# Designers Lighting Forum

## POWER LINE COMMUNICATION

GREG GALLUCCIO

Date

LEDucation®

Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

This course is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

---

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

# Learning Objectives

At the end of the this course, participants will be able to:

1. Understand how power line technology works
2. Know the advantages of using power line communication technology for lighting control
3. Understand the problems solved by PLC technology and recognize suitable applications
4. Know the current limitations in the state-of-the-art

# Definition:  Networked Lighting Control

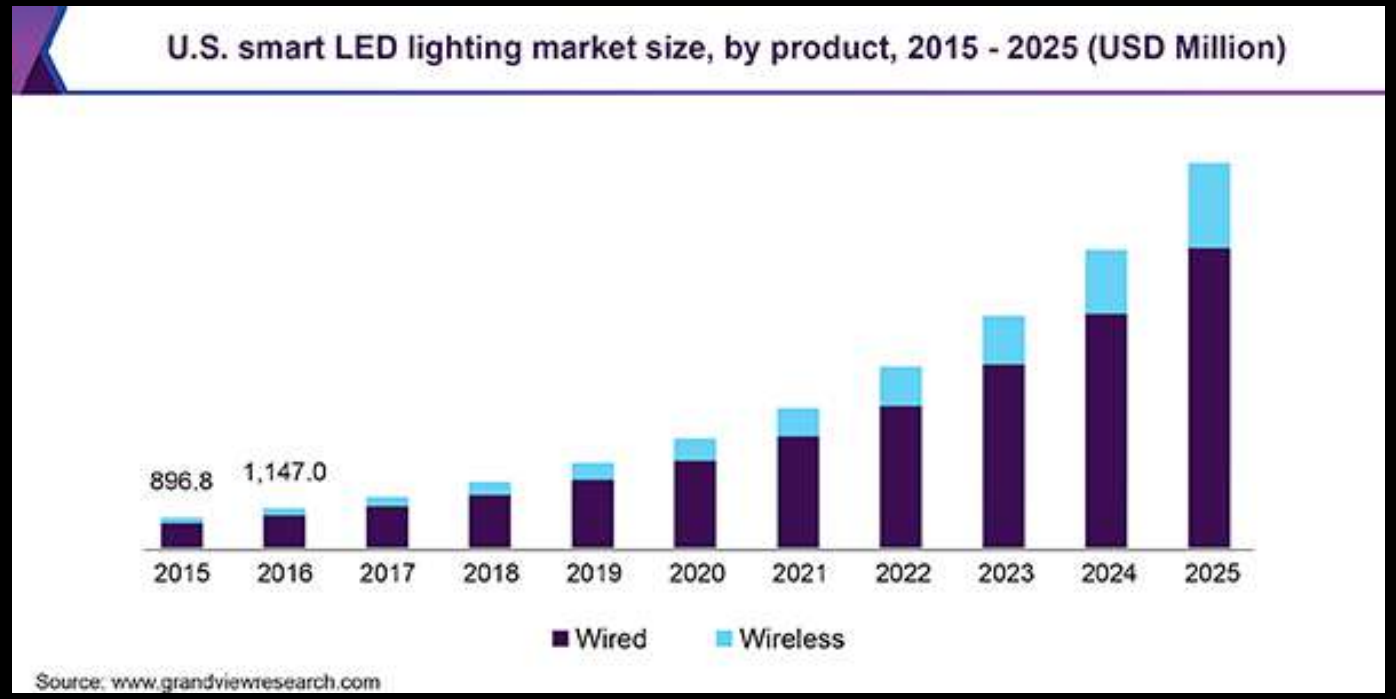
A system of of lights, sensors, controllers and other components that are interconnected for the purpose of sophisticated intelligent lighting control

"Smart Lighting"

