

# North Carolina Climate Change Interagency Council



Executive Order No. 80: NC's Commitment to Address Climate Change and  
Transition to a Clean Energy Economy

*9<sup>th</sup> Meeting*

*May 26, 2021*

*Virtual Meeting*

# Meeting Agenda & Objectives

|   |                    |
|---|--------------------|
| <b>Welcome and Introductions</b>  | <b>10:00-10:05</b> |
| <b>Executive Order 80 Section 8: State Building Energy Consumption</b>  | <b>10:05-10:45</b> |
| <b>2021 State Agency Resilience Strategy Reports</b>  | <b>10:45-11:45</b> |
| <b>Break (5 minutes)</b>  | <b>11:45-11:50</b> |
| <b>Public engagement</b><br>Individuals and organizations may provide input to cabinet agencies on their implementation of the EO. Oral presentations will be limited to 2 minutes. | <b>11:50-12:20</b> |

# Council Designee Introductions



# Executive Order 80 Section 8: State Building Energy Consumption

*Julie Pfeiffer, USI; Paul Braese, DPS; and David King, WCU*





# *Governor Cooper's Executive Order 80*

- Issued October 29, 2018
  - Two years have passed
  - Approximately four years left to achieve the goals
- Key Goals to strive for by 2025:
  - Reduce energy consumption per square foot (EUI) in state-owned buildings **by 40%** from fiscal year 2002-2003 levels\*
  - Builds on EUI goal established by GS 143-64.12(a) which required a **30%** reduction by 2015 based on the 2002-03 baseline



\* Energy Use Intensity (EUI) – defined as the measurement of a building's annual utility consumption relative to gross square footage, normally stated as BTUs/sqft.

# State-Owned Buildings

1. Cabinet Agencies (10)
2. Other Agencies (4)
3. UNC System & Affiliates (21)



- Encompasses over 137 MM gsf
  - *More than 61 Empire State Buildings*
  - *5 square miles (size of Zebulon)*

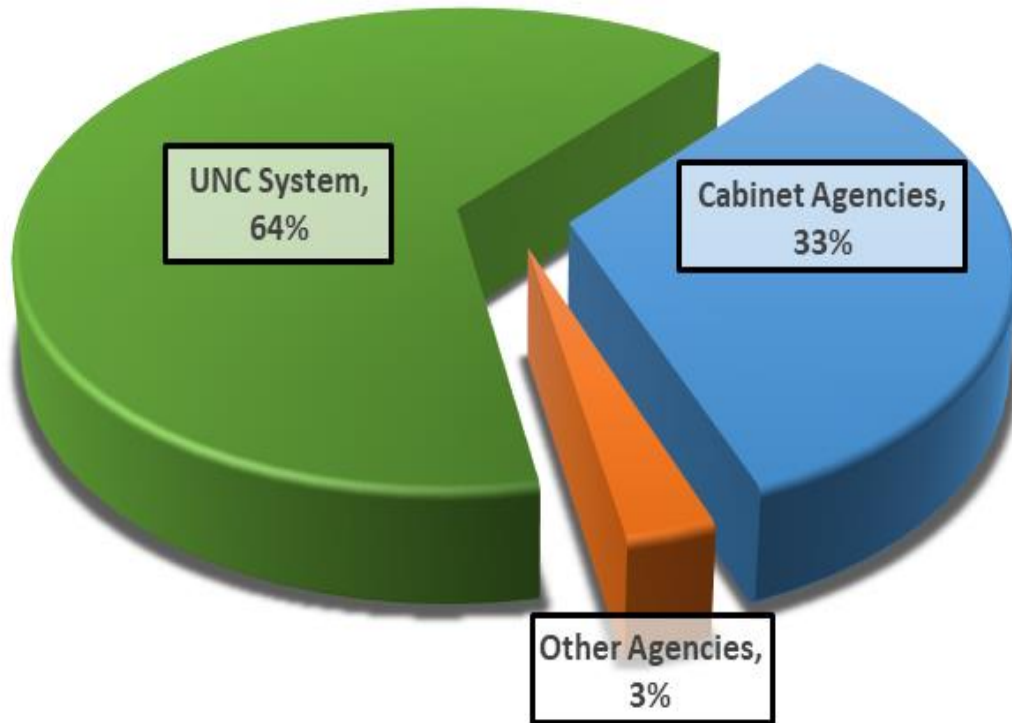


- Consumed over 12 Trillion BTU's During FY19-20
  - *2.1 MM Barrels of Crude Oil*
  - *~57 Miles of Railcars full of Coal*



