

Self Healing Distribution Grid

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Self Healing Distribution Grid

- What is a “Self Healing” grid?
- EISA, DOE goal and funding alignment
- How do we apply Self Healing to existing distribution systems?
- Characteristics of a Modern Self Healing Grid
- Smart Grid Application Support
- Systems in California
- Q&A



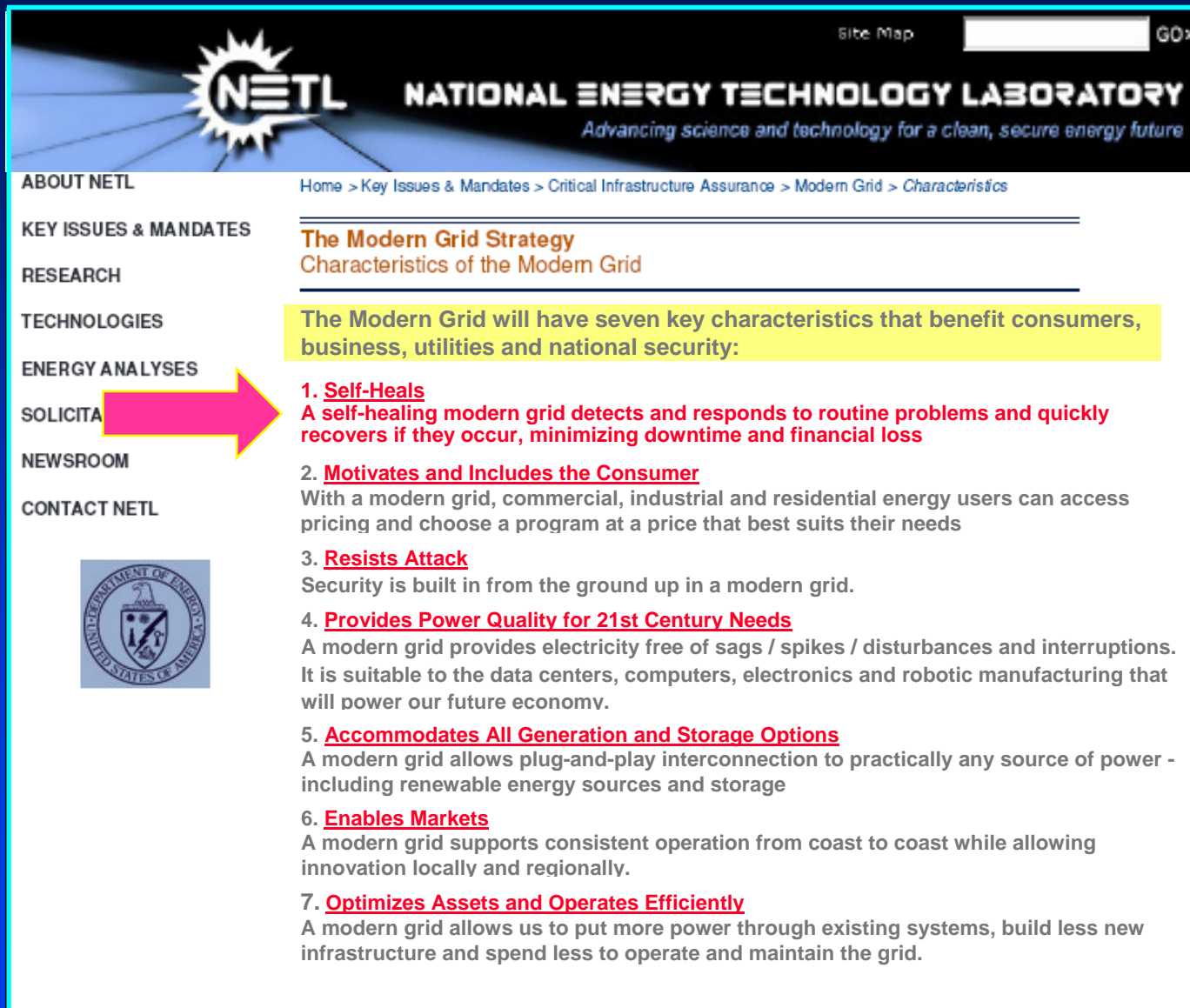
Self Healing Distribution Grid

What is it?

