



Edison SmartConnect™

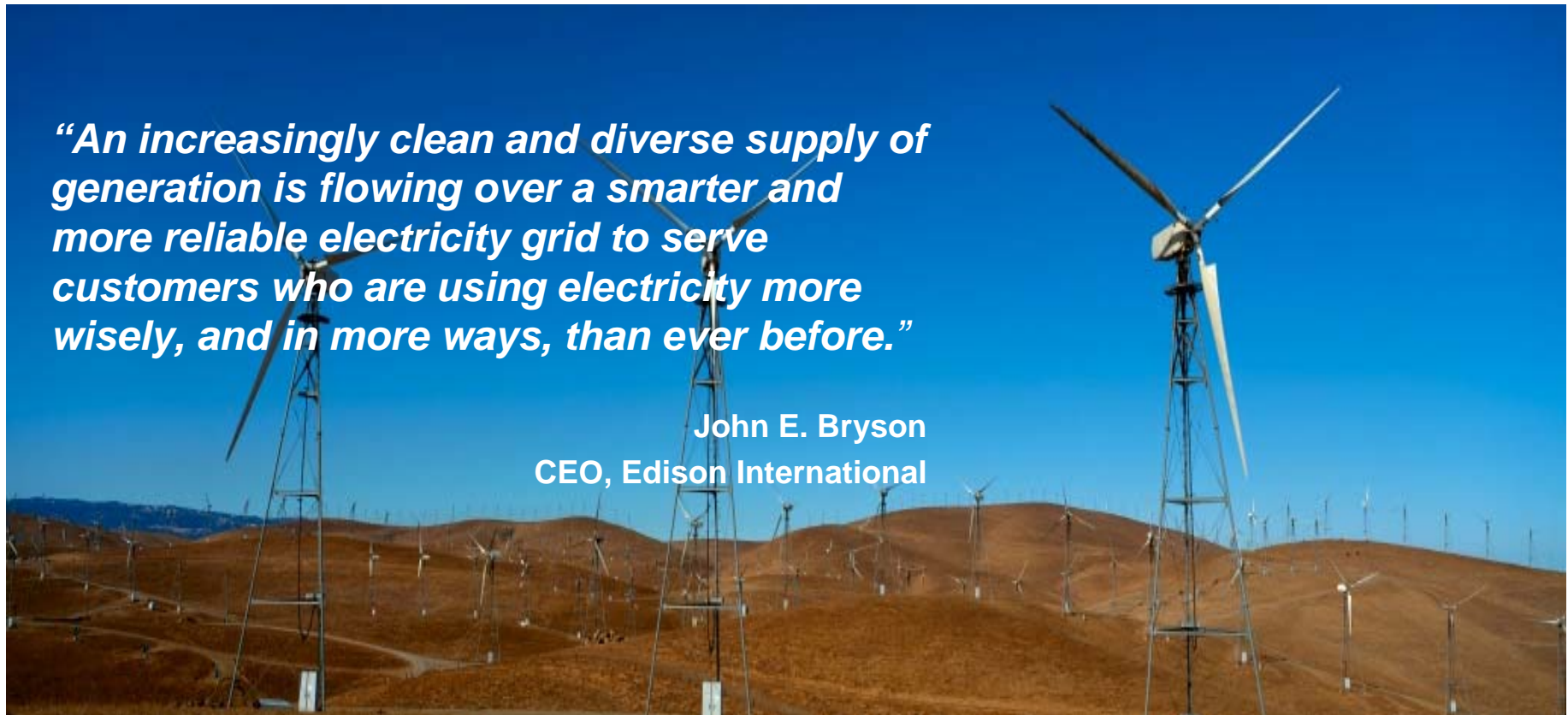
*Michael Montoya
Southern California Edison
Transmission & Distribution
May 23, 2008*



Edison International Vision

“An increasingly clean and diverse supply of generation is flowing over a smarter and more reliable electricity grid to serve customers who are using electricity more wisely, and in more ways, than ever before.”

