


# DOE - Energy Advisory Committee

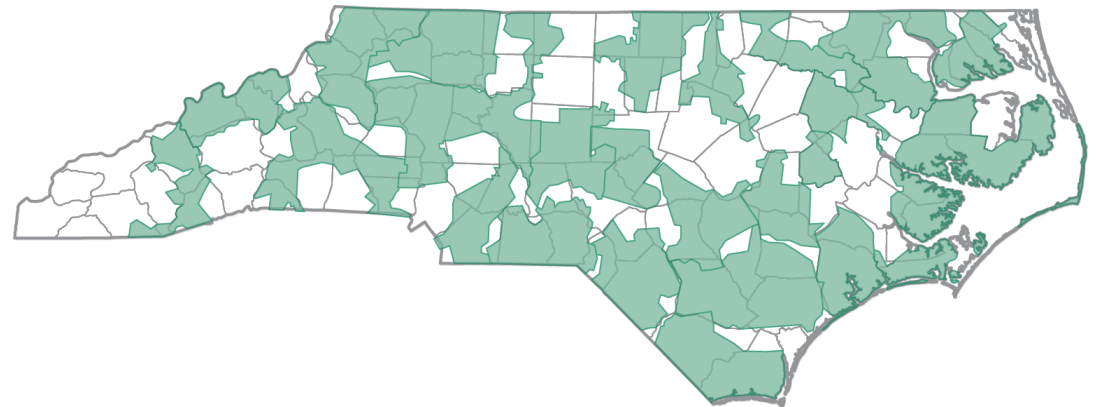
October 16, 2019

S. Lee Ragsdale, Jr.  
*Senior Vice President, Energy Delivery*



**NC** Electric  
Cooperatives

Your Touchstone Energy® Cooperatives 



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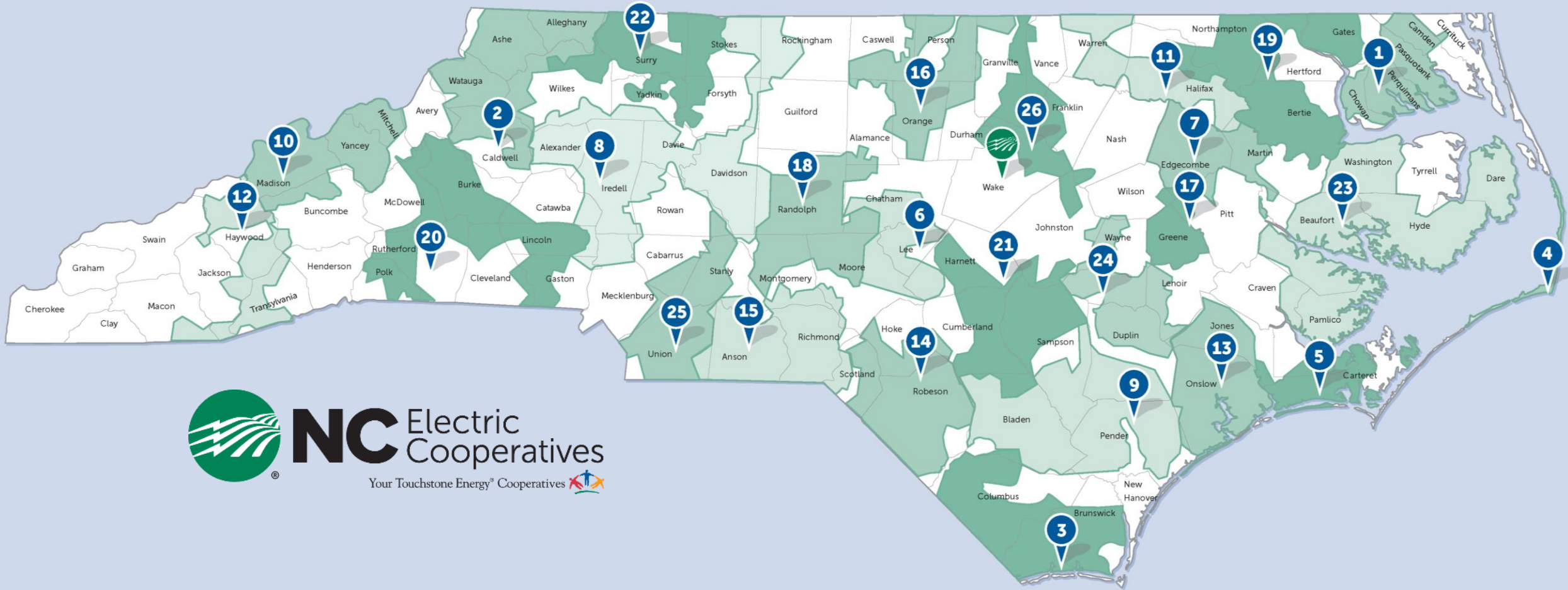
Households and businesses served by NC Electric Cooperatives