- Term used to describe a system that does not have a “single point of failure”
- As applied to radial distribution circuits
- “Advanced Distribution Automation”
- Fault Locating Isolation and Restoration (FLISR)



Self Healing Distribution Grid



Site Map GO

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Advancing science and technology for a clean, secure energy future


ABOUT NETL Home > Key Issues & Mandates > Critical Infrastructure Assurance > Modern Grid > Characteristics

KEY ISSUES & MANDATES **The Modern Grid Strategy**

RESEARCH Characteristics of the Modern Grid

TECHNOLOGIES

ENERGY ANALYSES


SOLICITATION 

NEWSROOM

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The Modern Grid will have seven key characteristics that benefit consumers, business, utilities and national security:

- 1. Self-Heals**
A self-healing modern grid detects and responds to routine problems and quickly recovers if they occur, minimizing downtime and financial loss
- 2. Motivates and Includes the Consumer**
With a modern grid, commercial, industrial and residential energy users can access pricing and choose a program at a price that best suits their needs
- 3. Resists Attack**
Security is built in from the ground up in a modern grid.
- 4. Provides Power Quality for 21st Century Needs**
A modern grid provides electricity free of sags / spikes / disturbances and interruptions. It is suitable to the data centers, computers, electronics and robotic manufacturing that will power our future economy.
- 5. Accommodates All Generation and Storage Options**
A modern grid allows plug-and-play interconnection to practically any source of power - including renewable energy sources and storage
- 6. Enables Markets**
A modern grid supports consistent operation from coast to coast while allowing innovation locally and regionally.
- 7. Optimizes Assets and Operates Efficiently**
A modern grid allows us to put more power through existing systems, build less new infrastructure and spend less to operate and maintain the grid.



Self Healing Distribution Grid

EISA

S-1306 – Matching Grants

- Qualifying Investments:
 - Manufacture of High Efficiency Appliances
 - Modifying special equipment, e.g. motors
 - Utility installment of Smart Grid enabled T&D infrastructure
 - Purchase / installation of metering and control equipment
 - Software to engage computers in smart grid functions
 - Installation by regional system operator of equipment to coordinate among utilities and regions
 - Non-utility owned DG
 - Devices to allow a vehicle to engage in smart grid functions (excluding storage costs)