John E. Bryson
CEO, Edison International

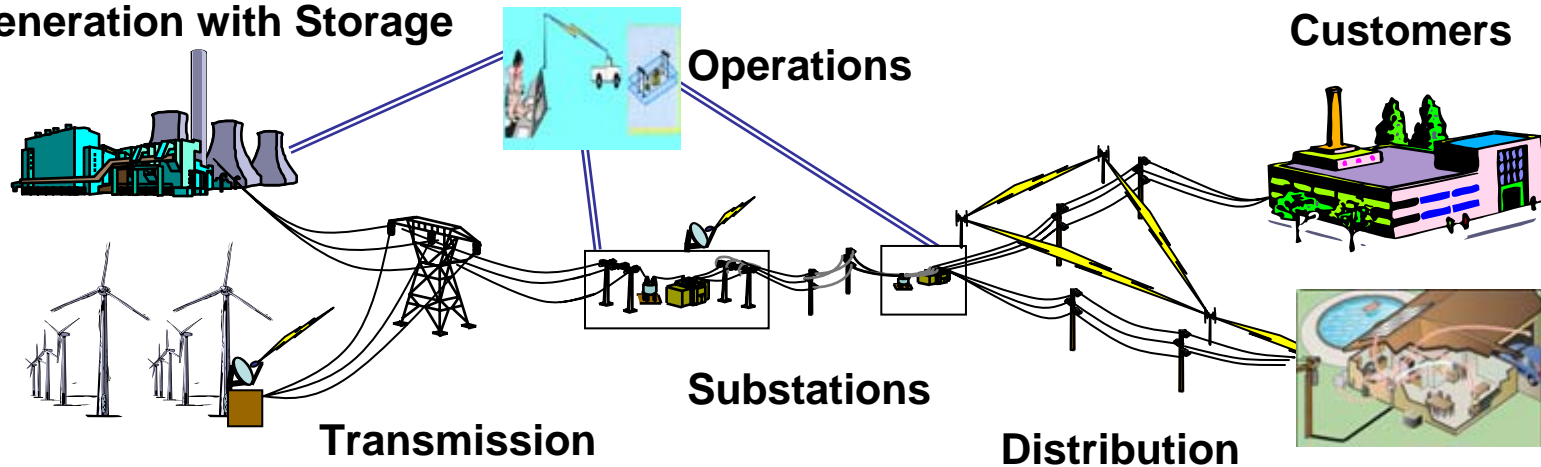




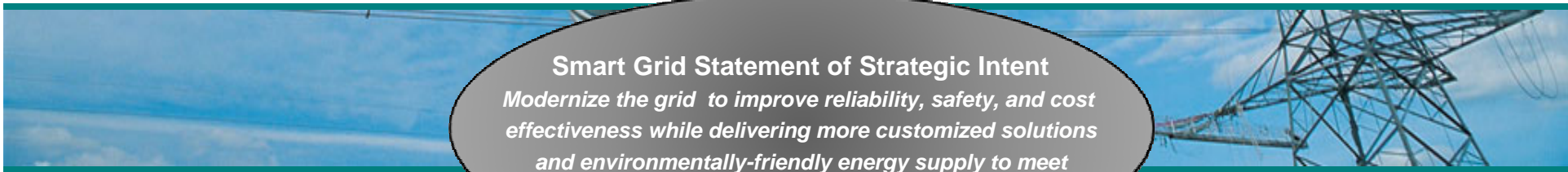
An Overview of the Smart Grid

Interoperability from the generator to the customer

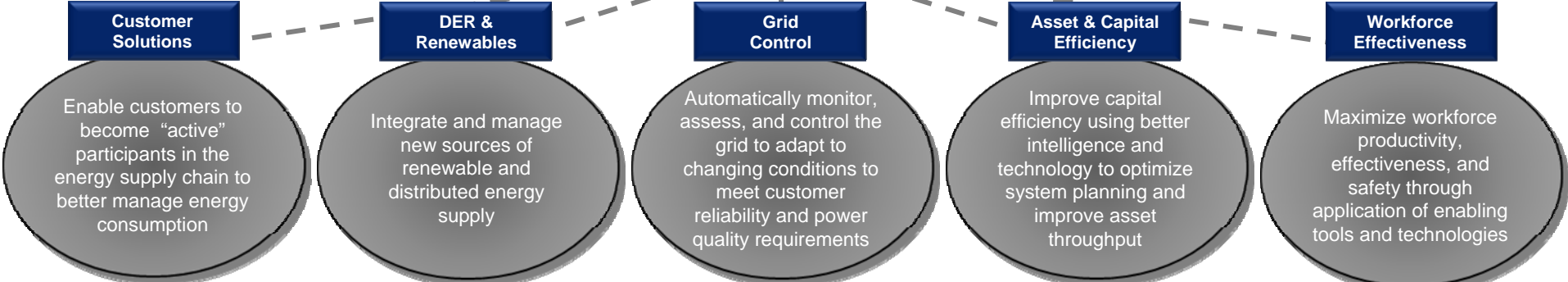
**Conventional and Renewable
Generation with Storage**



Self healing, more reliable, safer, and flexible



Smart Grid Statement of Strategic Intent
Modernize the grid to improve reliability, safety, and cost effectiveness while delivering more customized solutions and environmentally-friendly energy supply to meet customer energy management needs