LEDucation

Sales of Commercial Networked Lighting Controls

# POTENTIAL → Actual



LEDucation®

# Four Continuous Challenges

1. Complexity / User Interface /Commissioning

LEDucation®

# Four Continuous Challenges

## 2. Cost and ROI

- Redundant Power Supplies
- Recouping Development Costs
- Post Sales Service

LEDucation®

# Four Continuous Challenges

3. Inter-operability

LEDucation

# Four Continuous Challenges

## 4. Reliability and Security

LEDucation®

# TYPES OF NETWORKED LIGHTING CONTROL

Wired
- 0-10V Dimming
- DALI
- DMX
- Phase Cut Dimming
- Power Over Ethernet

Wireless
- Zigbee
- Bluetooth (BLE)
- WiFi
- Cellular

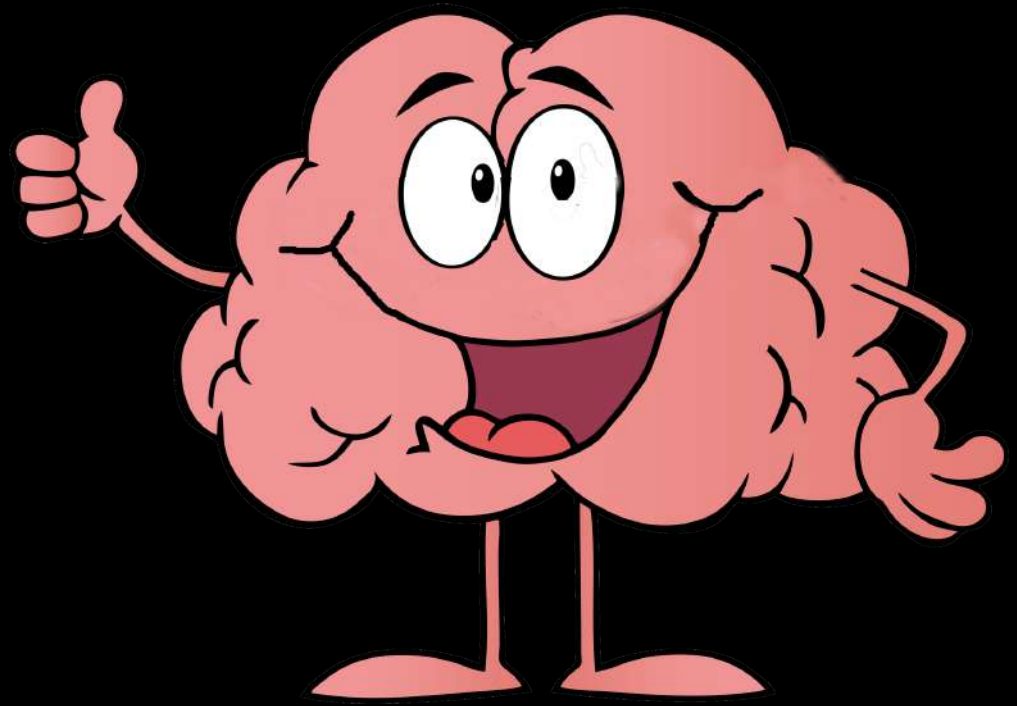
Power Line Communication (PLC)

