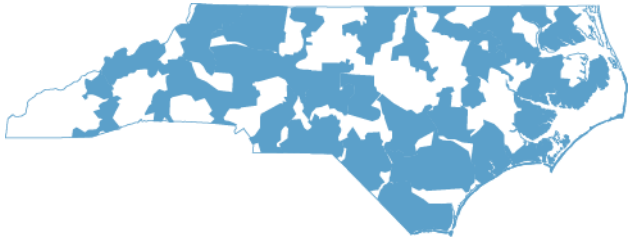
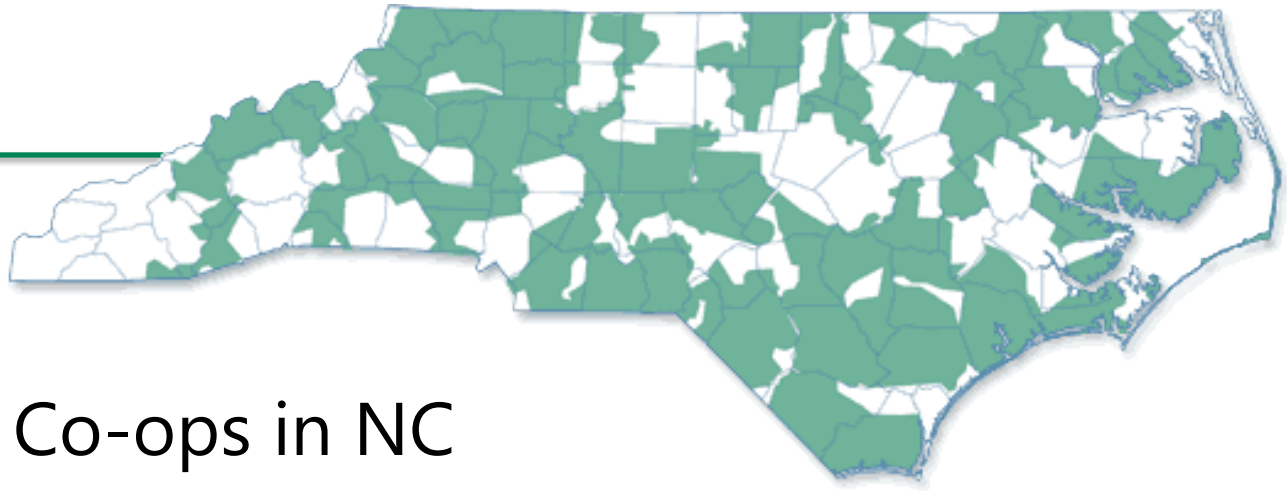


Retail Transformation

Joe Brannan
Executive Vice President and CEO,
North Carolina EMC

NCEMC



- 25 Member Co-ops in NC
- The state's first electric cooperative was established in 1936
- 93 of 100 counties served
- 45% of the land area
- 2.5 million people
- 98,000 miles of power lines

Innovation and the Transformation

Technology drives device adoption for energy with the consumer. Leading to more interfaces in the home

Smart Thermostats

- Popular with “early adopters”
- Provide Energy Efficiency and Demand Response
- Deliver economic benefits to the utility and consumer, with minimal discomfort
- Require broadband connections