# 93


Counties we work in around the state of North Carolina

# 26

Distinct member-owned, not-for-profit cooperatives



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# A Brighter Energy Future

## Businesses:

- Declaring sustainability goals
- Need to be “green”

## Consumers:

- Environmentally aware
- Focused on saving money



## A Brighter Energy Future

*For electric cooperatives and the people and communities they serve.*

- **Driven by service to our members**
- **Inspired to be a leader**



**Low Carbon**

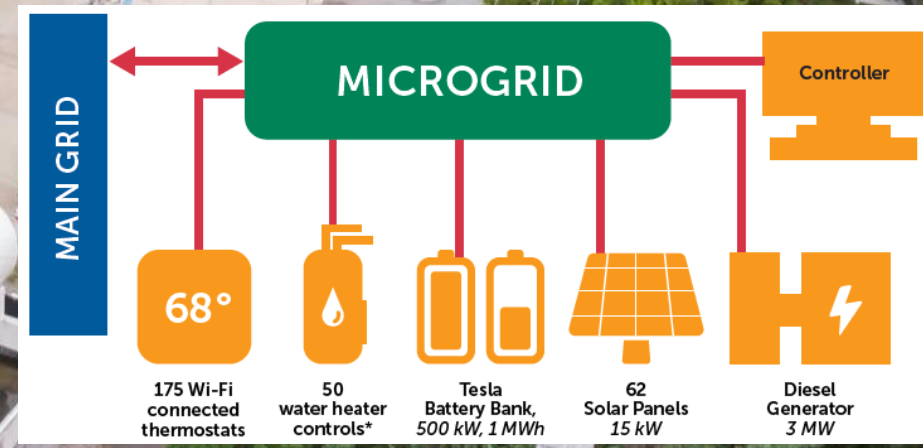


**Grid Flexibility**



**Beneficial Electrification**

# NCEMC System Microgrid-Ocracoke



# Use Cases: Key Lessons Learned

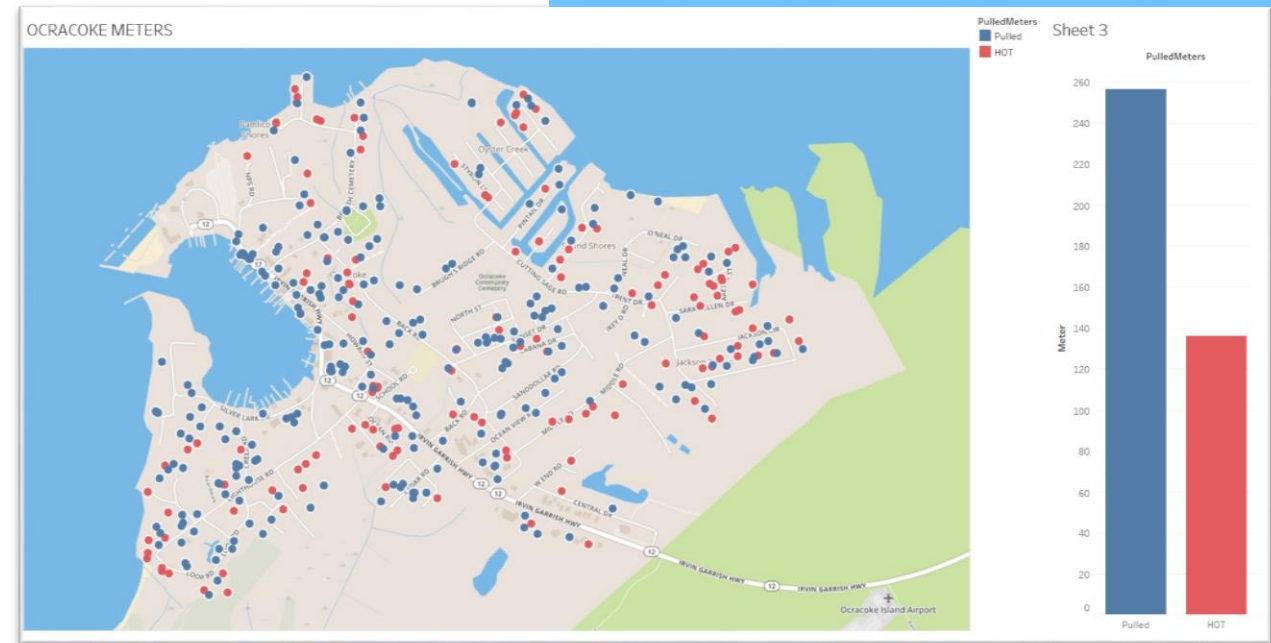
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Demand response	Maximum capacity integration lower than anticipated