Hybrid

CHALLENGES:
1. Complexity
2. Cost
3. Inter-Operability
4. Reliability/Security

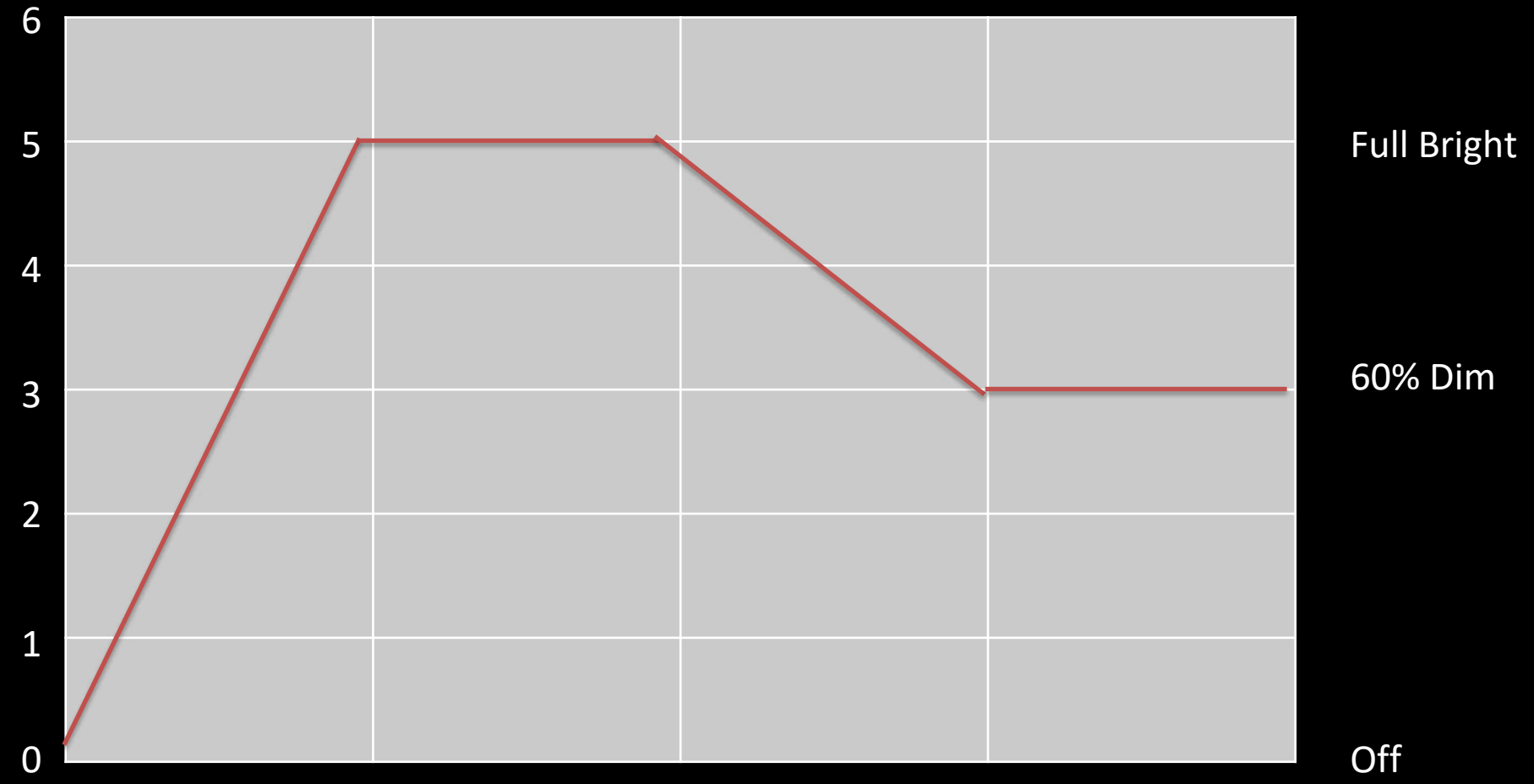
LEDucation®

# Faucets and Brains

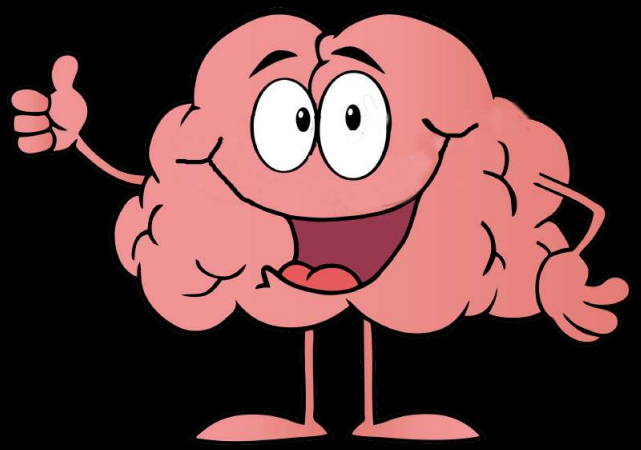


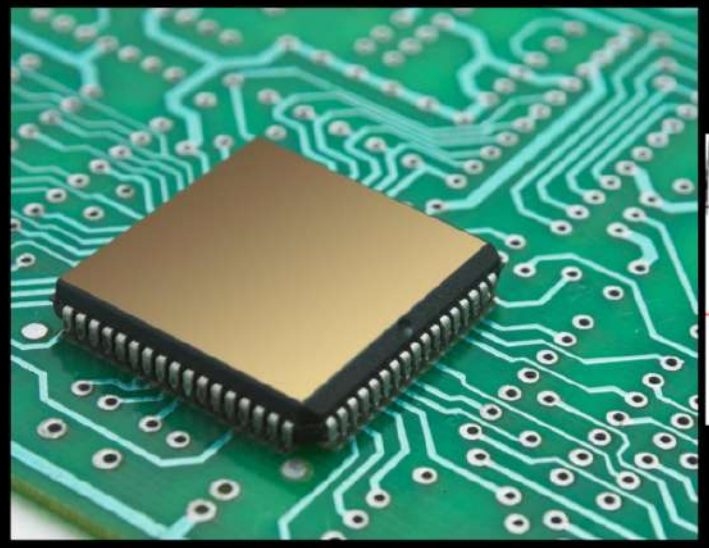
LEDucation®

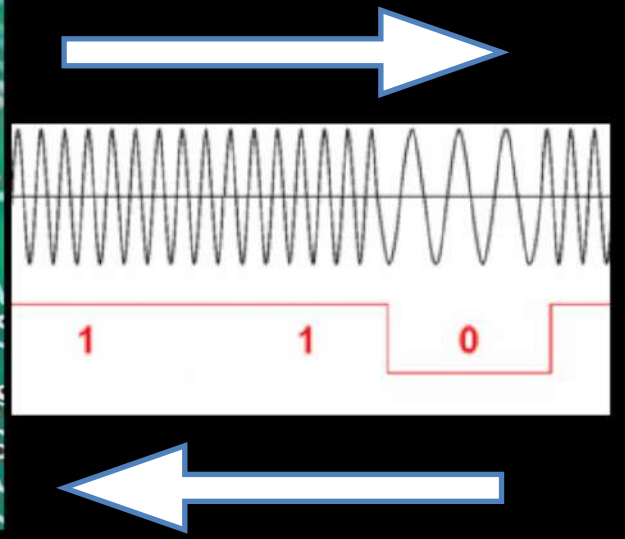
LED Current
(Ma)