Food for Thought…

Device Intelligence

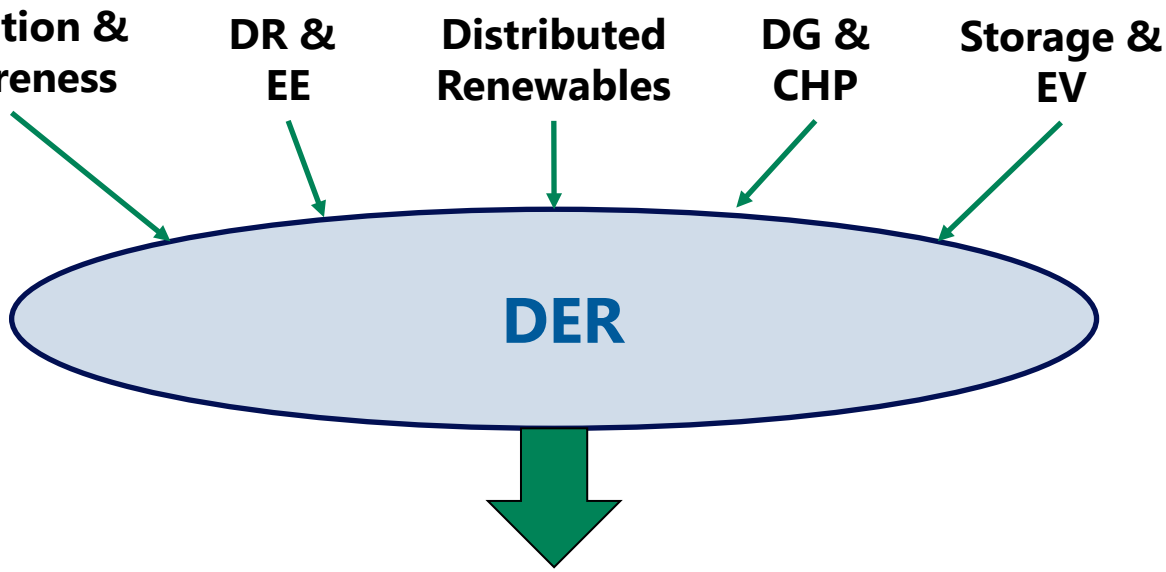
- Over-air software updates
- Autopilot with Autosteer and Summon
- Navigation to Superchargers
- Program time-of-day for charging

Built in technology:

- Zigbee automation
- On-board Dimming
- Color Changing

Does that mean Energy Intelligence?