# Percent Impact & Utility Spending

## Percent Impact\*



\*Composite value derived by averaging percent contribution of BTU and gsf to collective total

North Carolina  
Climate Change Interagency Council

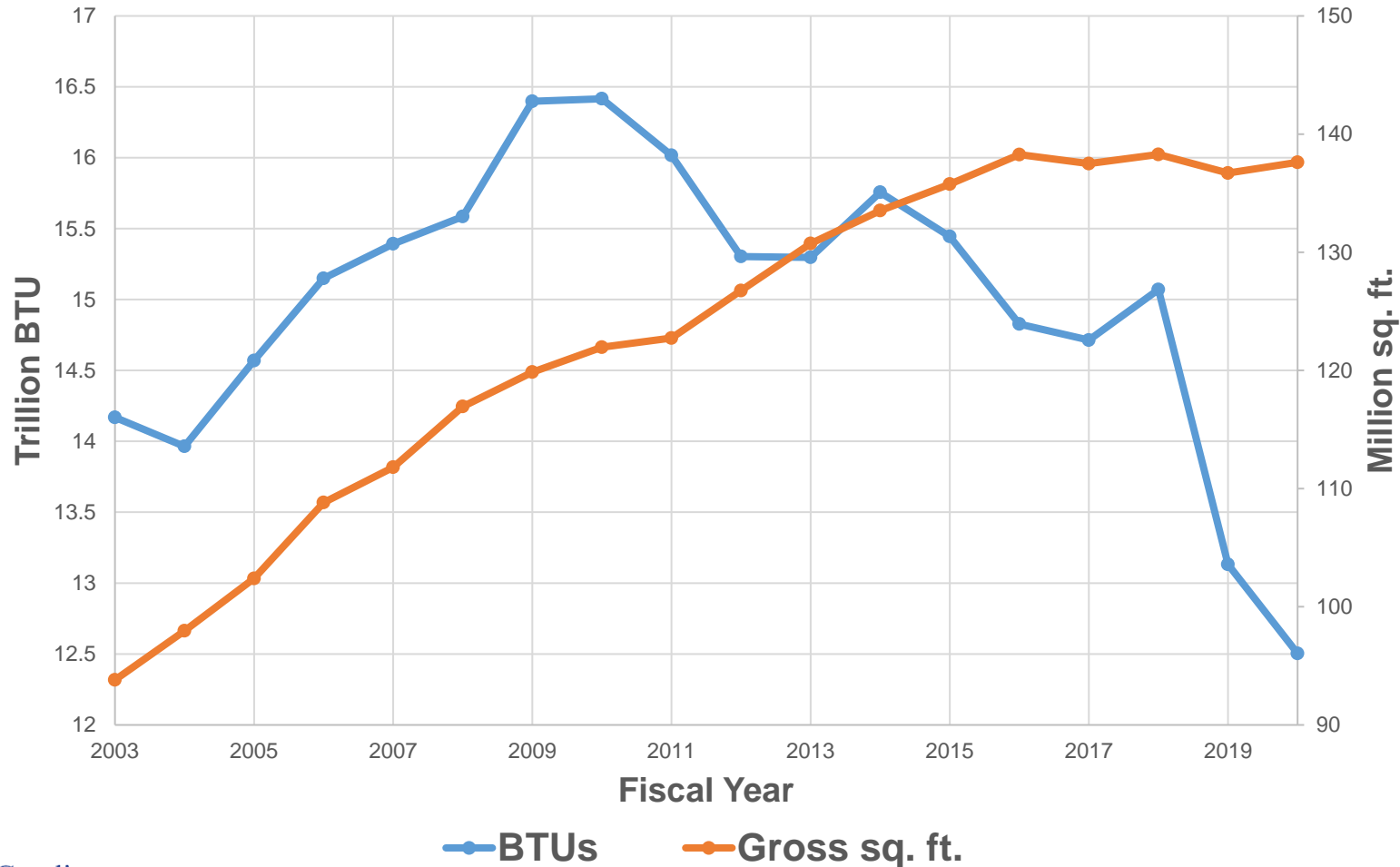
## Utility Spending FY19-20

|                  |                 |
|------------------|-----------------|
| Cabinet Agencies | \$90 MM         |
| Other Agencies   | \$6.3 MM        |
| UNC System       | \$211 MM        |
| <b>Total</b>     | <b>\$307 MM</b> |

**~\$850,000 per day or  
~\$35,000 per hour!**

# BTU, GSF, and EUI

Energy Consumption vs. Gross Sq. Ft.