LEDucation®







# CHALLENGES AND LIMITATIONS

## WIRED SYSTEMS

0-10 Volt Dimming
DALI

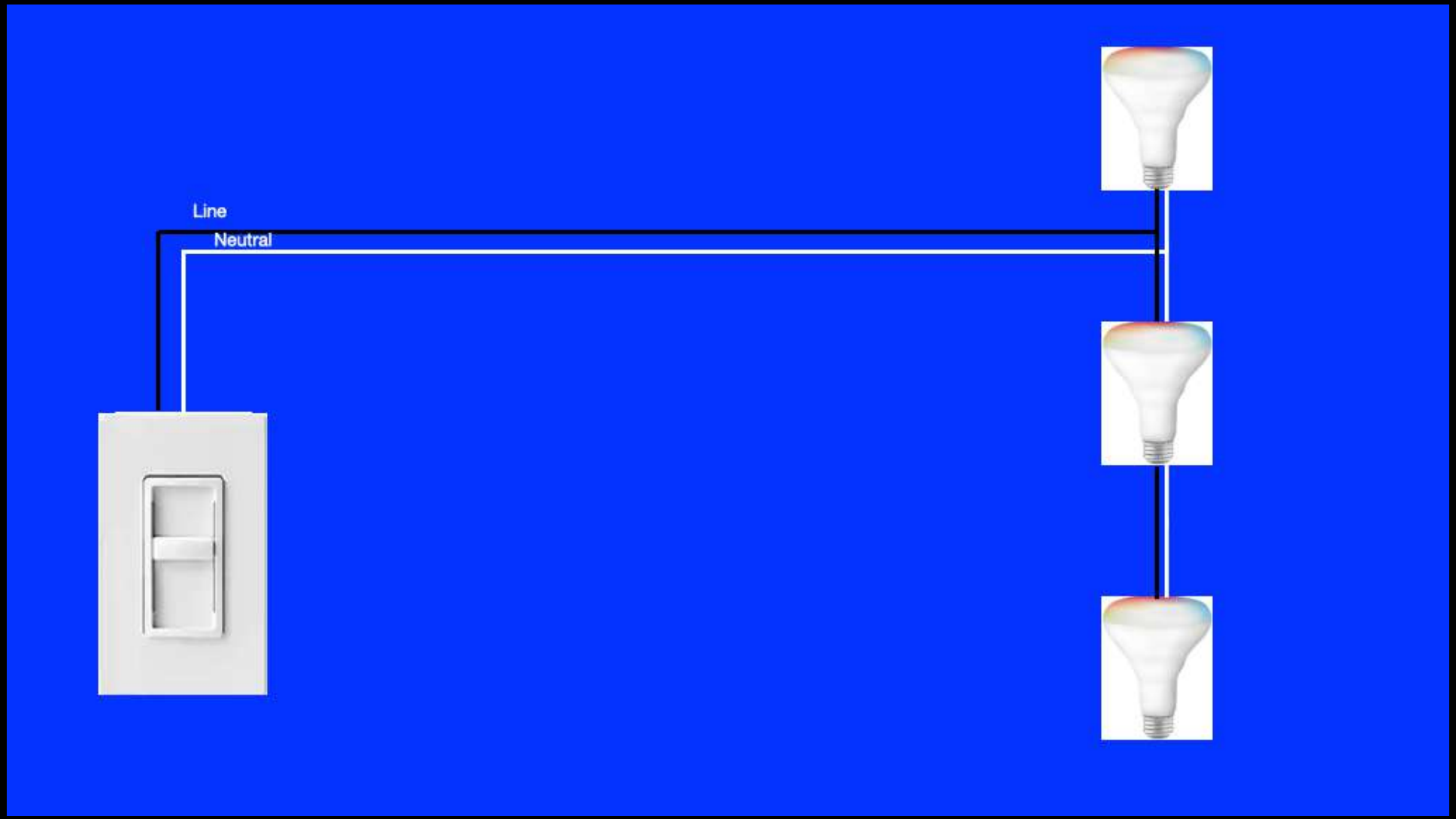
Power Over Ethernet

Cost of Wiring
Limited Capability
(Non-messaging)

LEDucation®

A Way Around The Wiring Problem:

Go Wireless!




