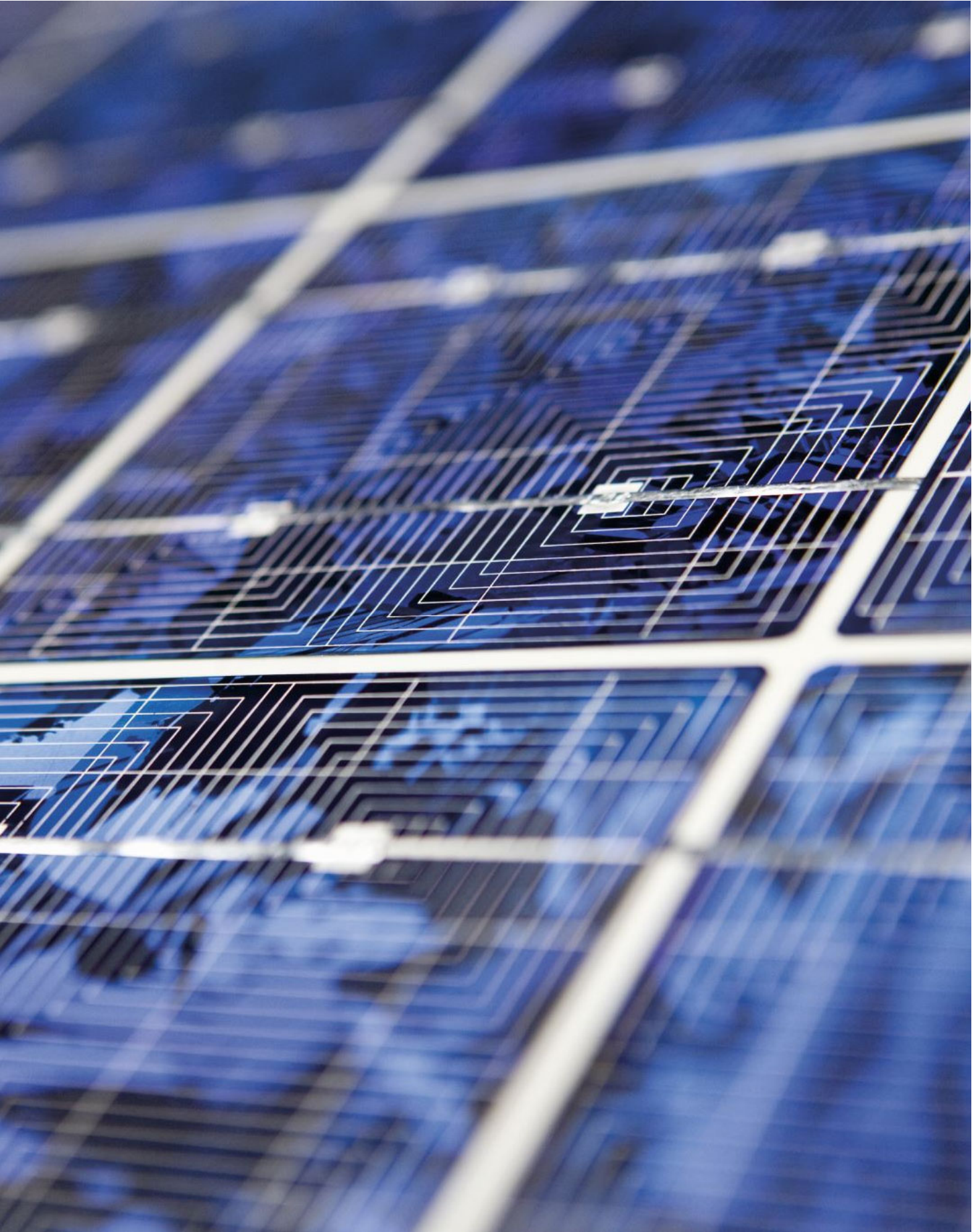




ELECTRICAL CX  
NEED FOR A PROPER CX PLAN  
AND CX SPECIFICATIONS  
FOR A SUCCESSFUL PROJECT



# HISTORICAL CX VS. TODAY'S ELECTRICAL NEEDS

## HISTORICALLY

- CX HAS BEEN LED BY MECHANICAL GROUPS (ASHRAE, AABC)
- MOSTLY FOCUSED ON HVAC SYSTEMS IN BUILDINGS
- MOST ELECTRICAL CX WAS LIGHTING CONTROLS

## TODAY

- ELECTRICAL SYSTEMS ARE MORE COMPLEX AND AUTOMATED
- MORE MISSION CRITICAL FACILITIES REQUIRING RELIABLE/REDUNDANT POWER SOURCES
- FOCUS ON EFFICIENT AND RENEWABLE OF POWER SYSTEMS

# ELECTRICAL SYSTEMS CX IS NOT JUST...

- JUST A GOOD DESIGN
- SPECIFYING THE “RIGHT” EQUIPMENT
- TURNING ON A CIRCUIT AND CALLING IT GOOD
- METERS READING CORRECTLY
- PROTECTIVE DEVICES SET PROPERLY
- PERFORMING NETA ACCEPTANCE TESTING
- SAFE OPERATION AND ARC FLASH MITIGATION



# ELECTRICAL SYSTEMS CX IS...



ADHERENCE TO OWNER'S PROJECT REQUIREMENTS  
(OPR)



THIRD-PARTY VERIFICATION OF INSTALLATION PER DESIGN,  
LOCAL CODES AND STANDARDS, AND MANUFACTURER'S  
RECOMMENDATIONS



SYSTEMATIC FUNCTIONAL TESTING OF ALL NORMAL  
OPERATING MODES, SEQUENCE OF OPERATIONS, FAILURE  
SCENARIOS, ALARMS AND INDICATIONS, EMMS, SCADA



VERIFICATION OF SYSTEM PERFORMANCE WITH  
CALIBRATED INSTRUMENTS (PQM, IR SCANS, VIBRATION  
ANALYSIS, ULTRA-SONIC TESTING)



# HOW DO WE ACCOMPLISH THIS?

## CX PLAN

- IDENTIFIES THE STEPS IN THE CX PROCESS
- MEMBERS OF THE CX TEAM (ROLES AND RESPONSIBILITIES, COMMUNICATIONS PROTOCOLS)
- TESTING SCHEMES AND METHODS
- MEASURES OF SUCCESSFUL TESTS

## SPECS

- GIVE SPECIFIC INSTRUCTIONS TO THE CONTRACTORS FOR CX REQUIREMENTS

# TESTIMONIES

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INTEGRATED SYSTEMS INTERACTION CAN CAUSE  
UNEXPECTED OUTCOMES AND REVEAL DESIGN AND  
INSTALLATION FLAWS

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FERRORESONANCE IN CHEYENNE, WY

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-KVAR AT ORLANDO AIRPORT

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RC CIRCUIT NOISE IN AMSTERDAM, NL



DISCUSSION