Strategic Objectives

- | | | | | |
|---|---|--|--|---|
| <ul style="list-style-type: none"> • Provide real-time information and response capabilities to enable customers to adjust and manage their energy use to changing grid conditions • Enable the grid to automatically adjust to changing customer loads and supply requirements | <ul style="list-style-type: none"> • Integrate renewables into bulk power system to meet requirements for green energy supply • Enable DER integration to improve grid stability, support customer end-use requirements, and improve power supply options for economic dispatch | <ul style="list-style-type: none"> • Prevent catastrophic bulk power system failures • Minimize service disruptions due to distribution system failure • Provide timely and accurate information about service issues | <ul style="list-style-type: none"> • Increase power throughput on transmission & distribution assets • Improve capital efficiency through condition-based maintenance/replacement • Use better info on load and grid operating performance to improve system planning | <ul style="list-style-type: none"> • Use advanced visualization and control systems to support and automate decision-making • Use emerging field technologies to improve crew safety and efficiency |
|---|---|--|--|---|



Strategic Objective

Enable DER integration to improve grid stability, support customer end-use requirements, and improve power supply options for economic dispatch.

Initiatives :

- Energy Storage Systems
- Distributed Generation
- DER Integration/Management Systems
- DER Strategy Development
- DER Tracking Database
- PHEV Integration
- Microgrids (Catalina Island)
- Distribution Harmonics
- Universal "Plug-and-Play" DER Interfaces



Strategic Objective:

Prevent catastrophic bulk power system failures using Phasor Measurement Units

Initiatives:

- Real Time Grid Monitoring
- Power System Outlook, PSO
- Synchronized Measurement and Analysis in Real Time, SMART®
- Voltage VAR Control Using PMU Data
- Phasor Wind Penetration (Renewables Integration)
- Phasor Black Start Capabilities
- Protection Using PMU Data
- Dynamic Voltage Control
- Dynamic Nomograms
- C-RAS Coordination
- Advanced Visual Interfaces PMU data on SCADA
- Predictive Grid Control System



Strategic Objective:

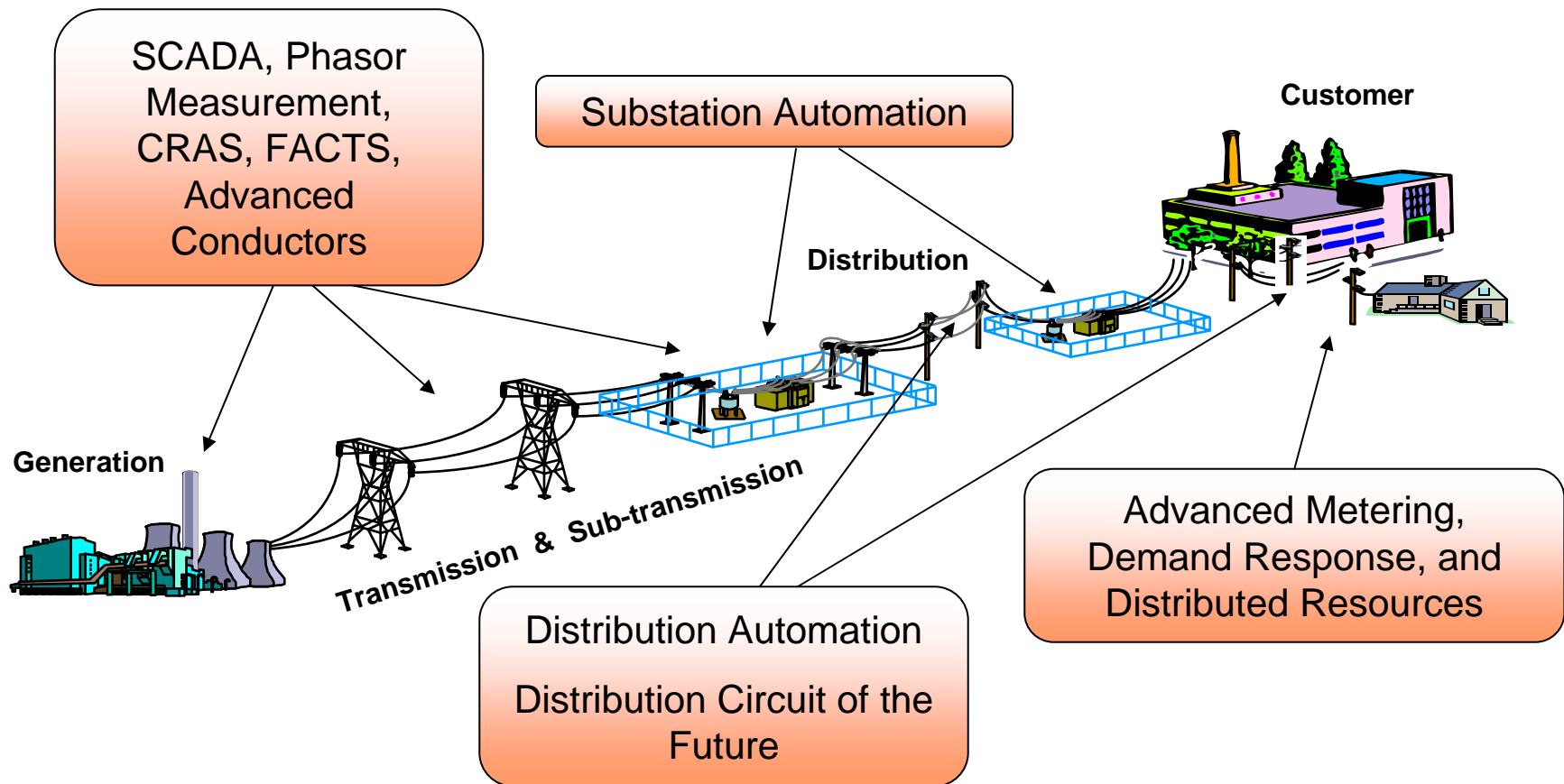
Minimize service disruptions due to distribution system failures