Self Healing Grid

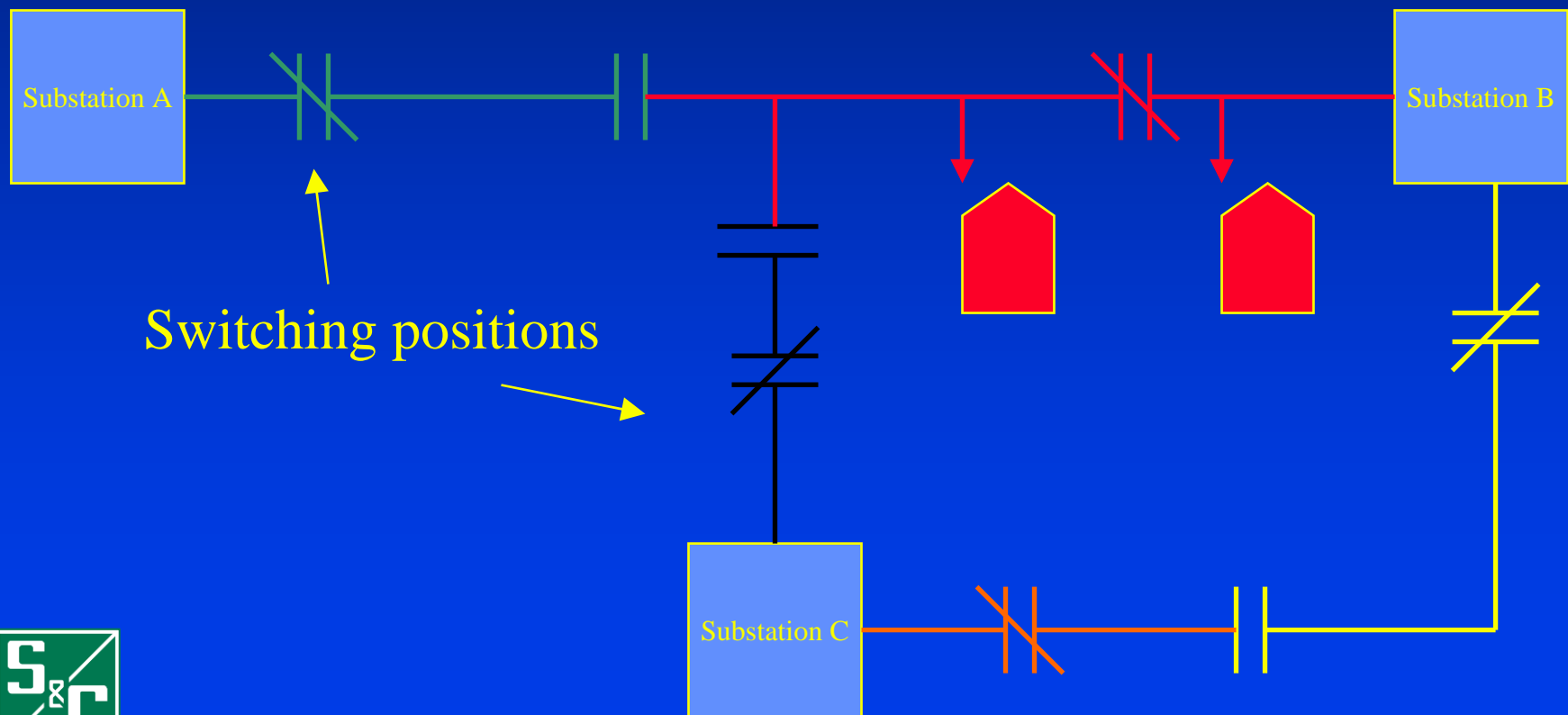
Legacy Grid Architecture

- Manual switching positions
- No intelligence
- No Sensors