| Participant                        | BTU/sqft % Change |
|------------------------------------|-------------------|
| Cabinet Agencies                   | -25%              |
| Other Agencies                     | +7%               |
| UNC System                         | -48%              |
| <b>State-Owned Buildings Total</b> | <b>-35%</b>       |



# Collective Emission Reductions



## Avoided Greenhouse Gas Emissions (Million Metric Tons of CO2 Equivalent (MMTCO2e))

| Participant          | Cabinet Agencies | Other Agencies | UNC System | All State Governmental Units |
|----------------------|------------------|----------------|------------|------------------------------|
| FY19-20              | 0.128            | 0.123          | 0.338      | 0.461                        |
| Cumulative FY03-FY20 | 1.28             | 1.30           | 3.04       | 4.34                         |

## Collective Accomplishments

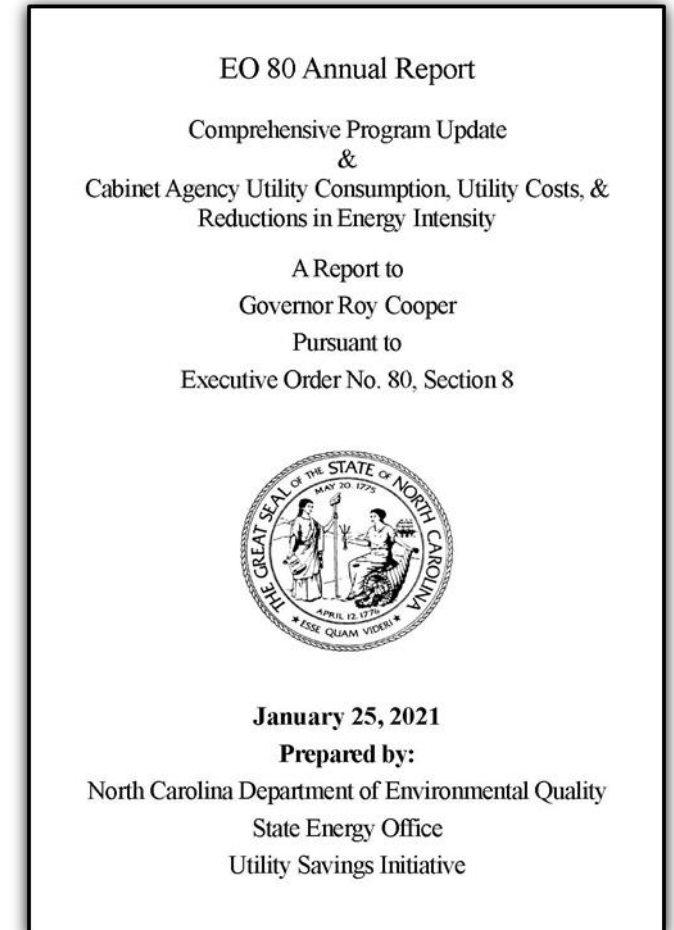


- During FY20:
  - **\$16MM** Less in Actual Utility Spending
  - Avoided\* **\$175 MM** in Utility Costs
- Since FY03:
  - Avoided **4.34 MMTCO<sub>2</sub>e** in Greenhouse Gas Emissions
  - Overall **-35%** EUI reduction
  - Avoided **\$1.5 Billion** in Utility Costs
- Universities have requested over **\$18.5 MM** in carry forward energy savings for FY20-21 (GS 116-30.3B)

*\* Avoided costs represent the amount of money that would have been paid if the entity did not implement any energy efficiency retrofits or upgrades.*

## *EO80 Section 8*

- All Utility Consumption reports were collected, analyzed, and compiled to determine current energy reductions.
- Those results were provided in the report both with graphs and tables
- Annual reports are posted here:  
<https://deq.nc.gov/conservation/energy-efficiency-resources/utility-savings-initiative>



# *Path Forward*



## Actions:

- Designate Full-Time Energy Managers
- Invest in Utility Data Collection System
- Explore Alternative Funding Opportunities

## Outcomes:

- Save Taxpayer Dollars
- Lower EUI Values
- Reduce Greenhouse Gas Emissions

***Collective Efforts Should Achieve EO80 40% EUI  
Reduction Goal by 2025***

# *The Importance of a Unified Data Collection System*

## **Paul E. Braese, PE, PEM, LEED AP**

North Carolina Department of Public Safety  
Central Engineering; Energy Manager  
919-324-1253 (office); 828-645-0229 (cell)  
[paul.braese@ncdps.gov](mailto:paul.braese@ncdps.gov)



