



# THE FINE ART OF CHAINSAW JUGGLING

TECHNOLOGY, REGULATION AND WORKFORCE FOR THE MODERN CO-OP

NRECA Coop Cyber Tech - Kansas City, MO - May 17, 2021

Former utility staff (telecommunications, water & electric)  
Drafter of NERC CIP standards and formal interpretations  
First NERC CIP auditor in the US  
Former Manager, CIP Audits and Investigations - WECC  
Contributor to NERC/ERO Auditor Manual and Guidance  
NERC SCWG and SITES contributor  
Speaker/contributor to multiple FERC Technical Committees, NOPRs and Orders  
Former Principal Investigator, US DOE National Electric Sector Cybersecurity Organization  
EnergySec Founder, Former Director, Former Instructor and President Emeritus  
SANS ISC456 Instructor: Essentials for NERC Critical Infrastructure Protection  
US Coordinator, Centro de Ciberseguridad Industrial (CCI)  
Instructor, Cyber Information Security Leader (CISL), CSA CPH  
Cybersecurity Advisory Team for State Solar, NARUC/NASEO  
National Telecommunications and Information Administration (NTIA) and Idaho National Lab (INL)  
Software Bill of Materials (SBOM) Energy POC Stakeholders  
DOE Solar Energy Technology Office (SETO) and National Renewable Energy Lab (NREL) Industry  
Advisory Board (IAB) for the Securing Solar for the Grid (S2G)  
Advisor to multiple industrial hardware and software vendors  
GCIP, CISA, CRISC, CISSP-ISSAP, SSCP, NSA-IAM, CVI, TCP, SCP





**Is this your first  
Co-op Cyber  
Tech event?**

**Who is a  
Distribution-only  
utility?**





# Who has Distribution & Transmission or Generation?

**Who is from the  
operations or  
engineering  
side?**





**Who is from the  
IT or business  
side?**

**Who is from the  
management  
strata?**







**Who has  
security in their  
job description  
(written or  
implied)?**

**Who is from  
compliance?**





**Who has all the  
resources they  
need for  
security?**

**Who has all the  
resources they  
need for  
compliance?**





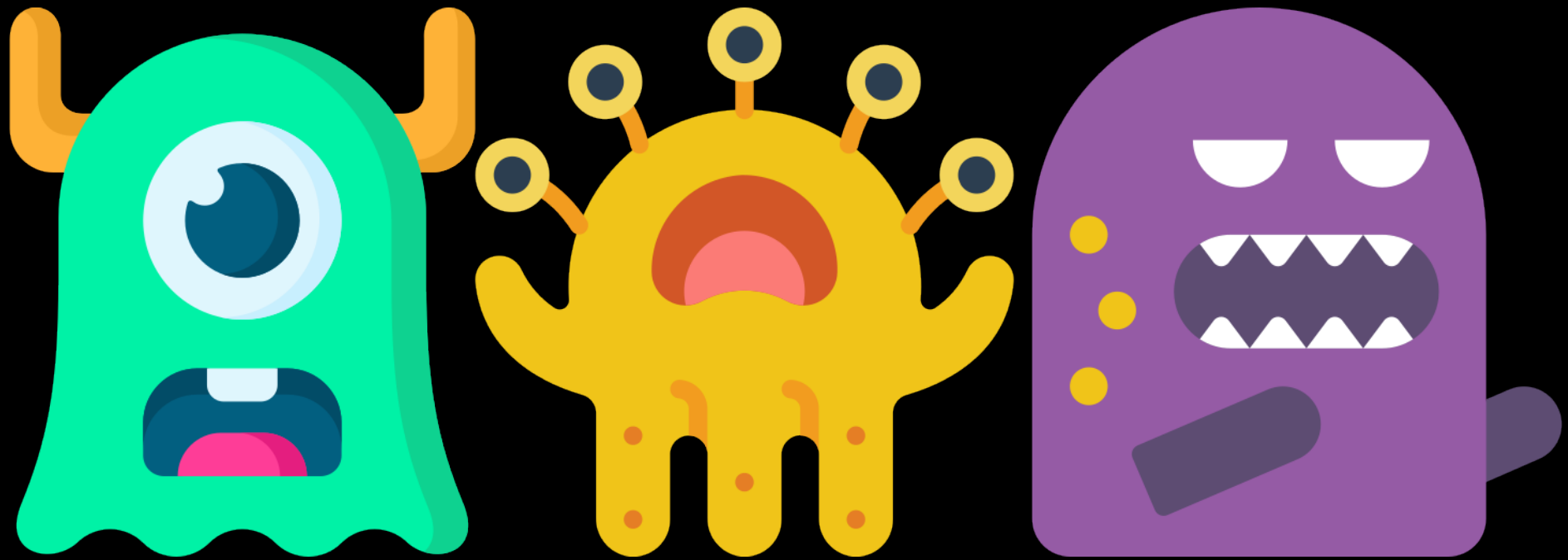
**Who has all the  
training budget  
they need for  
security and  
compliance?**