- No communications



Self Healing Distribution Grid

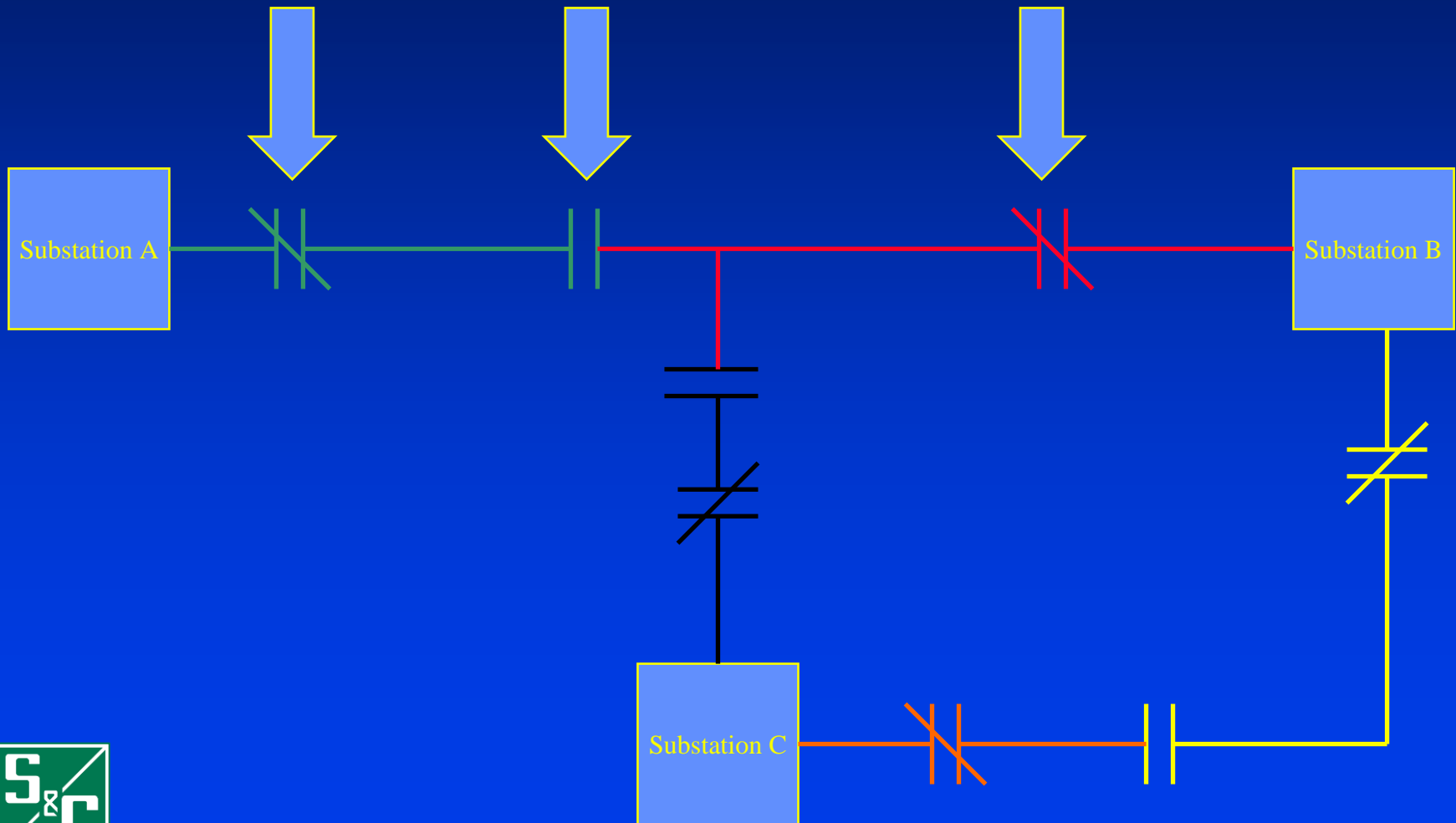
Graphical Representation of a Distribution Feeder Network