Initiatives:

- *Distribution Automation*
- *Next Generation Substation Automation*
- *DCMS + EMS Coordination & Integration*
- *Substation Gateway for DA Integration*
- *Dynamic Voltage Control*
- *Cable Monitoring*



SCE Smart Grid Activities





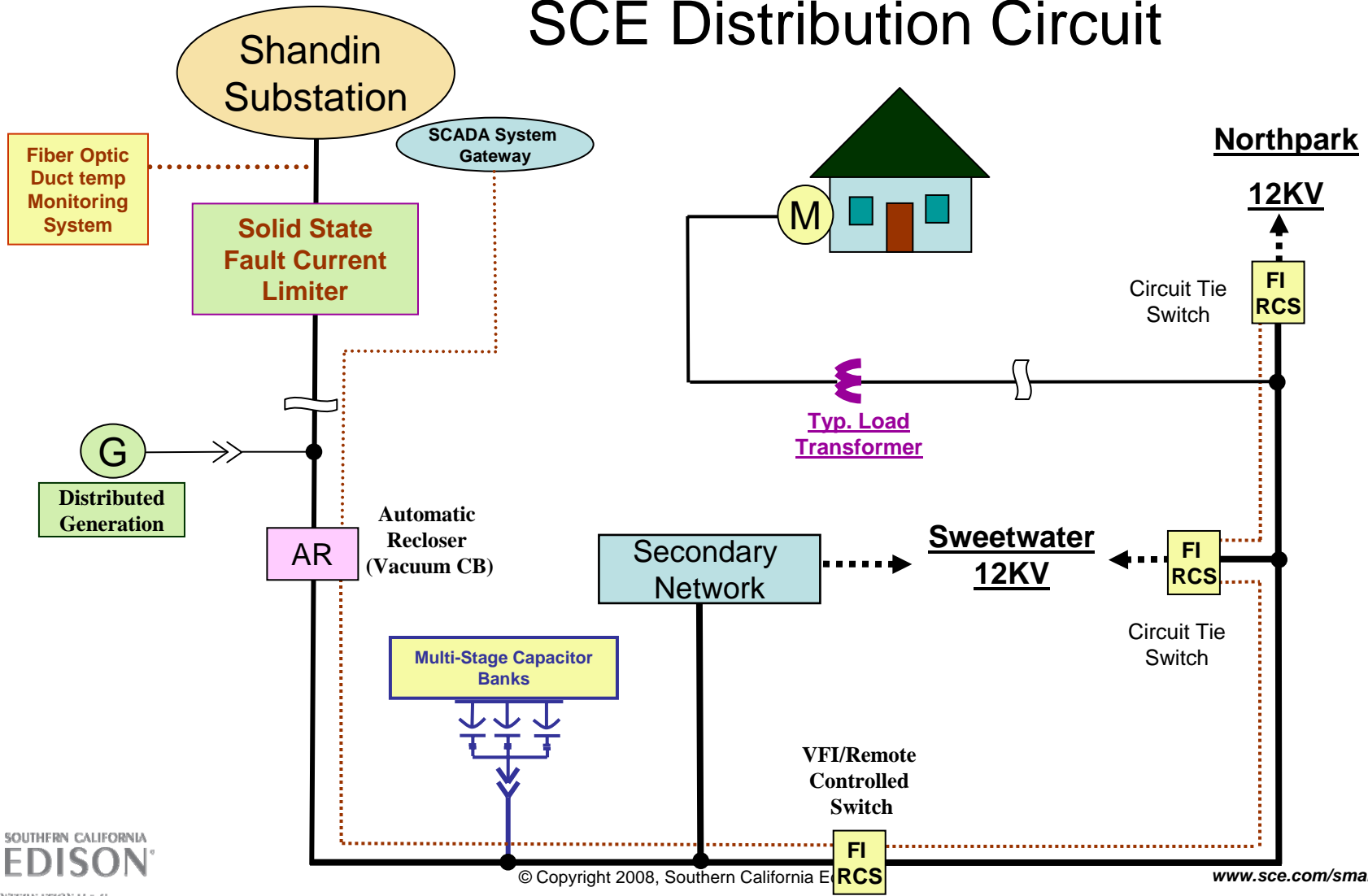
Smarter Distribution

- Avanti, SCE's "Circuit of the Future"
- High Speed Communications
- Transmission Technologies for Distribution Use
- New Technologies for Asset Monitoring
- Secondary Networks