**Who has been  
in their current  
role for less  
than 1 year?**





**Who is just  
raising their  
hand to make  
the questions  
go away faster?**



**Technology Regulation Workforce**





# WARNING

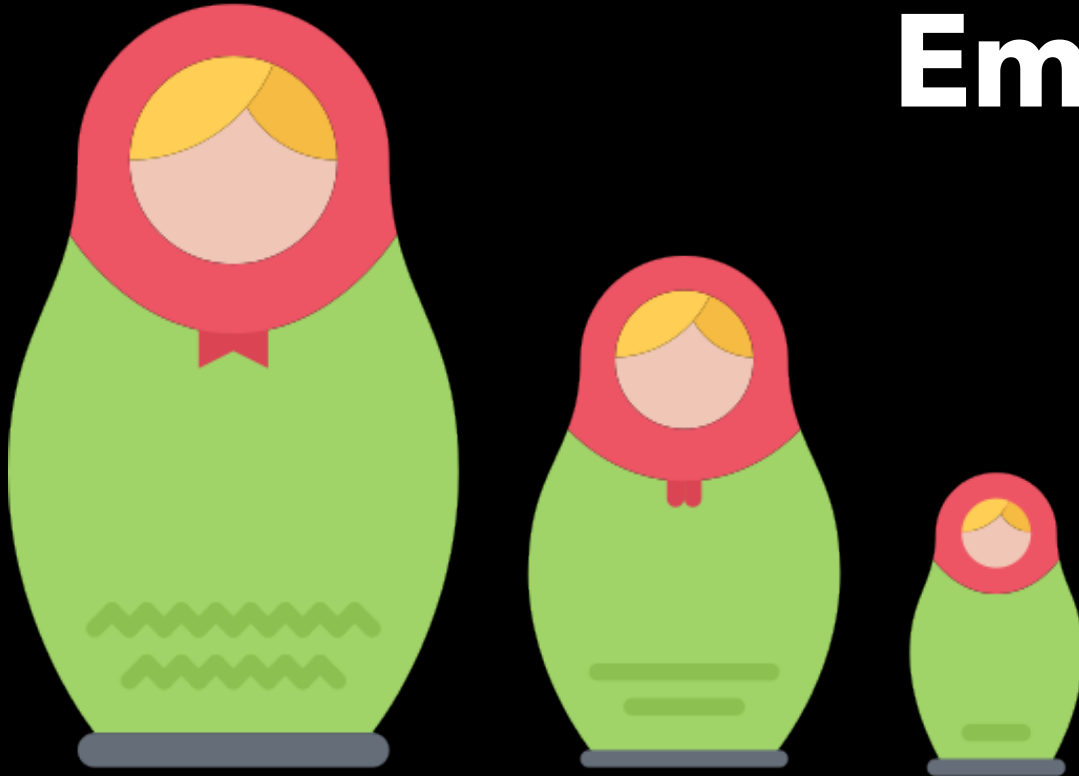


**When everything  
is important  
nothing is  
important**

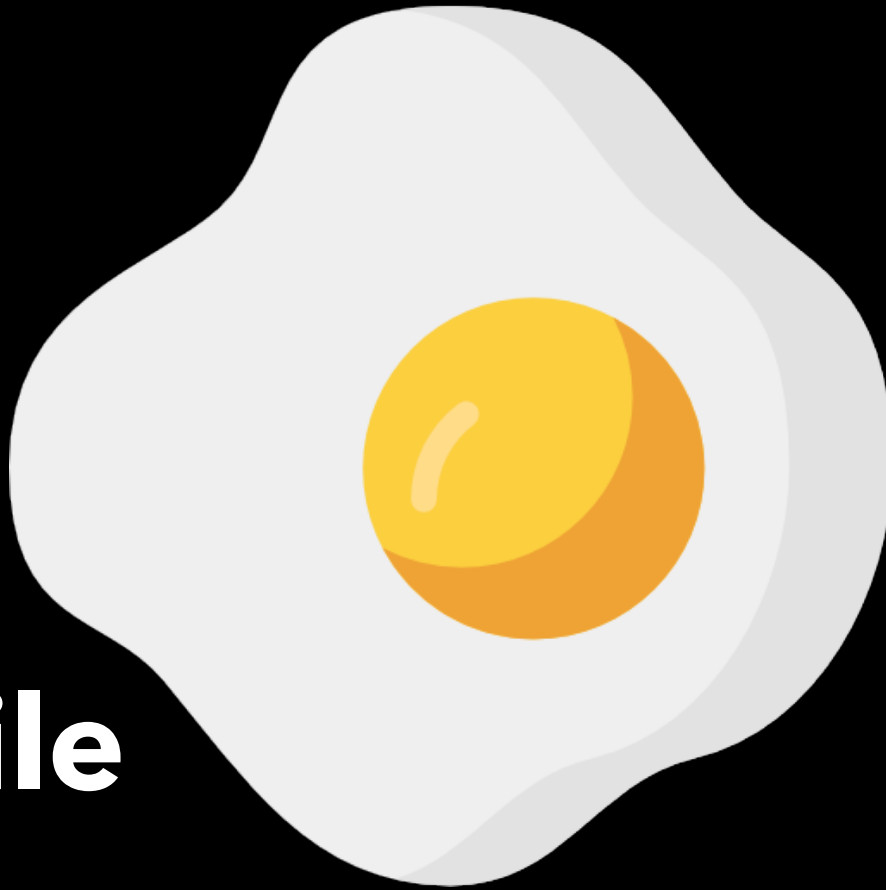


# Technology

# Embedded



**Fragile**





# Connected



# Exposure



# Infinite