Self Healing Distribution Grid

Application

Replace or modify with Smart Switches



Self Healing Distribution Grid

Characteristics of a Smart Switch

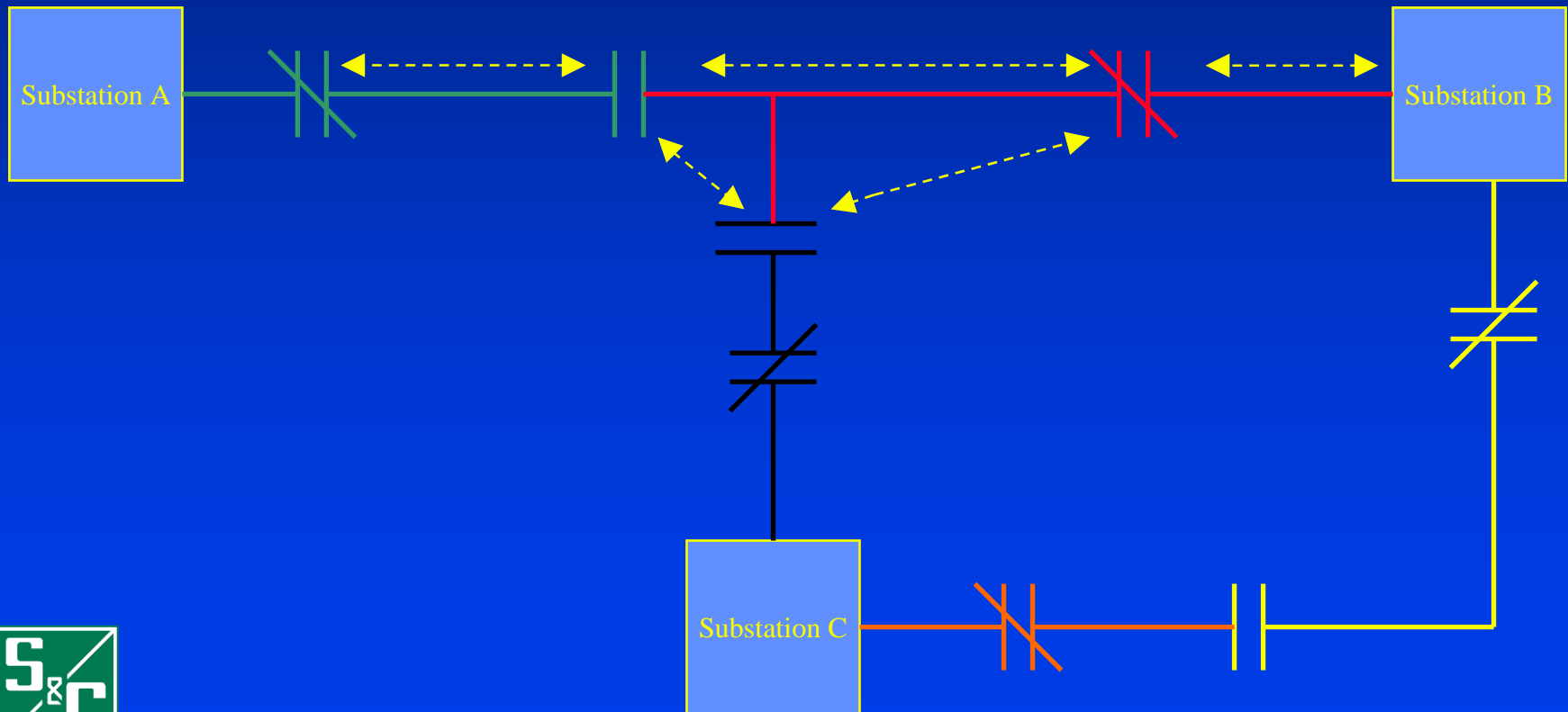
- Distributed Intelligence
- Standard Products
- Communications
- Control
- Highly Accurate Sensing
- Load Information
- Fault Indication
- GPS Location
- SCADA Access