leducation.org

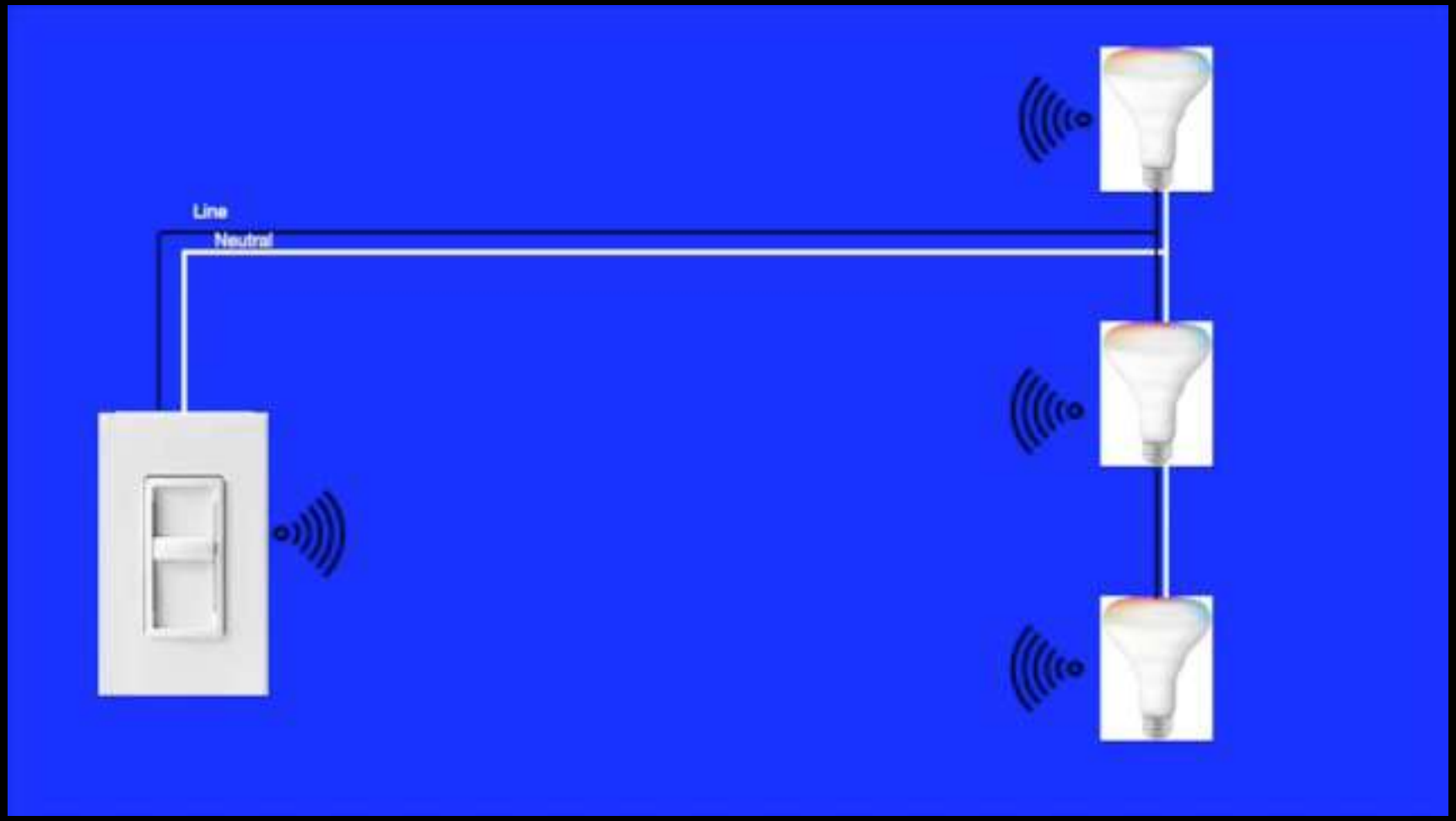
LEDucation®

# CHALLENGES AND LIMITATIONS

WIRELESS SYSTEMS

Reliability
Security
(Subject to Hacking)