Ancillary services	Battery performance better than expected
Capacity firming/renewables	Battery firms up solar capacity, with exceptions
Islanding and resiliency	Coordinate, communicate and listen
Asset deferment	Supply-side and demand-side resources extend asset life
Power quality improvement	Solar inverters can be programmed to solve issues on the distribution system

# Hurricane Dorian – Infrastructure Matters



- 389 meters pulled (29%)
- 250 meters reconnected
- Electrician and county inspection required before reconnection



# NCEMC Consumer Microgrid Butler Farms






**A microgrid at Butler Farms**



Lillington, NC

### Butler Farms Microgrid Components

*Resources owned by the farm:*

-  20kW solar panels
-  100kW diesel generator
-  185kW biogas generator

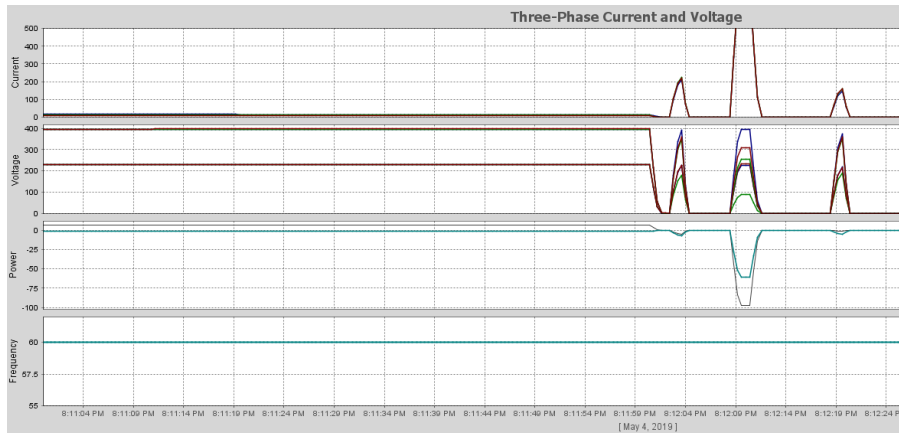
*NCEMC-owned:*

-  250kW/735kWh battery system
-  Controller to integrate and manage all components