Self Healing Distribution Grid

Application

Add Smart Communication Network

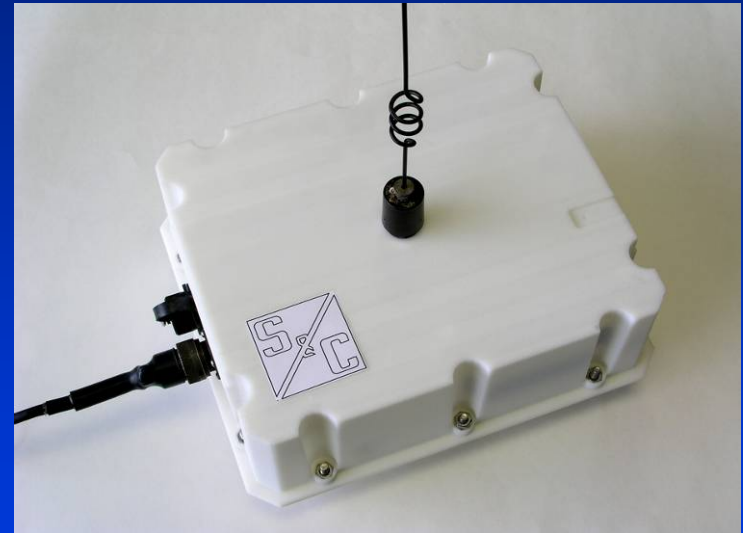


Self Healing Distribution Grid

Application

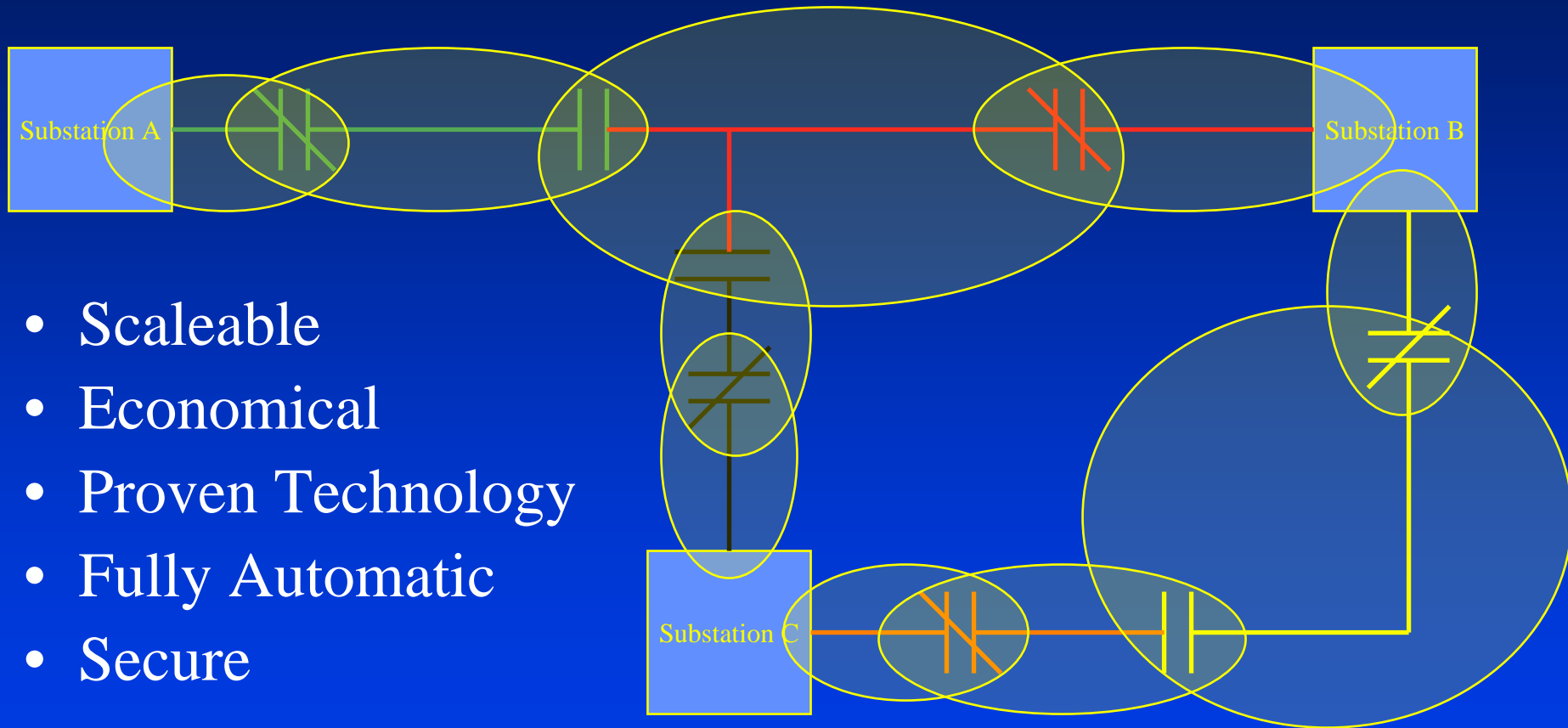
Characteristics of Smart Communication

- Peer to Peer
- High Speed, low latency
- Open Standards (TCP/UDP etc.)
- Standard protocols (DNP etc.)
- High Bandwidth
- Secure