Distributed Energy Resources

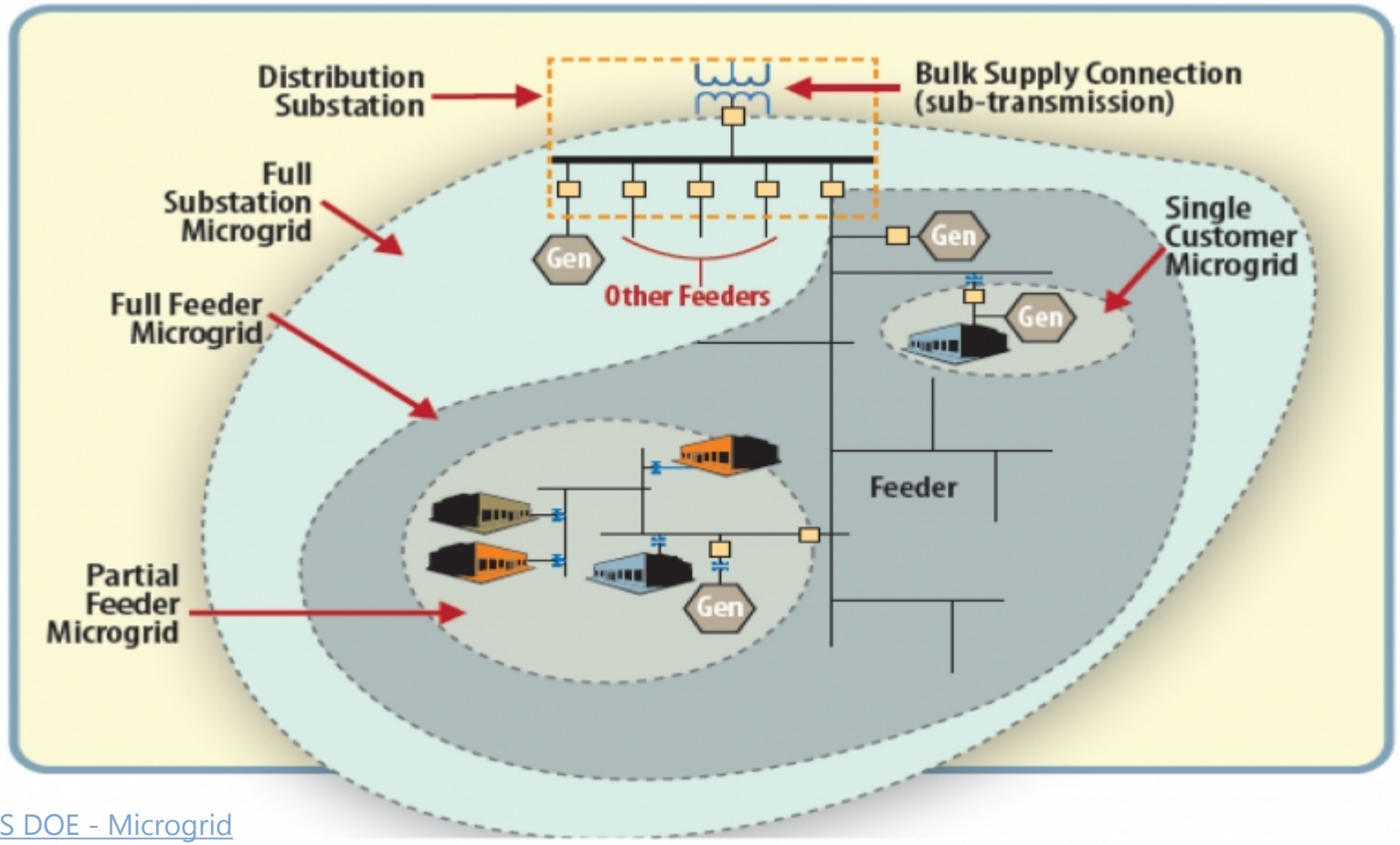


Integrated Operation within Conventional Grid

Benefits include:

- Complementary
- Interoperability
- Operational flexibility

Microgrids for Community Sustainability



Source: [US DOE - Microgrid]

Microgrid Components

- Energy Storage
  - Battery
  - Fly-wheels
- Distributed Energy Resources
  - Solar and other renewables
  - Customer-owned generation
  - Utility-owned generation
- Retail demand response
  - HVAC and Water Heaters
  - Commercial Energy Management Systems

Why a Community Microgrid?

- Beach community seasonal load coincides with costly periods
- Limited traditional generation capacity
- Long, exposed power lines
- Marine environmental conditions with high wind and storms at times

Distribution System Operator(s)

- Custodian for distribution system reliability
- Managing distributed energy resource integration
- Upstream integration to Transmission Operations
- Distribution System Management

Future "Integrated Distributed" Electricity System
(High-DER, Multi-directional energy flows & Multi-level optimizations)

