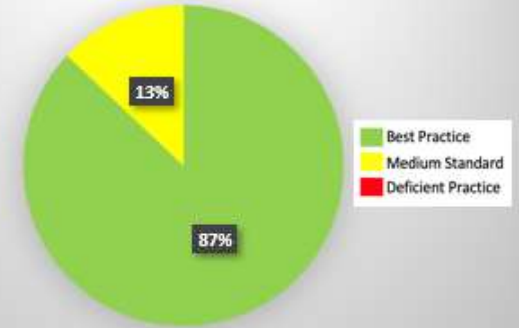
Indemnification - General Obligations



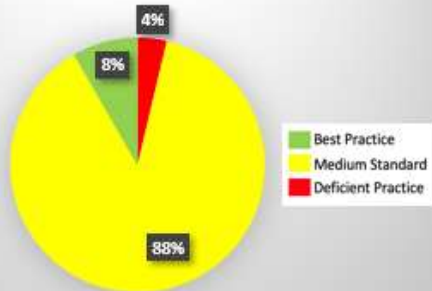
Pay If/When Paid



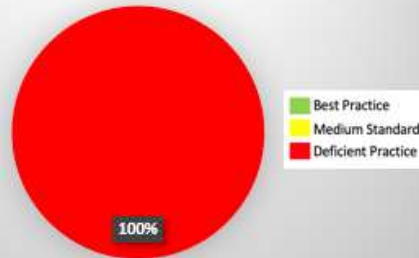
Contractor Right to Stop Work



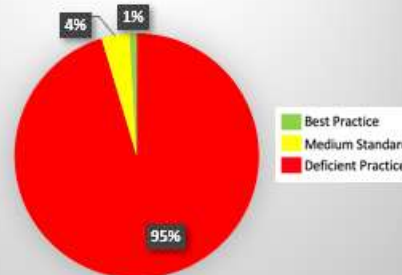
Subsurface Conditions



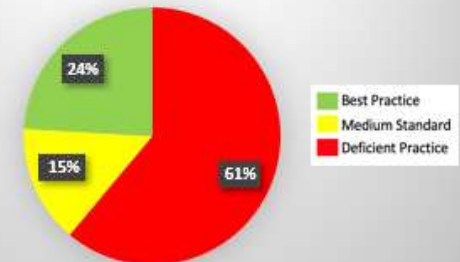
Overall/Aggregate Caps on Liability



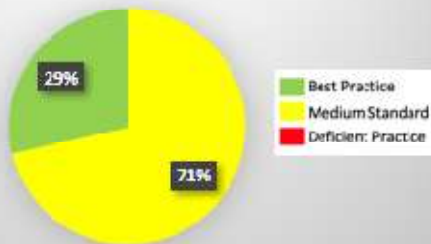
Liquidated Damages



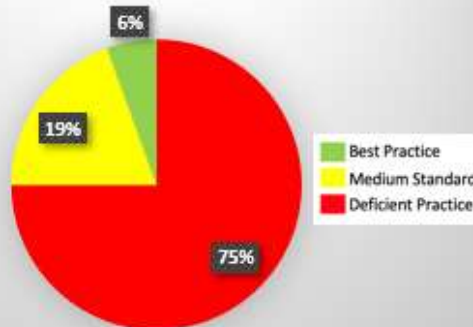
Pay If/When Paid



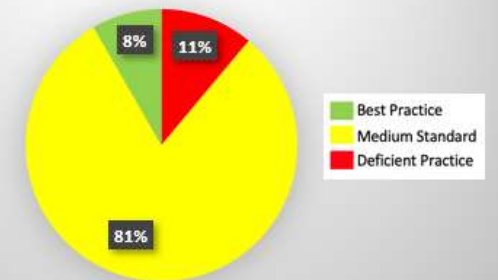
Delays: Compensation, Remedies and/or Limitations