Stack

# Dependence







# Innovation

# Invisible

**DER, DERMS, DOMS, ADMS**  
**Inverter Based Resources**  
**Battery Storage**  
**OMS/SCADA**  
**INSM**

**Zero Trust**  
**Work From Anywhere**  
**Advanced Analytics**  
**Data Is Money**  
**Cloud Operations**

# Regulation





**NERC**



**Extra-NERC**

**INSM**  
**Vendor Remote Access**  
**Physical Security**  
**Virtualization**  
**BCSI**

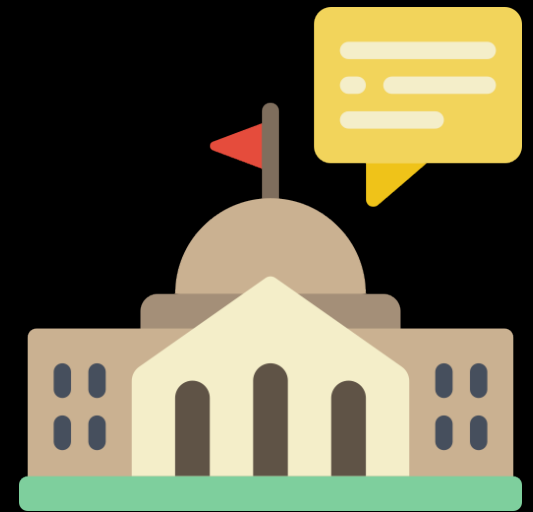