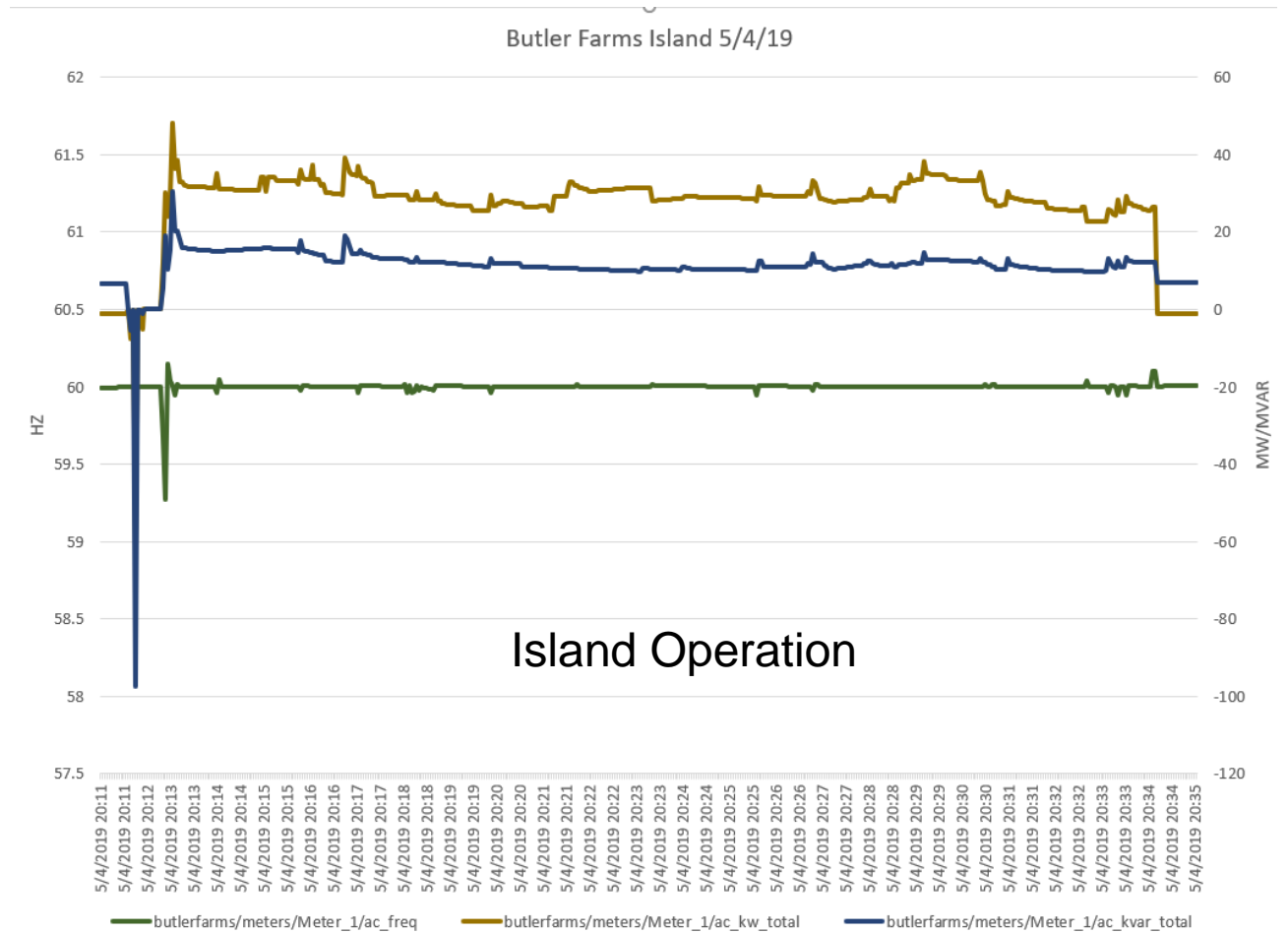
# Butler Farms – Farm Island event 5/4

On Saturday, May 4, 2019, a tree caused an outage on the LD Black 12kV feeder that serves Butler Farms.