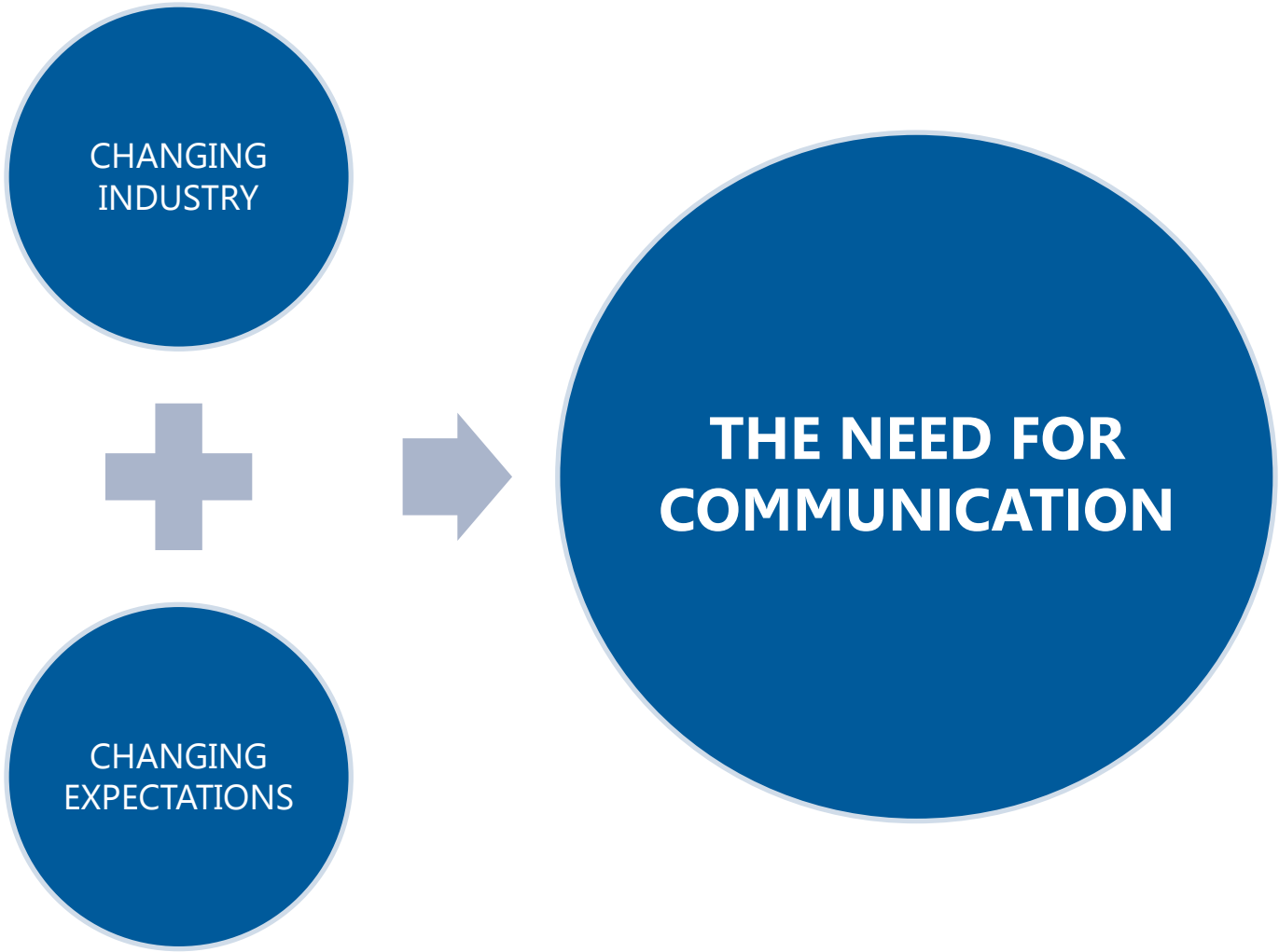
Barriers to Integration

- Technology and innovation are driving adoption of devices
  - Solar PV, Battery Storage
  - Micro-turbines
  - Connected thermostats and water heaters

- Interconnection
  - "Standards" exist for larger resources – focused on grid protection and safety

- Interoperability
  - More, smaller, devices will behave differently – i.e. the "Flock"

KNOWLEDGE → COMMUNICATION



Communications

- Communications channels are evolving

- Time cycle is short

Opportunities - Fundamental Motivators

- Distribution System Management
- Upstream Integration with Transmission Operations
- Maintain value to the consumer
  - Value can be price, the environment, reliability, convenience, etc.
  - We depend upon a reliable grid

Communications

smart hub

Service Offerings

COOPERATIVE

Recommendations and Considerations

- Ensure and facilitate broadband connectivity throughout rural and islanded communities
- Develop open standards and protocols for device communication within the home and to the utility
- Interconnection and communication protocols for residential scale energy resources

North Carolina's Electric Cooperatives

Your Touchstone Energy® Cooperatives