Self Healing Distribution Grid

Communication and Control Mesh

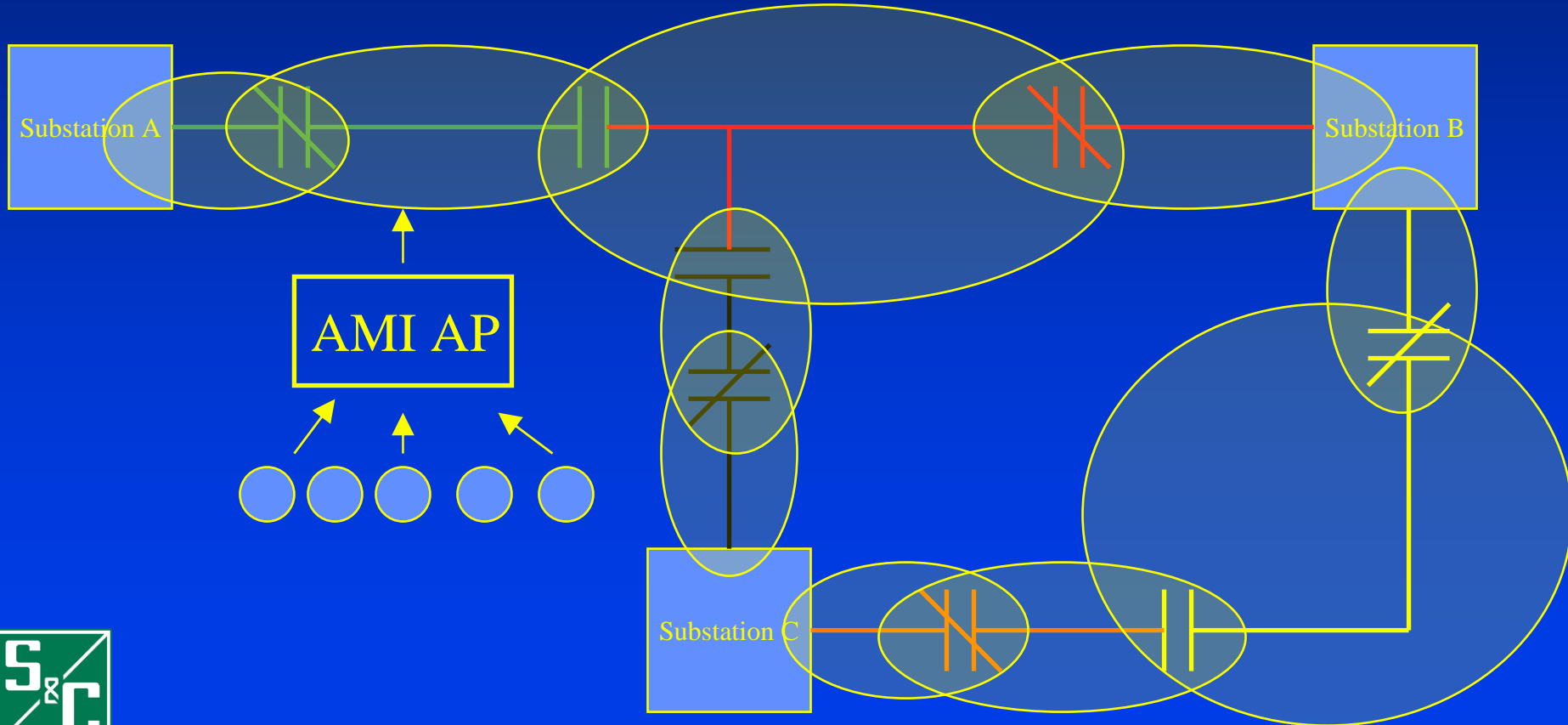


- Scalable
- Economical
- Proven Technology
- Fully Automatic
- Secure

Self Healing Distribution Grid

Smart Grid Application Support

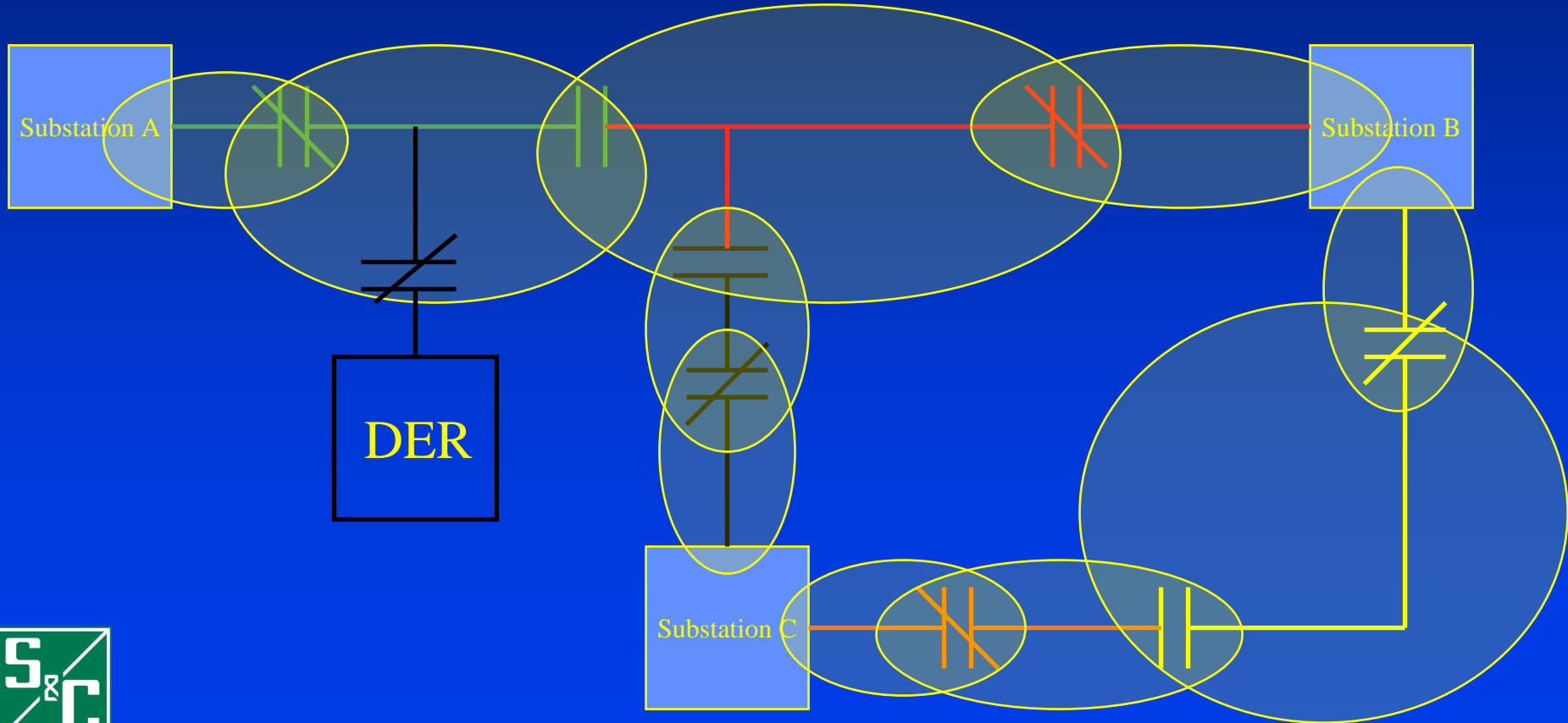
Automated Metering Infrastructure



Self Healing Distribution Grid

Smart Grid Application Support