The Butler Farms Microgrid successfully recognized the outage and transitioned into Farm Island mode to support the farm during the 20-minute event.



Time of Fault





# Taking measured steps...what have we learned?



Devices



Applications



Aggregation



**Experience prepares us for the DO environment  
and enhanced member services**

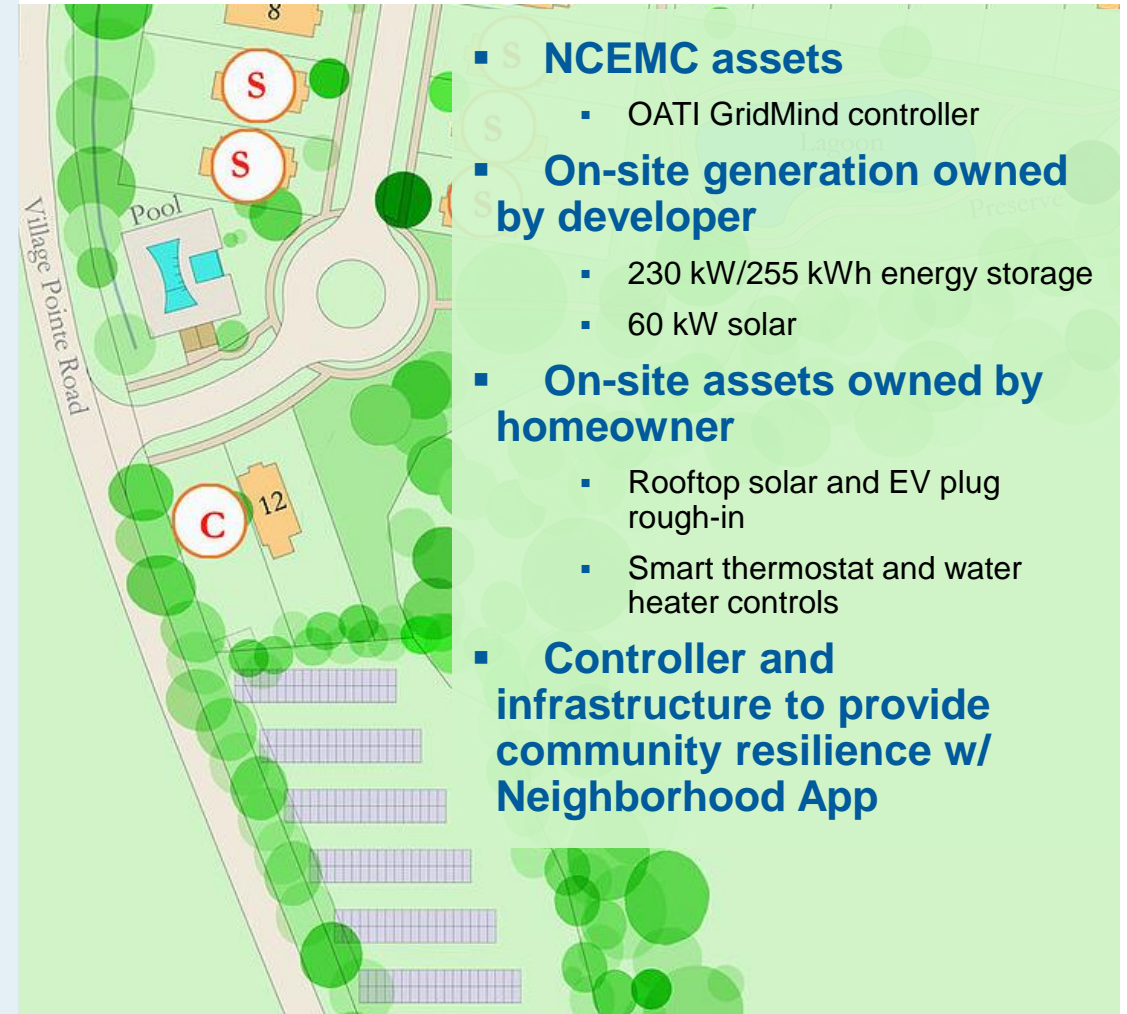
# Heron's Nest Neighborhood

## What's New

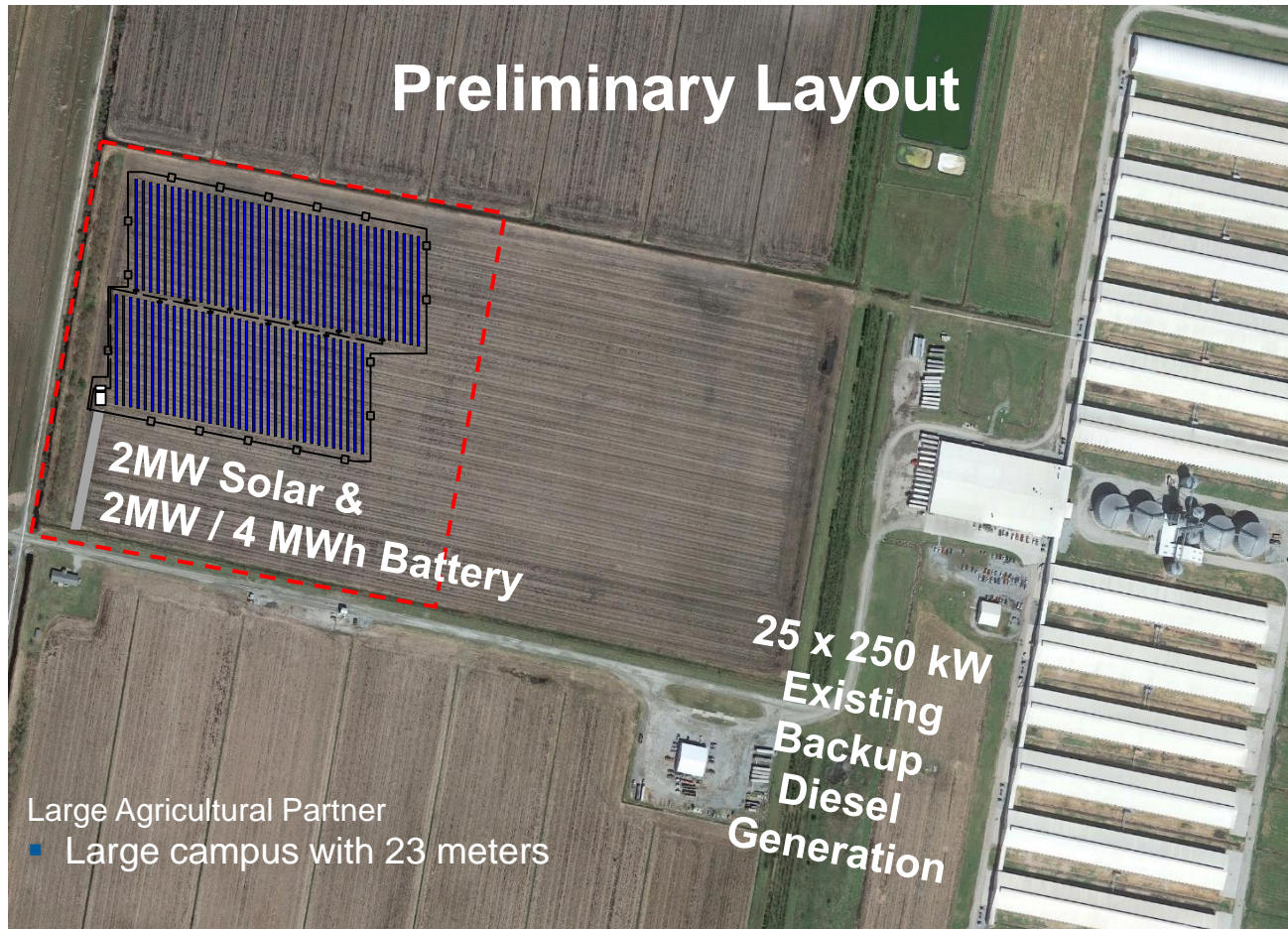
- Local edge-of-grid resources provide enhanced resiliency
- OATI GridMind (site controller) will integrate with NCEMC DERMS
- GridPort (distributed sensors) on individual devices