NORTH CAROLINA DEPARTMENT OF  
**PUBLIC SAFETY**



# The Importance of a Unified Data Collection System

The Value of a Utility Management Dashboard:  
NC Department of Public Safety's Approach



# Desired Outcomes

- ▶ The value of the **dynamic dashboard**
  - Examples
- ▶ Behind the dashboard: The value of a **unified data collection system**
  - And why robust data collection is needed.
- ▶ **Cloud/commercial based vs. In-House Solutions**
  - The challenges of utility data collection

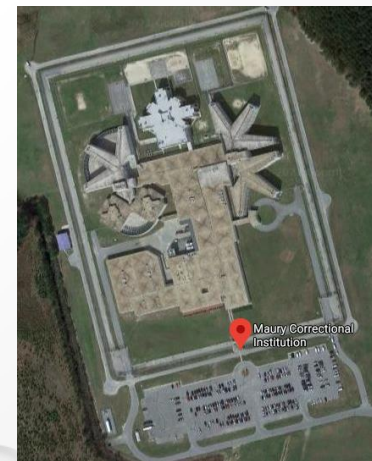
# Useful Concepts

- ▶ You cannot manage what you cannot measure.
- ▶ The Pareto principle (20/80 rule)
- ▶ GIGO: Garbage In, Garbage Out
- ▶ If you are mining data, you are not managing it (one stop shopping)
- ▶ You will never have enough people.
- ▶ Propane & Fuel Oil are commodities, not utilities

# Background:

- ▶ NC Department of Public Safety:
  - Adult Corrections
    - Prisons
    - Administration/Other
    - Correction Enterprise
  - Juvenile Justice
    - Youth Development Centers
    - Juvenile Justice
    - Administrative/Other
  - Other:
    - State Highway Patrol
    - Emergency Management
    - SBI
    - National Guard

# Prisons: Thousand Cells





# Prisons: NCCIW





1388102-58bf77ad658e42e4b787265f08ec3d1a-429w.webp

# By The Numbers:

- ▶ 19,000,000+ GSF
- ▶ 734 Sites
- ▶ 286 Providers
  - 2259 Accounts
  - 3319 Meters



# By The Numbers

|                    |     |
|--------------------|-----|
| ▶ Electric         | 968 |
| ▶ Outdoor Light    | 441 |
| ▶ Gas              | 386 |
| ▶ Trash            | 376 |
| ▶ Water            | 358 |
| ▶ Sewer            | 337 |
| ▶ Propane          | 247 |
| ▶ Fuel Heating Oil | 80  |
| ▶ Stormwater       | 79  |
| ▶ Fire             | 14  |
| ▶ Diesel           | 6   |
| ▶ BOD              | 6   |
| ▶ Grease Trap      | 5   |
| ▶ Irrigation       | 4   |
| ▶ Recycle          | 3   |



# What We Want:

## What We Have

## What We Desire

### And Why a Dashboard Is Important




# Why the Dashboard: Examples





1. Pareto Principle (20/80 rule)
  - Which Division?
  - Which Utility?
  - Which Buildings?
- ▶ Outliers
  - Increases in Cost
  - Highest Cost Per Use
  - Dramatic Yearly Increases