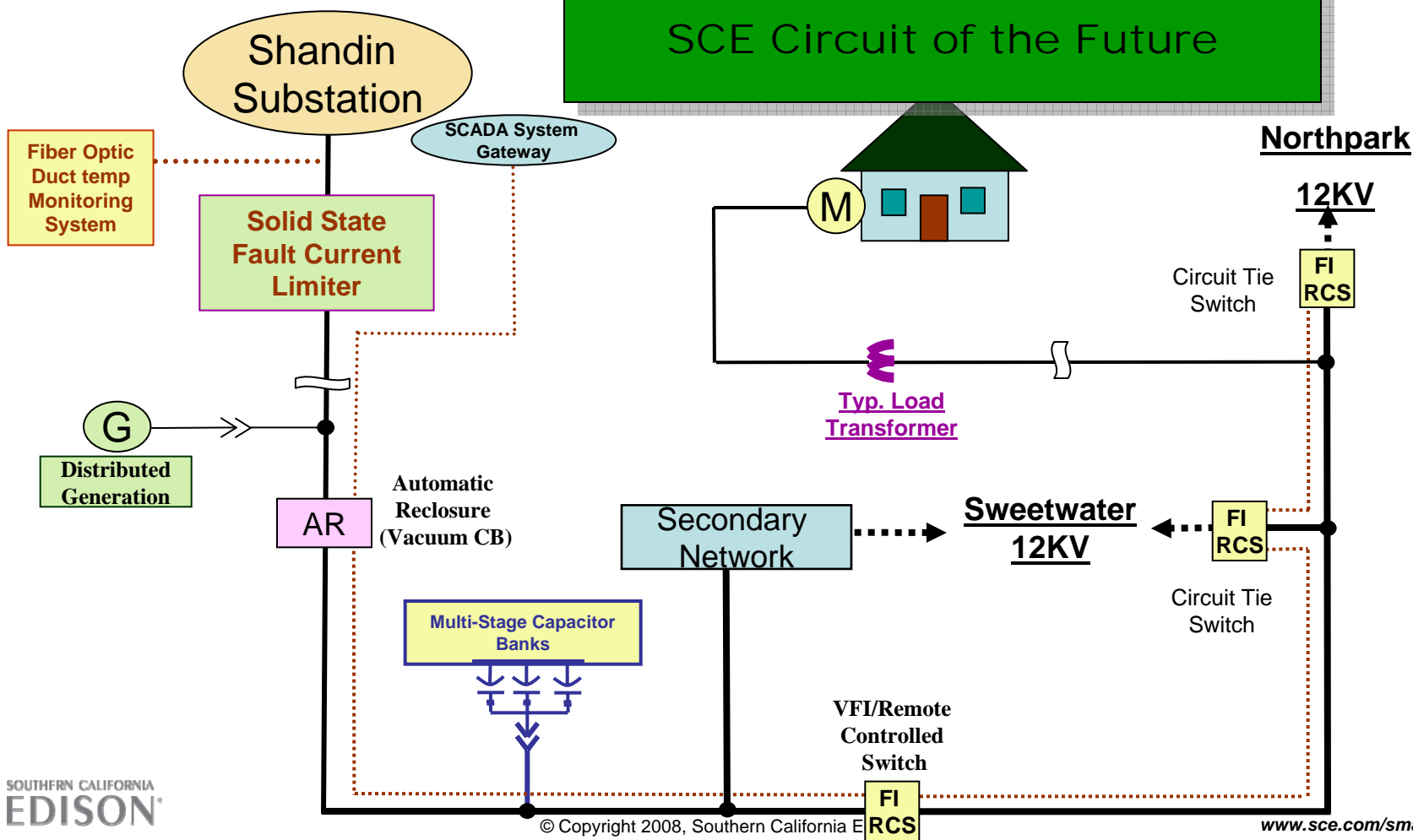
SCE Distribution Circuit






Moving Beyond the Traditional

SCE Circuit of the Future



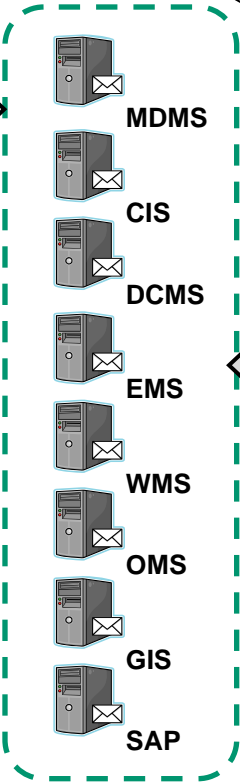

System Planner of the Future

- Asset condition, system load and customer usage data overlaid on GIS maps
- Real time virtual simulation of load scenarios on new circuit designs
- EPC plan integrated with procurement and work management system