# High/Medium/Low Inverter Based Resources





**National Cyber Strategy**  
**National Security Memo**  
**Executive Orders**  
**DHS CISA CPGs**  
**NIST CSF**



# NIST 800 Special Pubs

ES-C2M2

CMMC

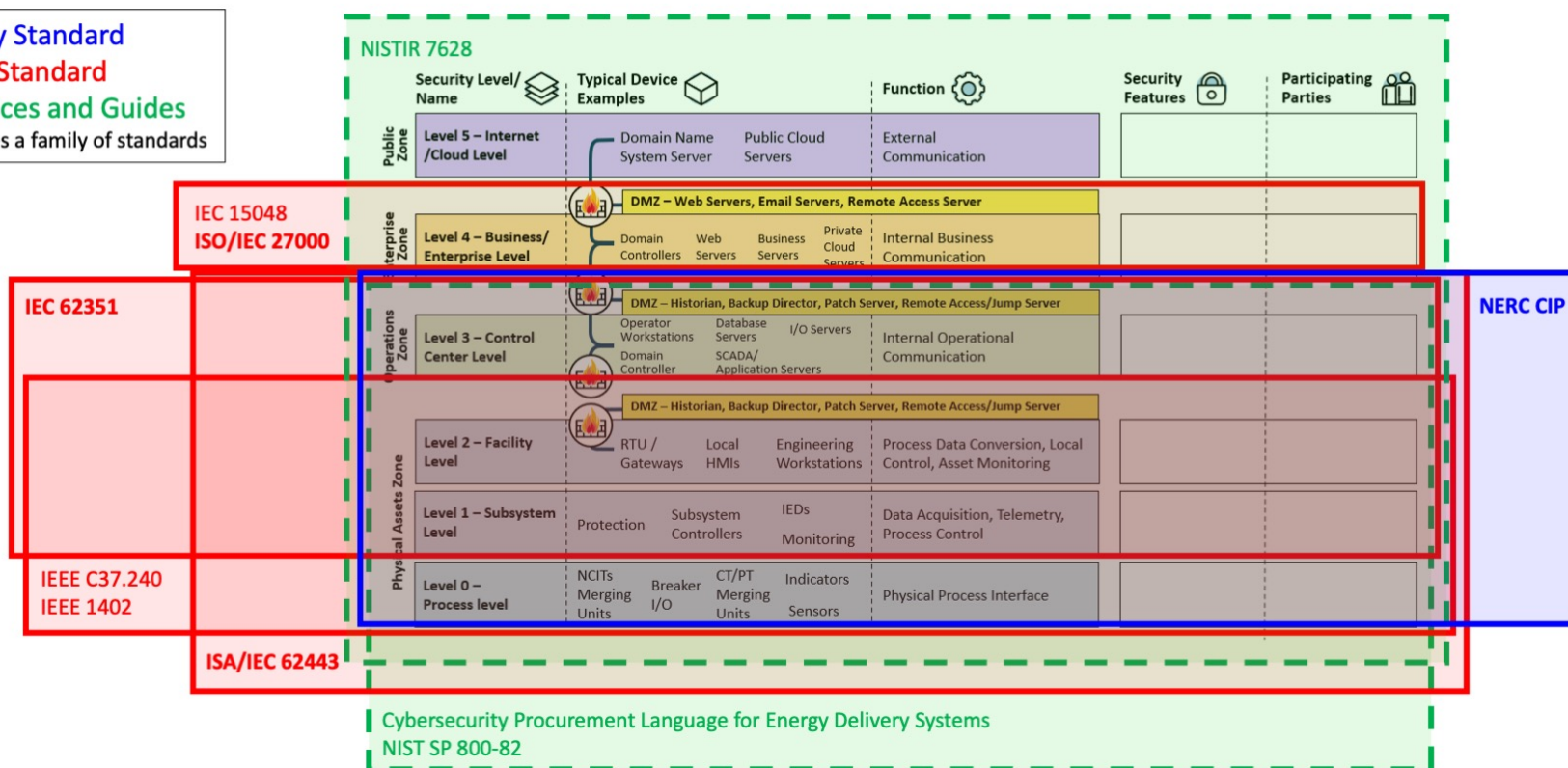
NIS 2

CRF



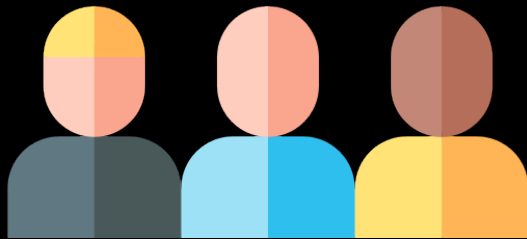
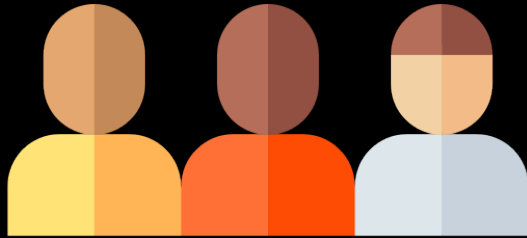
# Asset Owner-Operator Standards overlaid on Generic Electric Reference Architecture Profile