LEDucation®




leducation.org

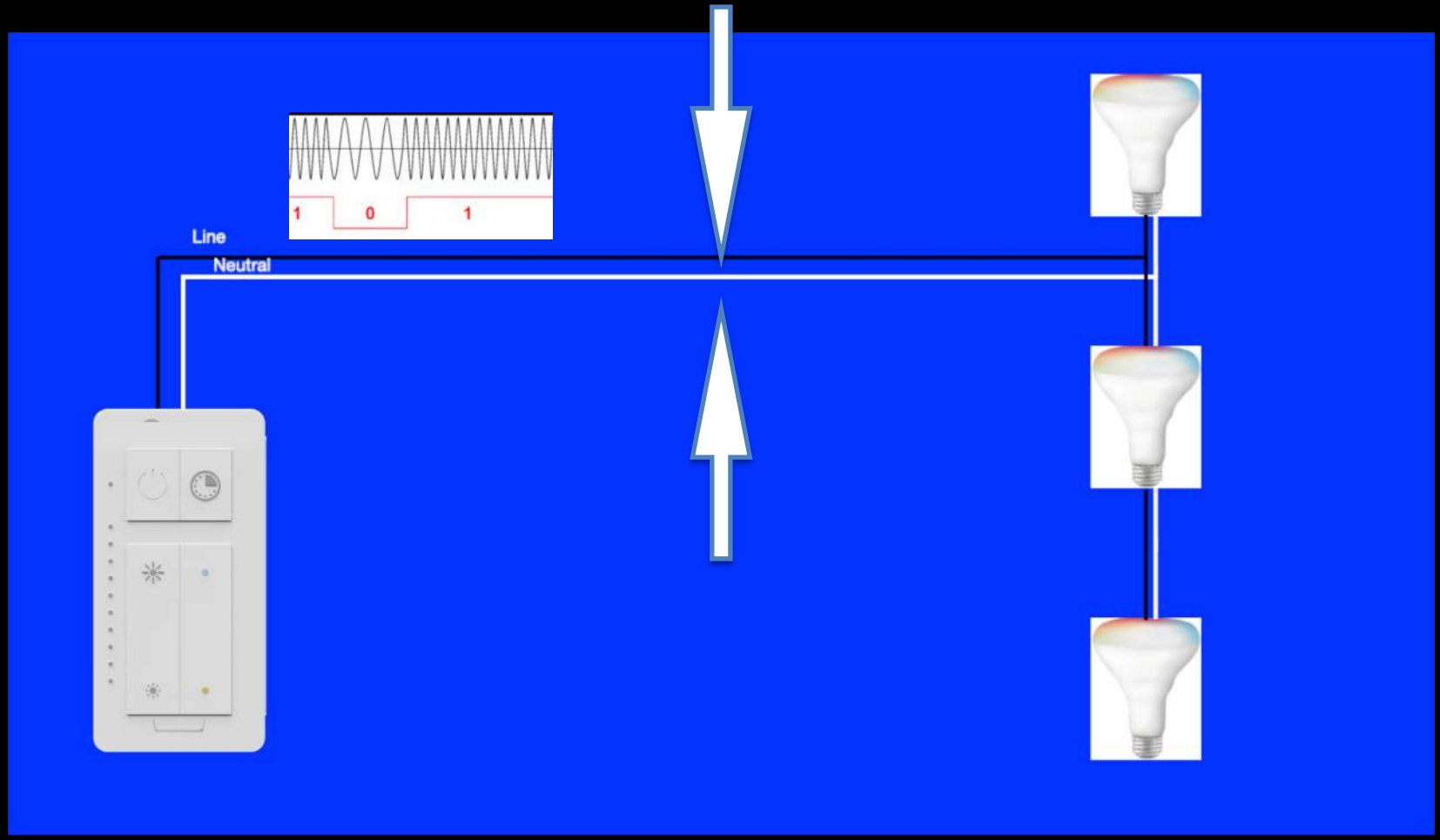
LEDucation®

# What's The Solution?


leducation.org

LEDucation®

# POWER LINE COMMUNICATION




leducation.org

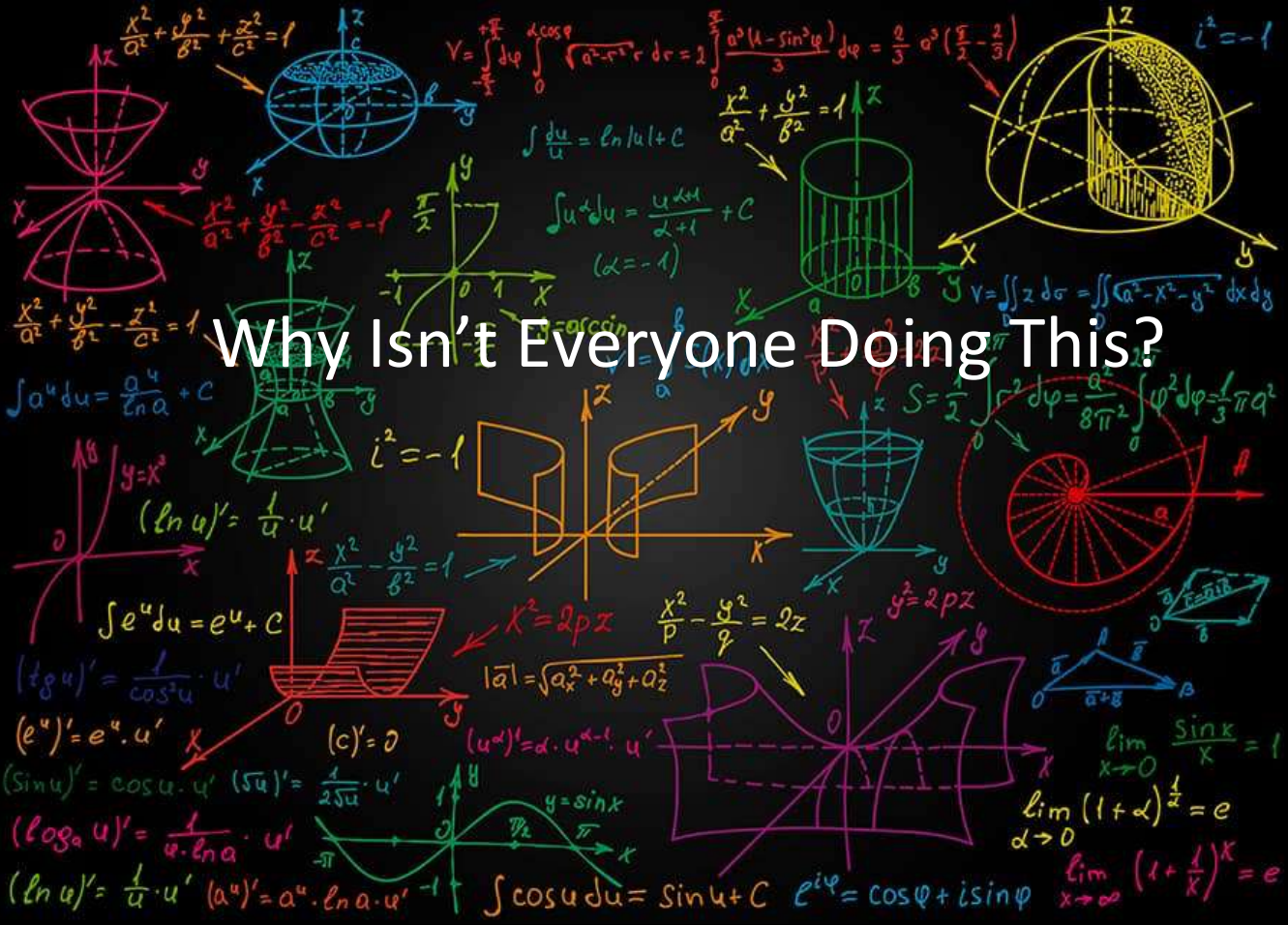
# BENEFITS

Reliability
Security
Interoperability
Cost



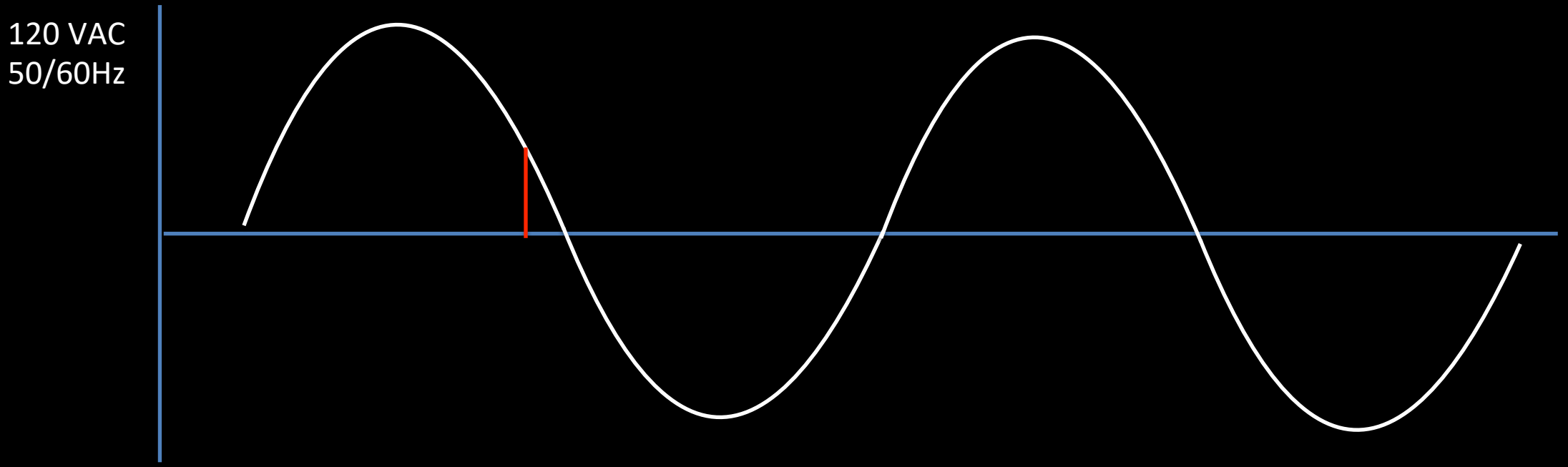
LEDucation®

# POWER LINE COMMUNICATION

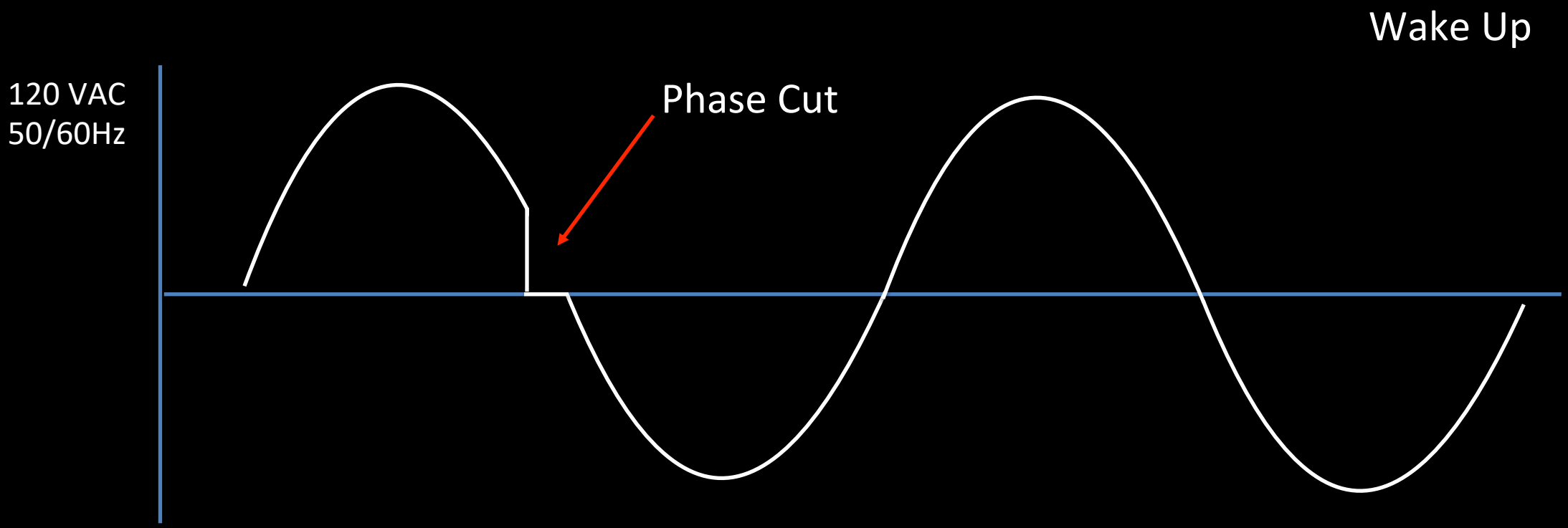