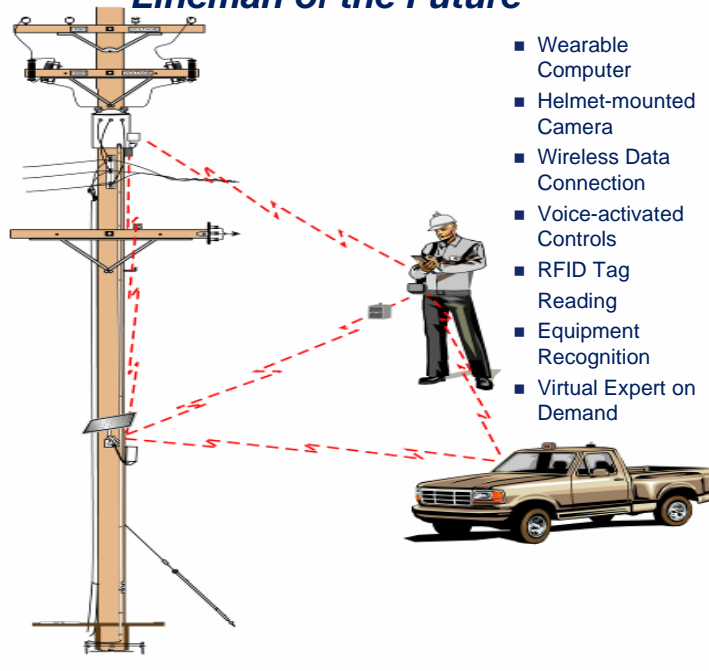
GCC Operator of the Future

- Advanced visual interfaces build upon automated decision support software
- Operator intervention needed only in extreme situations
- Simulators allow for better operator training