# The Dashboard

  **Home Page**  
Version 39 Last Refreshed Apr 19, 2021 5:04 AM Tutorial ?

Executive Summary Pages

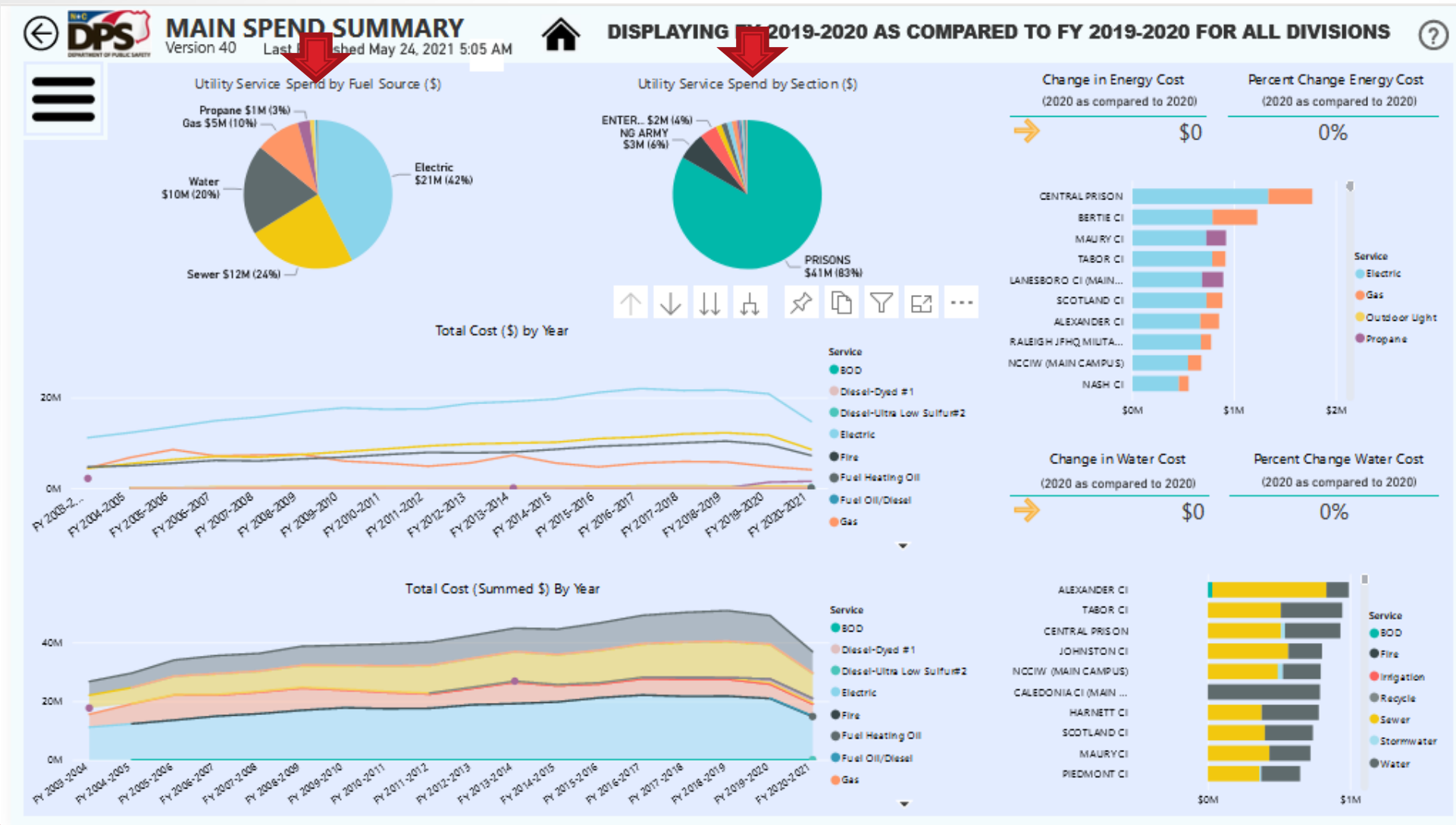
-  **Energy Managers Summary**
-  **Prisons Summary**
-  **Regional Summary**
-  **Executive Summary**

Detailed Pages

-  **All Utilities**
-  **Energy Utilities Only**
-  **Water Utilities Only**
-  **Individual Sites**
-  **Additional Pages**