## Project Timeline

- Energize battery and solar by December 2019
- Integrate controls by April 2020



# Large Agricultural Microgrid



## What's New

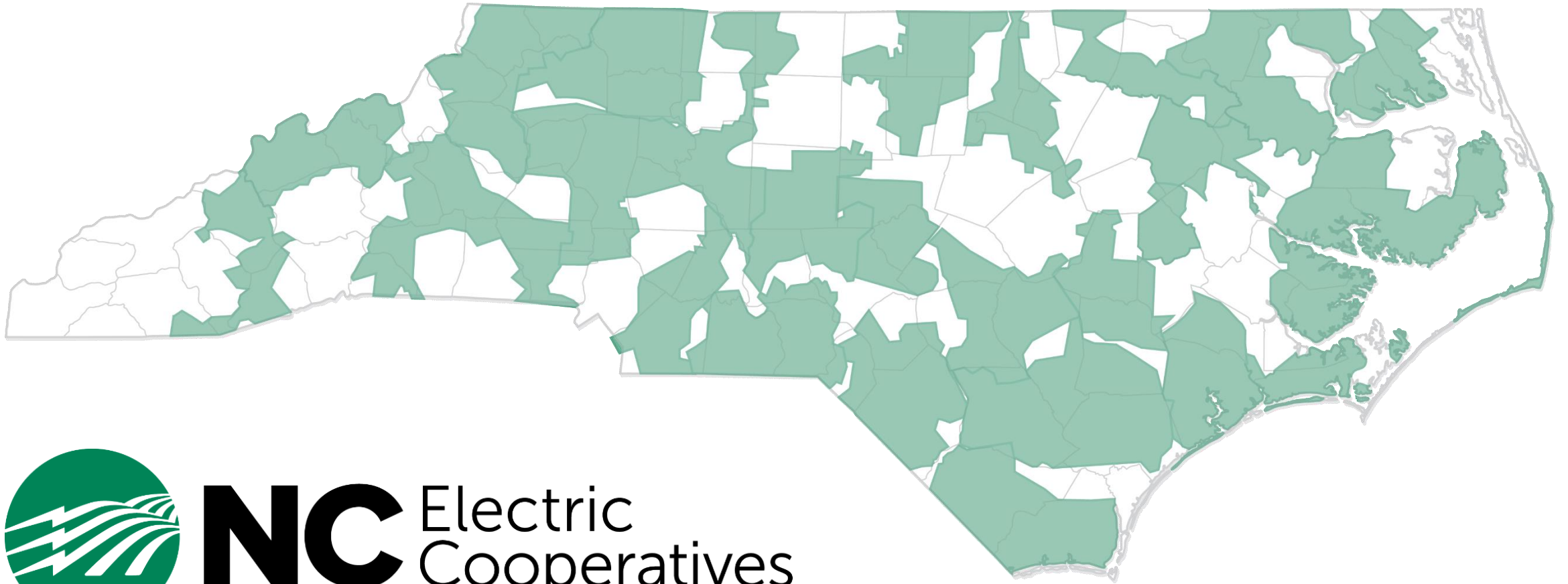
- Designing optimal control of distributed, back-up diesel generation to balance against solar + storage

## Project Timeline

- COD in Q2-2020

## Microgrid resources

- 2 MW Solar + 2 MW / 4 MWh Storage
- Served by express feeder
- Control connection to diesel generation to manage transient stability



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