**Mandatory Standard**  
**Voluntary Standard**  
**Best Practices and Guides**  
**BOLD indicates a family of standards**





# Workforce



**Skills**

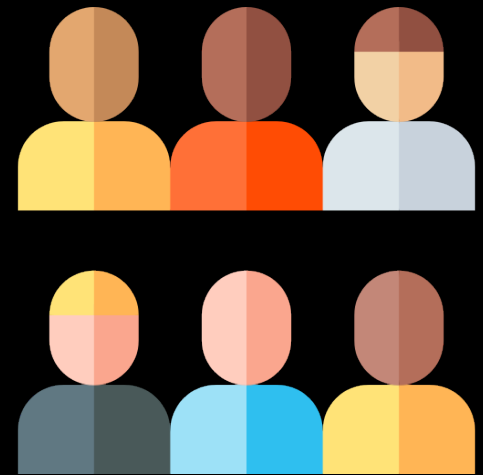


**Budget**



**Mgmt**

**NRECA (of course)  
CS2AI, SANS, CCI  
Internet, YouTube  
Events, CFPs/CTFs  
Time...**



# Market Rates

## FTE vs. Contract

## Tools vs. Person

## Interns

## Grants

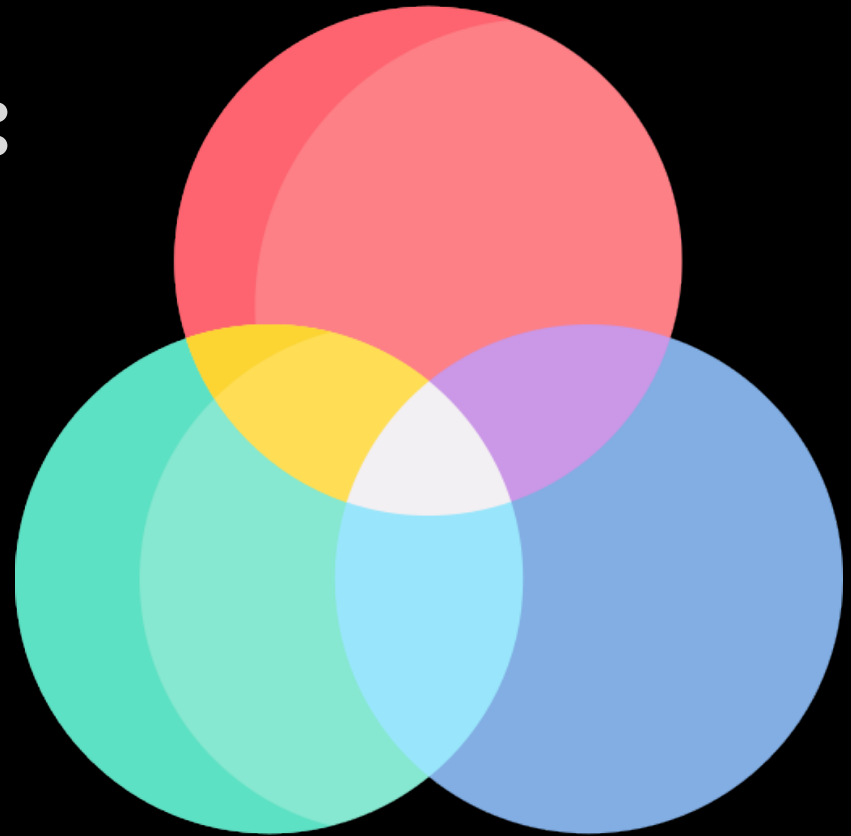


**Nonstandard Everything**  
**New Organizational Units**  
**New Roles**  
**New Keywords**  
**New Pay Scale**





**Brave New World:**  
**Technology**  
**Regulation**  
**Workforce**





**Are you  
Ready?**

**Go.  
Seriously.  
Things will move fast.  
Grab your jetpack.**

**We got this.**



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