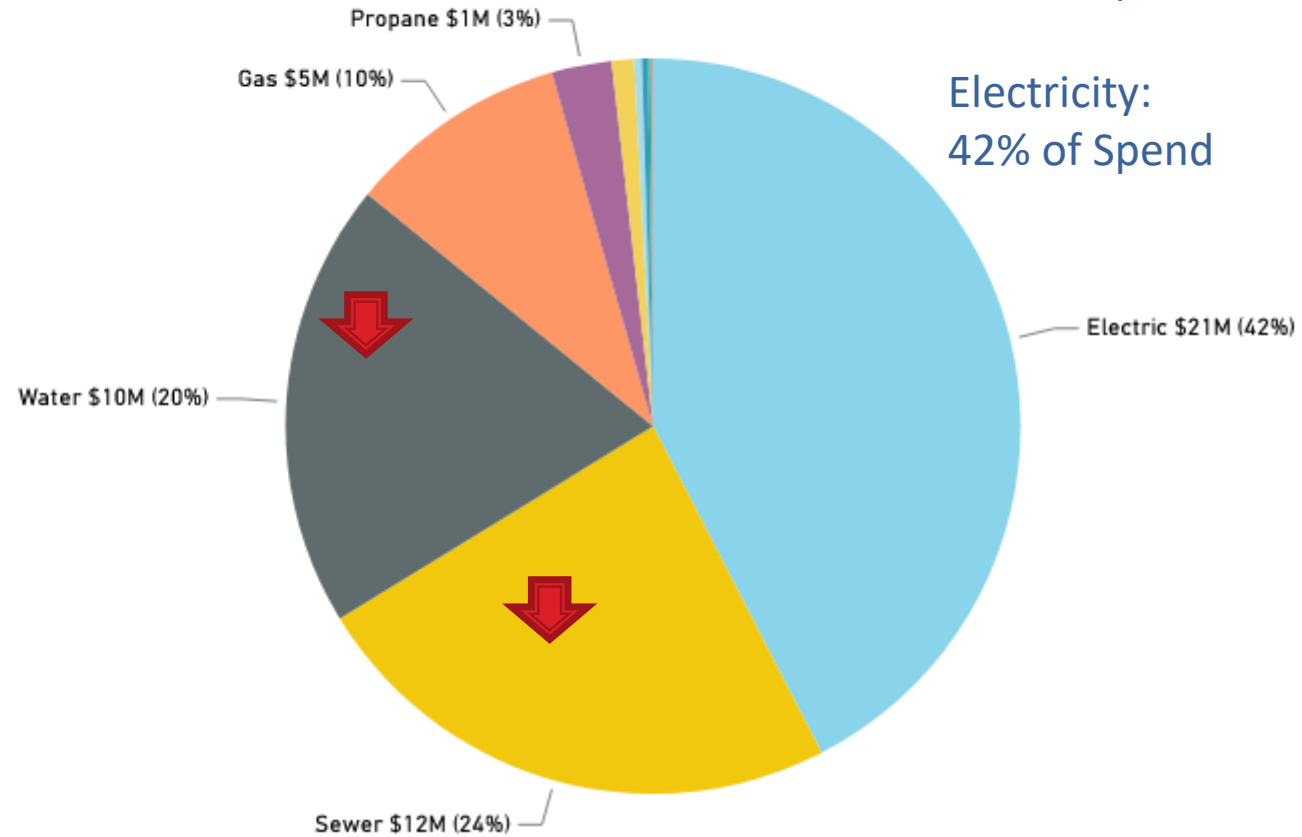
# The Dashboard:

## Biggest Utility Spend, Biggest Division Spend



# The Dashboard: Biggest Utility Spend,

UTILITY SERVICE SPEND BY FUEL SOURCE (\$)