Hazardous Materials - Responsibilities



Design Responsibility



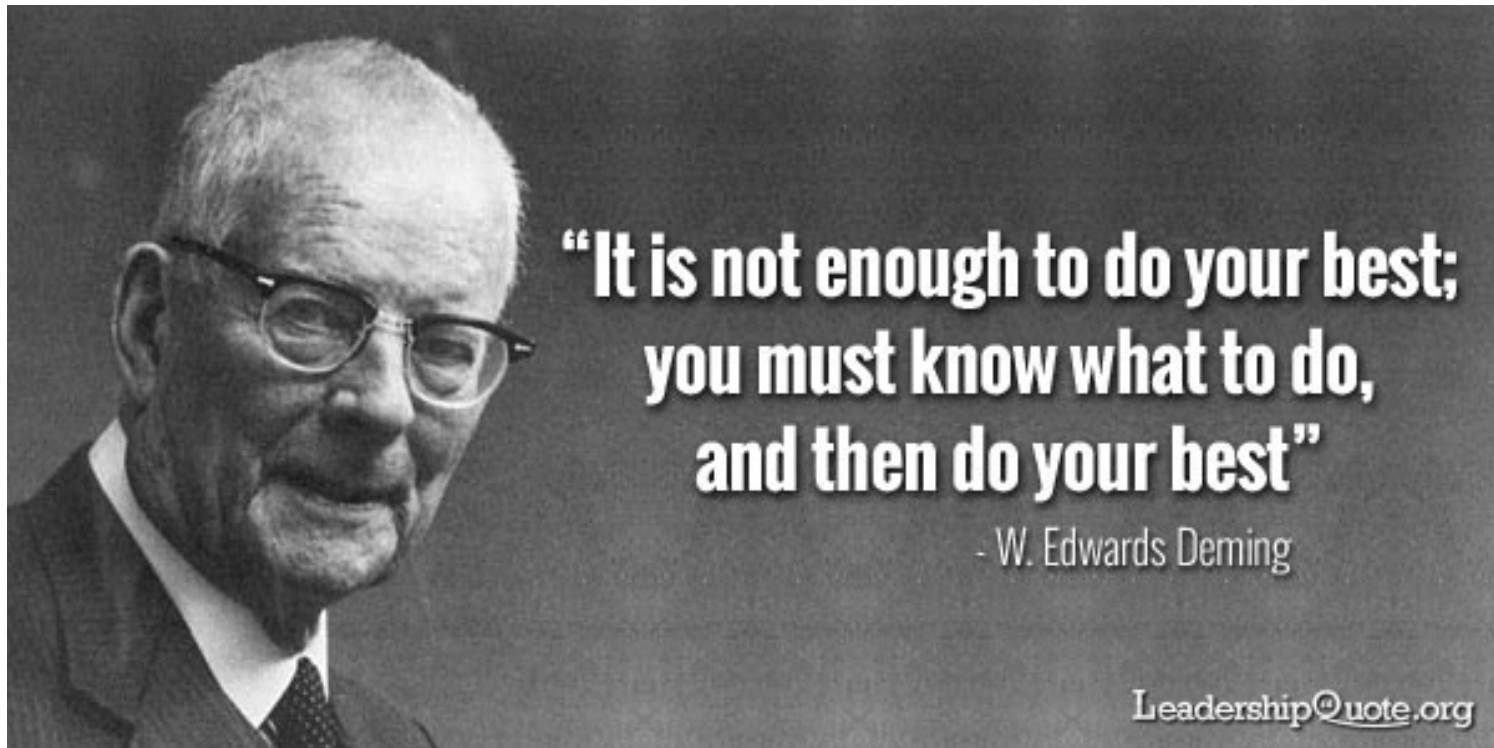
1. Pay if Paid

- a. Best Practice: There is no requirement or condition whereby payment to the Contractor by the Owner must occur before payment to the Subcontractor. In other words, there is no condition of payment to the Subcontractor.
- b. Medium Practice: There is a condition whereby the Contractor is to be paid by the Owner before being required to pay the Subcontractor, however this falls short of a strict pay if paid clause (i.e., a strict condition precedent does not exist within this framework, or there exists a clause providing that if the Owner doesn't pay within a reasonable time, through no fault of the Subcontractor, then Contractor must pay).
- c. Deficient Practice: A strict pay-if-paid clause exists in that there is an absolute condition precedent to the Subcontractor's right to be paid if and until the Contractor is paid by the Owner.



Edward Deming

It is not necessary to change. Survival is not mandatory.





Josh Bone
Executive Director, ELECTRI
josh.bone@electri.org

Q&A