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June 17, 2024

# CPIRP Technical Conference

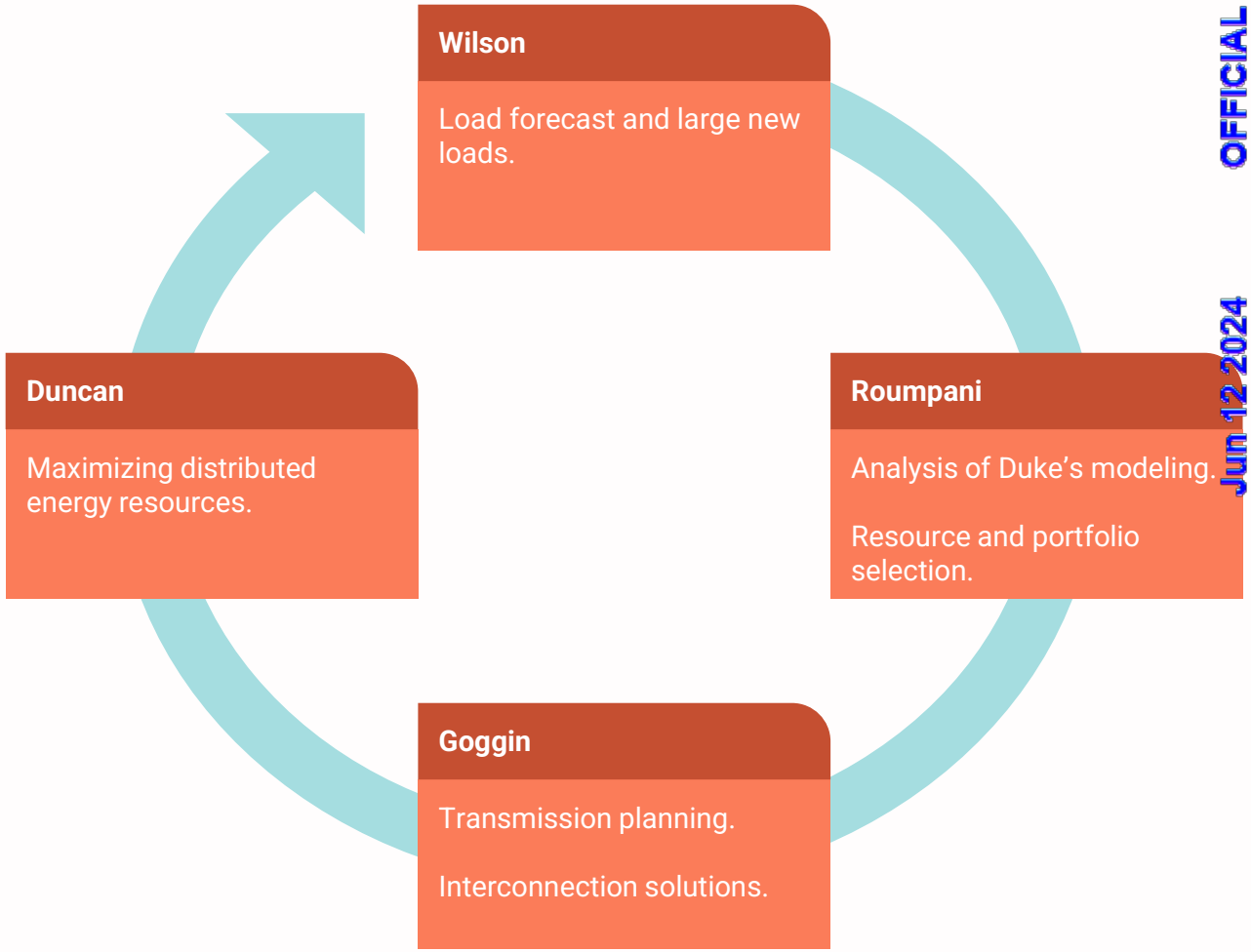
## Docket E-100 Sub 190

# On behalf of:

# SACE,
# NRDC,
# Sierra Club,
# and
# NCSEA.

# SACE et al. Testimony Overview

Designed to address four key parts of the resource planning process.