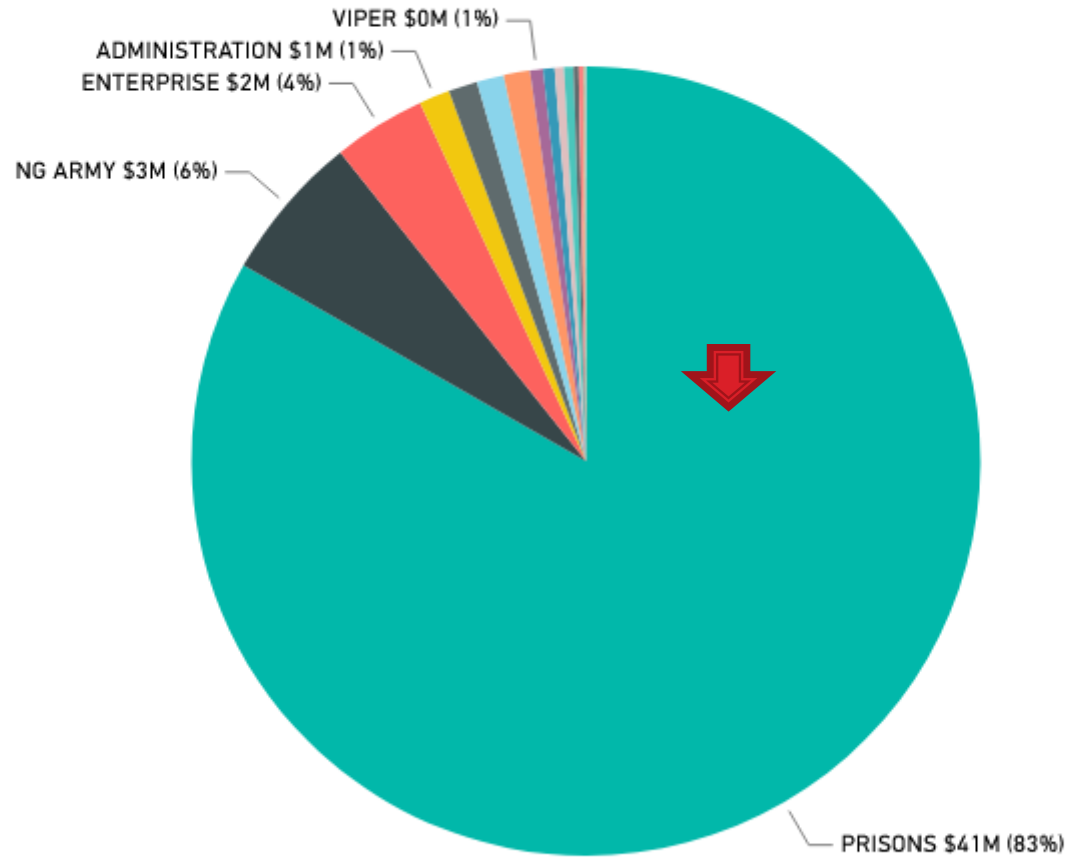


Water/Sewer:  
44% of Spend

Electricity:  
42% of Spend

# The Dashboard: Biggest Division Spend

UTILITY SERVICE SPEND BY SECTION (\$)

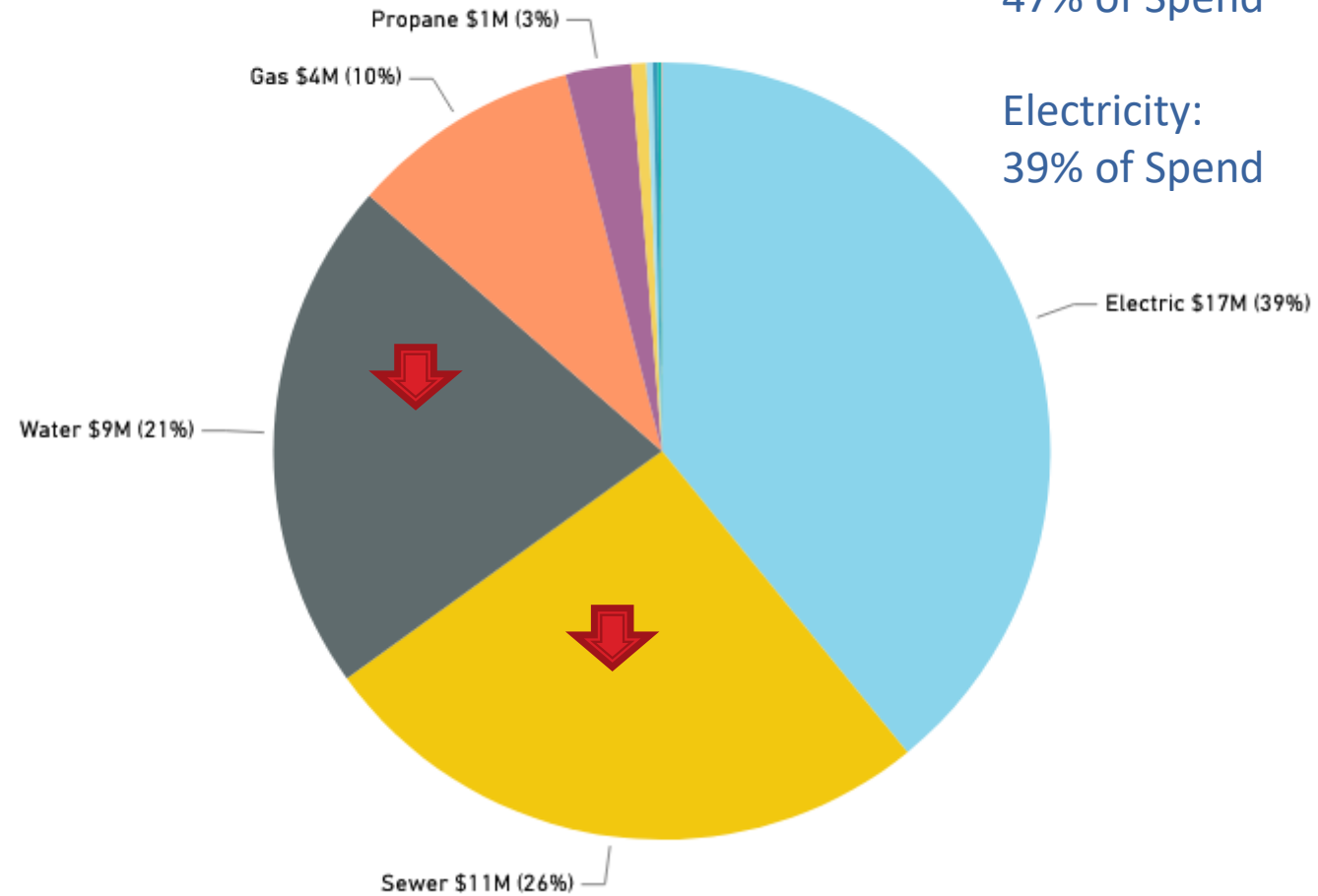


Prisons:  
83% of Spend

# The Dashboard:

## Prisons Biggest Utility Spend

UTILITY SERVICE SPEND BY FUEL SOURCE (\$)