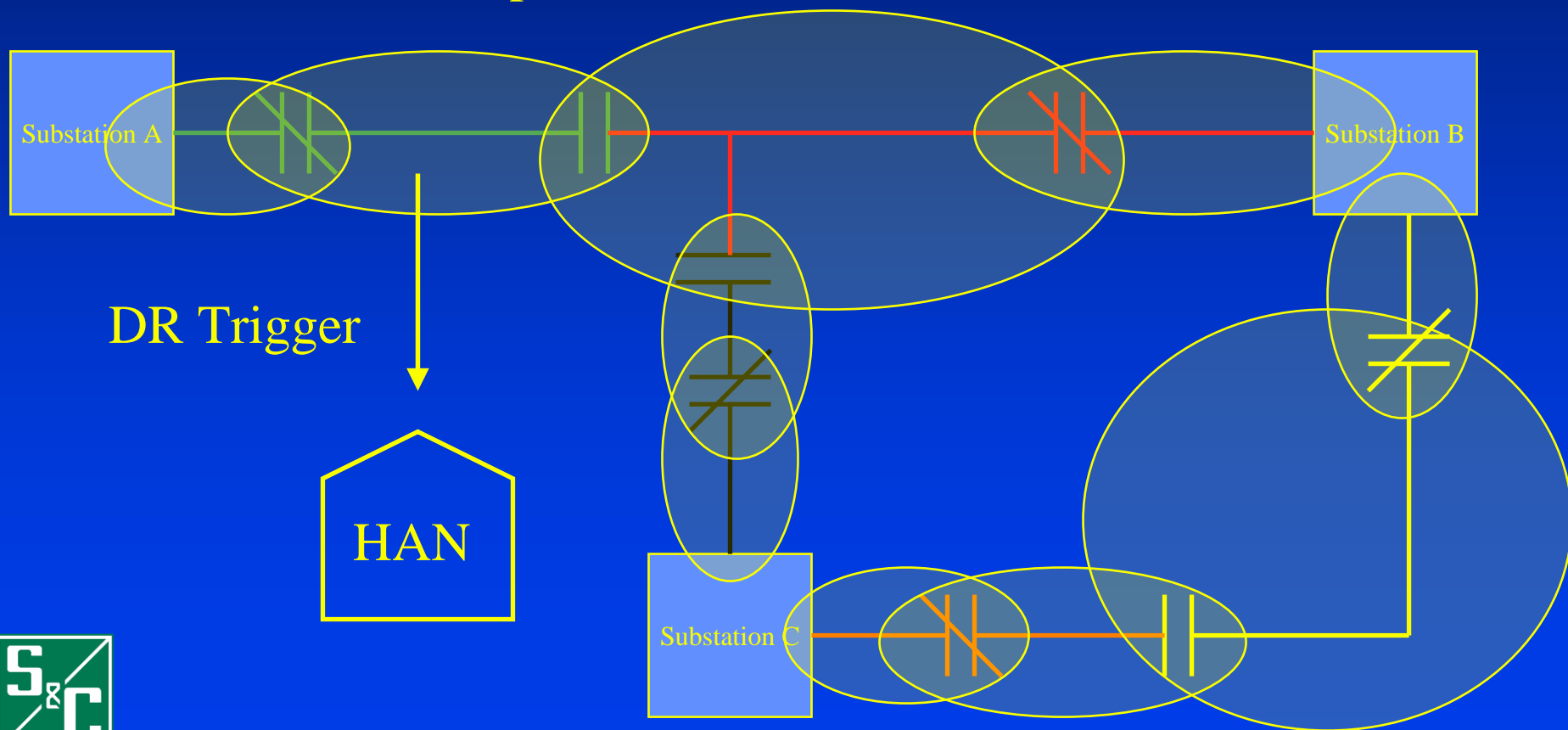
Distributed Energy Resources



Self Healing Distribution Grid

Smart Grid Application Support

Demand Response



Self Healing Distribution Grids

California Projects

- PG&E
 - San Francisco Region
 - SSN Interoperability Pilot
- SDG&E
 - Feeder Automation System Technology (FAST)



Self Healing Distribution Grids

Questions?