Engineer of the Future

- Multidisciplinary
- Systems oriented
- Better analytics
- IT proficient



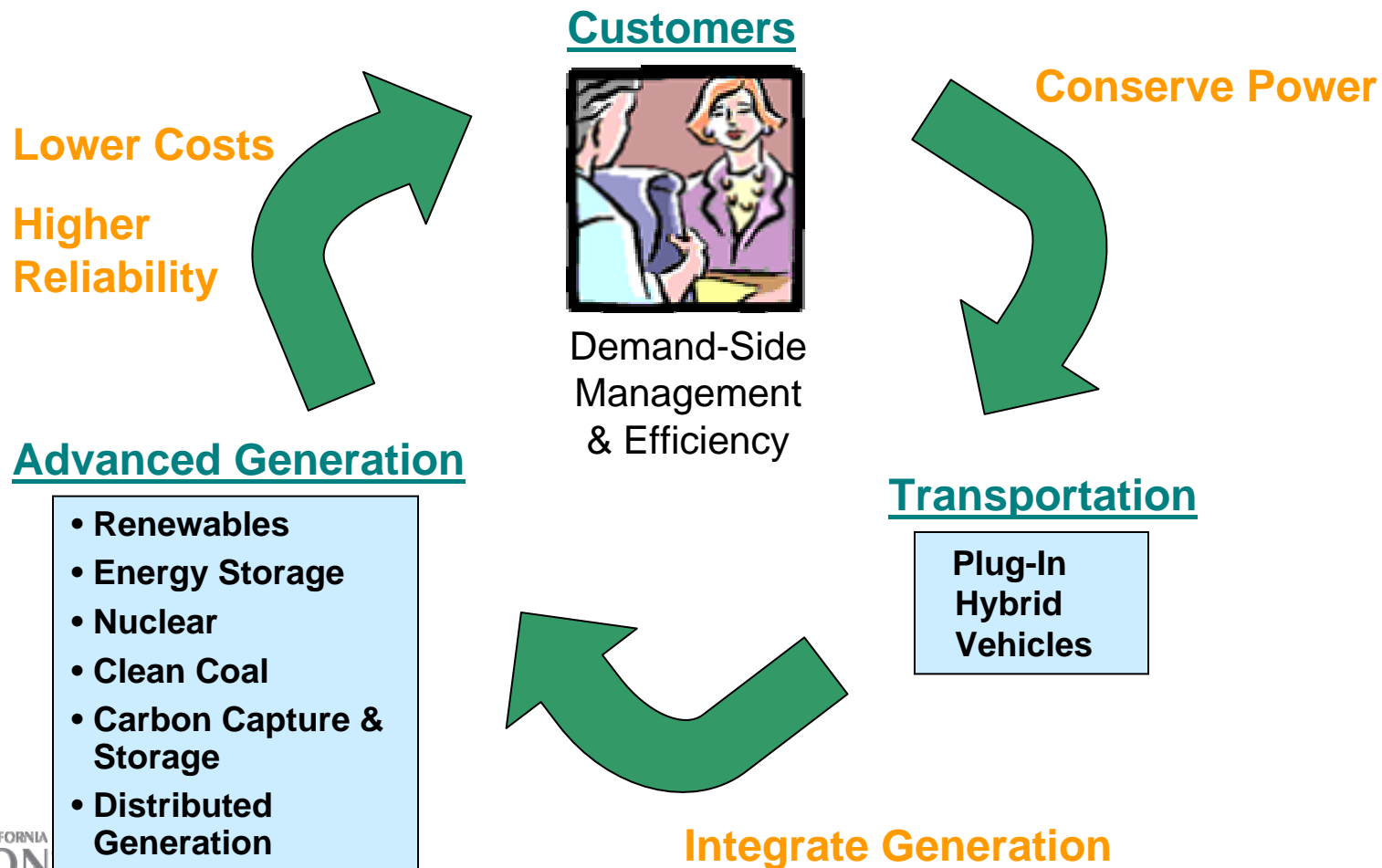
Lineman of the Future

- Wearable Computer
- Helmet-mounted Camera
- Wireless Data Connection
- Voice-activated Controls
- RFID Tag Reading
- Equipment Recognition
- Virtual Expert on Demand



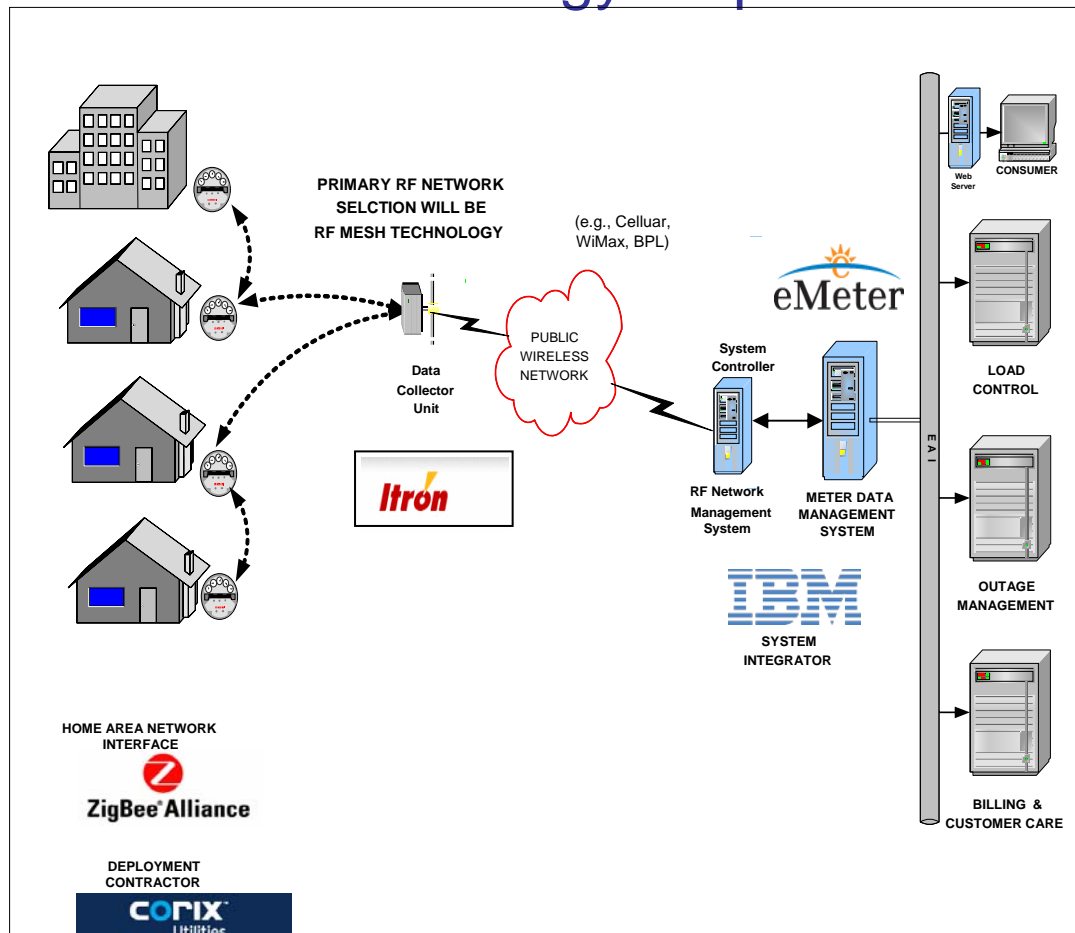


SmartGrid/SmartConnect as Enabling Technology





Technology Map



3rd Gen Electronic meters:

- 200A integrated service switch
- Home Area Network interface
- Energy & Voltage measurement
- Outage detection & service status
- Theft/tamper detection
- Remote firmware upgradability
- Robust security

Multi-Tier Telecom Network

- Designed for flexibility & security
- 2-way narrowband 900MHz RF LAN
- Open standard ZigBee 2.4GHz HAN
- Cellular based WAN with flexibility for technology changes

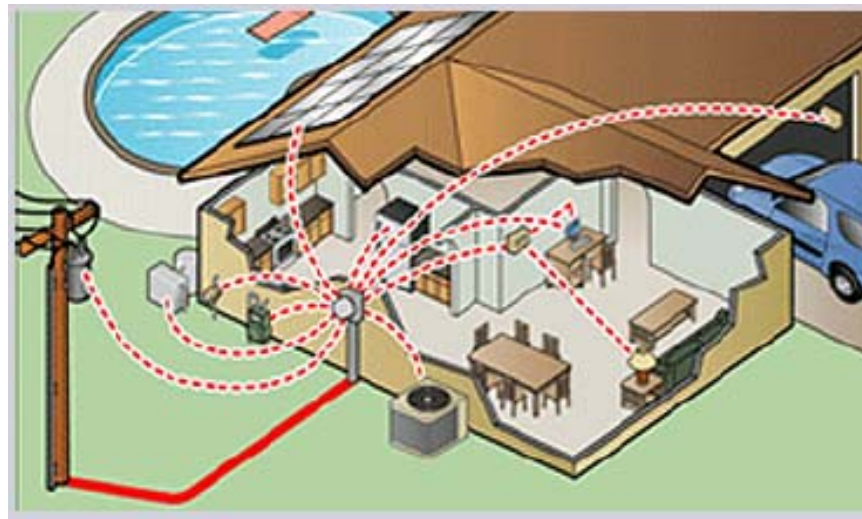
Grid Utilization

- Transformer Load Management
- Asset Management
- Personnel Productivity and safety
- Outage Management
- Customer Communications
- Demand Response



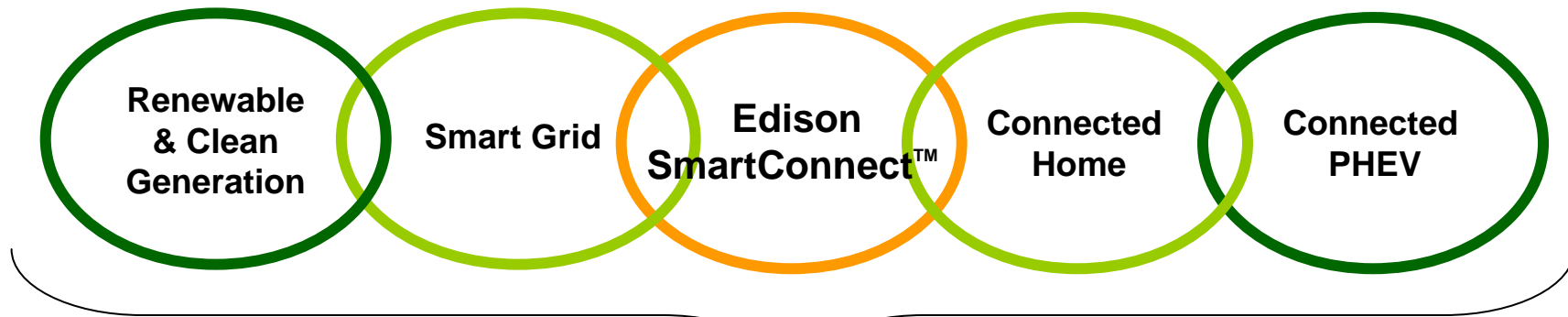
What a Smarter Grid Means for Customers

- Enhanced utility service reliability.
- More stable, higher-quality electricity supply.
- Shorter customer outages, faster service restoration.
- A “self-healing” grid.
- New customer program and service options.
- Increased customer control of energy costs.
- Customer connectivity to new “communicating” appliances.

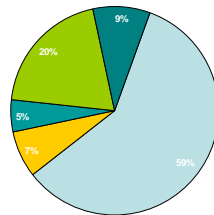




Integration of Information Technology with Energy Technology Delivers Environmental Benefits



Low Carbon
Fuel Mix



Energy
Management
& Efficiency

- Reduced Cost & Rate Pressures
- Meeting Customer Expectations for Value & the Environment