# Testimony Overview

## Witness Wilson

**Purpose**
To analyze Duke's load forecast and resource adequacy study.

**Recommendations**

- Address large new loads as described in the attached report. This includes creating a new customer class for 20+MW, and creating several pathways to treat their load.
- Engage professional forecasters for a more comprehensive load forecast, with multiple scenarios for large loads.
- Duke should study the relationship between extreme winter weather and load.

## Witness Roumpani

**Purpose**
To evaluate Duke's analysis and proposed pathways.

**Recommendations**

- Do not approve Duke's recommended P3 Fall Sup. Portfolio or NTAP.
- Hold in abeyance any decision regarding Duke's proposed gas buildout.
- Require CPCN applications to include a clean portfolio alternative analysis.
- Require Duke to explore earlier coal retirements.
- Approve wind and solar additions from P1 (Base Core).

# Witness Duncan

**Purpose**
To evaluate Duke's integration of distributed energy resources.

**Recommendations regarding:**

- Behind the meter storage.
- EV managed charging.
- Virtual power plants.
- Distribution resource planning.

# Behind the Meter Storage

- Duke did not incorporate BTM Storage into modeling.
- BTM storage rate grew in Carolinas from 1% in 2019 to 10% in 2022.
- I forecasted BTM storage adoption by applying attachment rates from SEIA and LBNL to the Company's BTM solar forecast.
  - Res - 28% by 2028 and 50% by 2040
  - Nonres - 19% by 2028 35% by 2040
- **I found 469 MW of BTM storage by 2038 and 1,018 MW by 2050.**
- Performance of BTM storage depends on tariff structure, customer preference, and available programs.

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Table 2: Behind the Meter Battery Storage Forecast (MW)

| | DEC NC | DEP NC | DEC SC | DEP SC | TOTAL |
|---|---|---|---|---|---|
| **2024** | 5 | 4 | 1 | 0 | 10 |
| **2025** | 12 | 10 | 4 | 1 | 26 |
| **2026** | 22 | 18 | 7 | 1 | 48 |
| **2027** | 34 | 28 | 11 | 2 | 75 |
| **2028** | 49 | 40 | 15 | 3 | 108 |
| **2029** | 65 | 54 | 21 | 4 | 144 |
| **2030** | 83 | 69 | 27 | 5 | 184 |
| **2031** | 103 | 85 | 33 | 6 | 227 |
| **2032** | 124 | 103 | 39 | 7 | 273 |
| **2033** | 145 | 120 | 46 | 9 | 319 |
| **2034** | 164 | 136 | 52 | 10 | 362 |
| **2035** | 175 | 147 | 56 | 11 | 388 |
| **2036** | 185 | 157 | 59 | 12 | 413 |
| **2037** | 196 | 168 | 63 | 13 | 440 |
| **2038** | 208 | 179 | 67 | 14 | 469 |
| **2045** | 326 | 289 | 103 | 23 | 741 |
| **2050** | 451 | 399 | 137 | 31 | 1018 |

# BTM Storage Recommendations

1. Require Duke to revise the proposed CPIRP to include a BTM storage forecast.
    a. At a minimum, require future CPIRPs to incorporate a BTM storage forecast.
    b. The forecast should delineate between naturally occurring BTM storage and storage associated with programs.
2. Require Duke to evaluate how incorporating BTM storage changes model selection of CTs.

# Electric Vehicle Managed Charging

- Duke did not incorporate EV managed charging into EV load forecast.
- I created a potential for EV managed charging:
  - 40% of EVs participate (Brattle Group's VPP assumption).
  - Each participating EV reduces peak demand by 76%, according to SC pilot findings.
- **2038 winter peak drops 251 MW; summer peak drops 658 MW.**
- Supplemental modeling included NC TOU rate, which reduced summer peak by 24% and winter by 12% in 2038.