- “Dirty” power
- Blockages
- Cost

# How Does It Work?

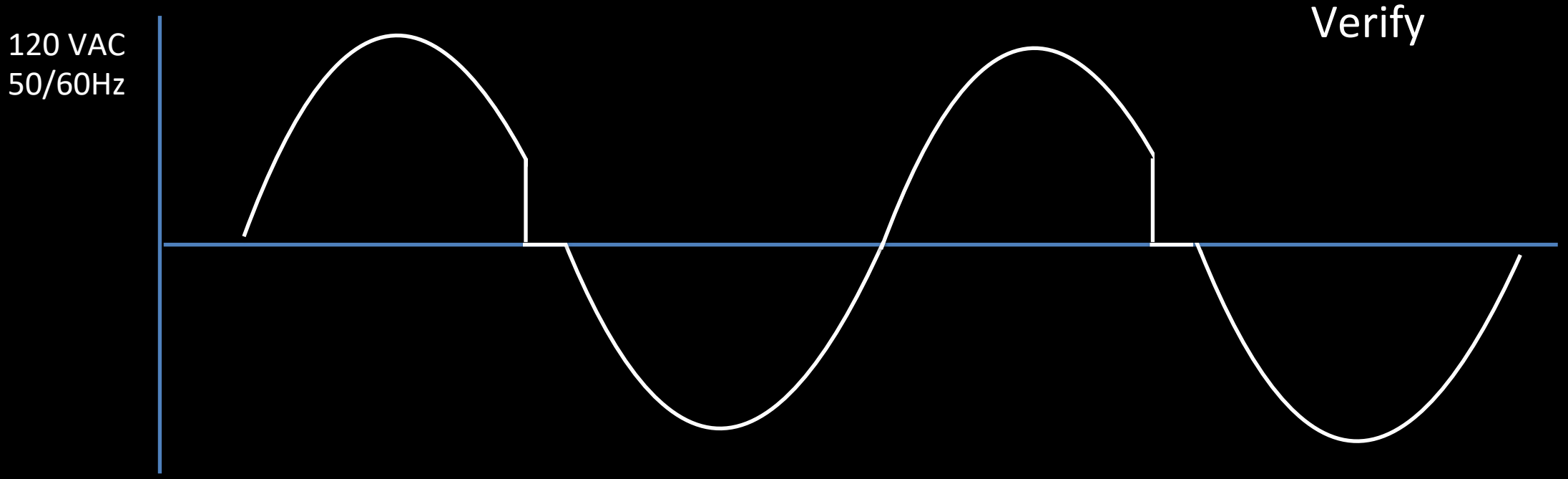


# How Does It Work?



LEDucation®

# How Does It Work?

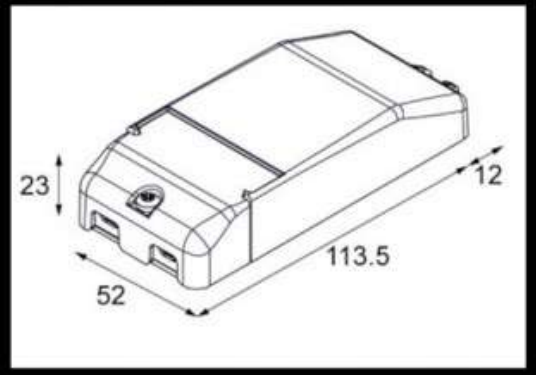


# BENEFITS

Reliability
Security
Interoperability
Cost



# Inter-Operability



# LIMITATIONS/CHALLENGES

Speed


Bandwidth


Physical Barriers

# APPLICATIONS

Concrete Construction and Other Prohibitive Wiring Areas

LEDucation®

# APPLICATIONS

High Security Areas

Prisons

Government Buildings

LEDucation®

# APPLICATIONS

Areas with high levels of electromagnetic interference

# APPLICATIONS

Tricky Control Problems

LEDucation®

leducation.org

This concludes The American Institute of Architects Continuing Education Systems Course

leducation.org