Table 3: Potential Impact of System Wide EV Managed Charging (simplified)

| Year | Potential Peak Reduction Due to EV Managed Charging | |
|---|---|---|
| | Winter | Summer |
| 2024 | 1 | 7 |
| 2025 | 3 | 16 |
| 2026 | 5 | 28 |
| 2027 | 9 | 45 |
| 2028 | 15 | 73 |
| 2029 | 26 | 99 |
| 2030 | 39 | 129 |
| 2031 | 55 | 187 |
| 2032 | 75 | 241 |
| 2033 | 99 | 299 |
| 2034 | 126 | 359 |
| 2035 | 155 | 470 |
| 2036 | 186 | 536 |
| 2037 | 218 | 599 |
| 2038 | 251 | 658 |
| 2045 | 1110 | 1256 |
| 2050 | 1678 | 1840 |

# EV Managed Charging Recommendations

1. NCUC should determine current load forecast overestimates EV load.
2. Require Duke to modify proposed CPIRP to include the impact of EV managed charging and other potential EV management protocols.
    a. At a minimum, require that change for future CPIRPs.

# Virtual Power Plants



**Findings**

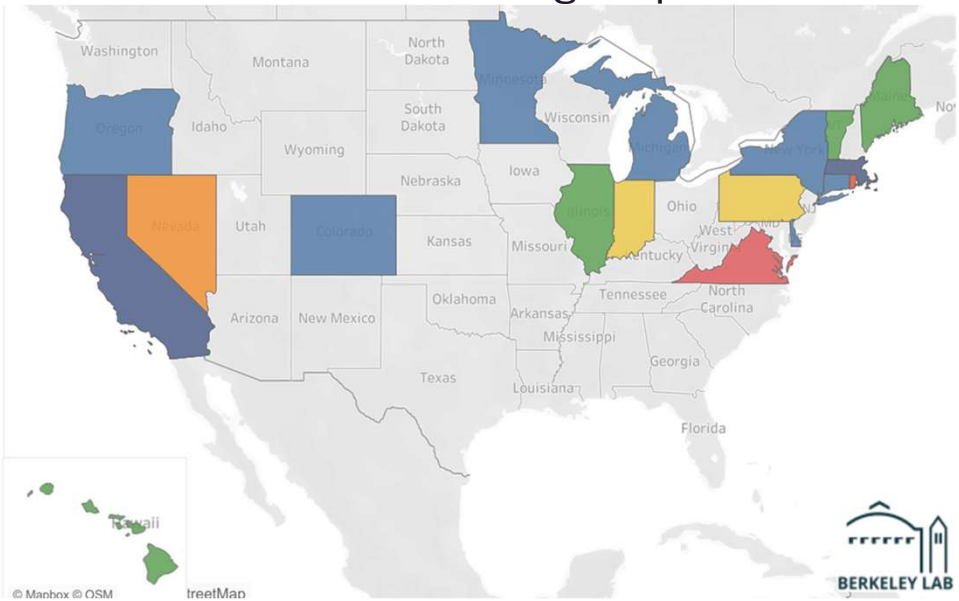
- Duke did not model VPPs.
- VPPs are the only resource that meets load growth and lowers customer bills.
- PowerPair and Active Load Management will enable VPP modeling and growth.

**Recommendations**

1. Require Duke to work with stakeholders to:
    a. Incorporate an incentivized BTM solar + storage program as a supply side resource in the next CPIRP, based on findings from PowerPair.
        i. Include C&I customers.
    b. Create portfolios of EE/DSM and other programs to develop several VPP supply side resources to include in next CPIRP.
2. The NCUC should establish a VPP goal of 300 MW by 2030.

# Distribution Resource Planning

State Distribution Planning Requirements




Source: LBNL

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- A DRP facilitates better integration of DERs into planning through analysis, data sharing, and investment planning.
- Duke's Integrated System Operations Plan (ISOP) is not a DRP.
- There are currently no DRP requirements in the CPIRP.
- Establishing DRP requirements is consistent with least cost planning because it advances Duke's ability to maximize cost-effective DERs.

# Distribution Resource Planning Recommendations

I recommend the NCUC require Duke to file a Distribution Resource Plan as a part of future CPIRPs.

The NCUC should establish specific goals and filing requirements for the DRP.

I lay out specific recommendations in Section VIII of my testimony.

# Witness Goggin

**Purpose**
To examine Duke's ability to plan for and interconnect new, clean resources.

**Recommendations**

- Adopt proposed solutions to interconnect new renewables and battery storage faster.
- Reduce or eliminate the assumed wind and solar generic transmission network proxy costs.
- Use proactive multi-value transmission planning.
- Evaluate expanding transmission ties.
- Find that increasing dependence on gas exposes ratepayers to reliability and economic risks.

**Thank you.**

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