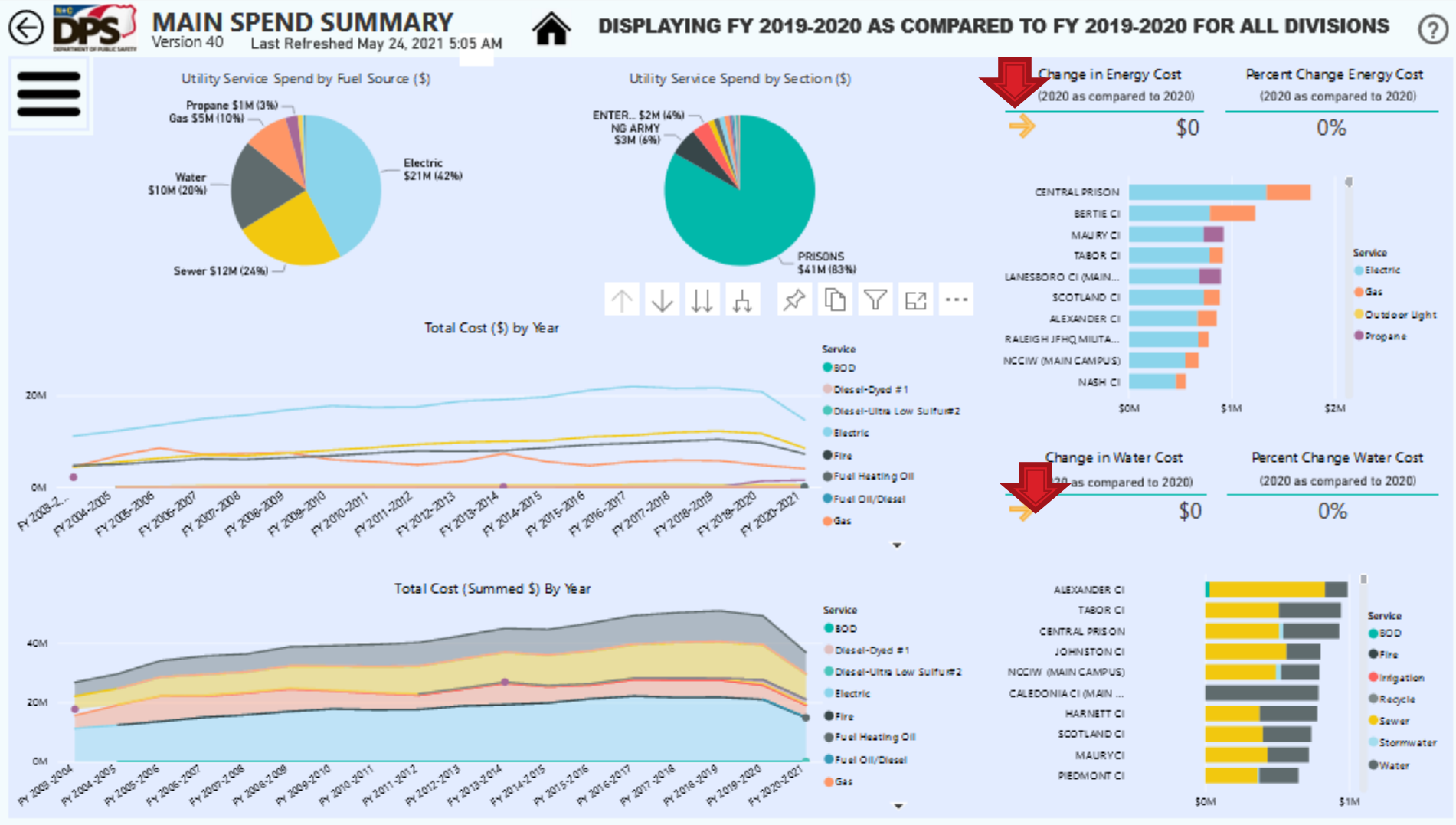
Water/Sewer:  
47% of Spend

Electricity:  
39% of Spend



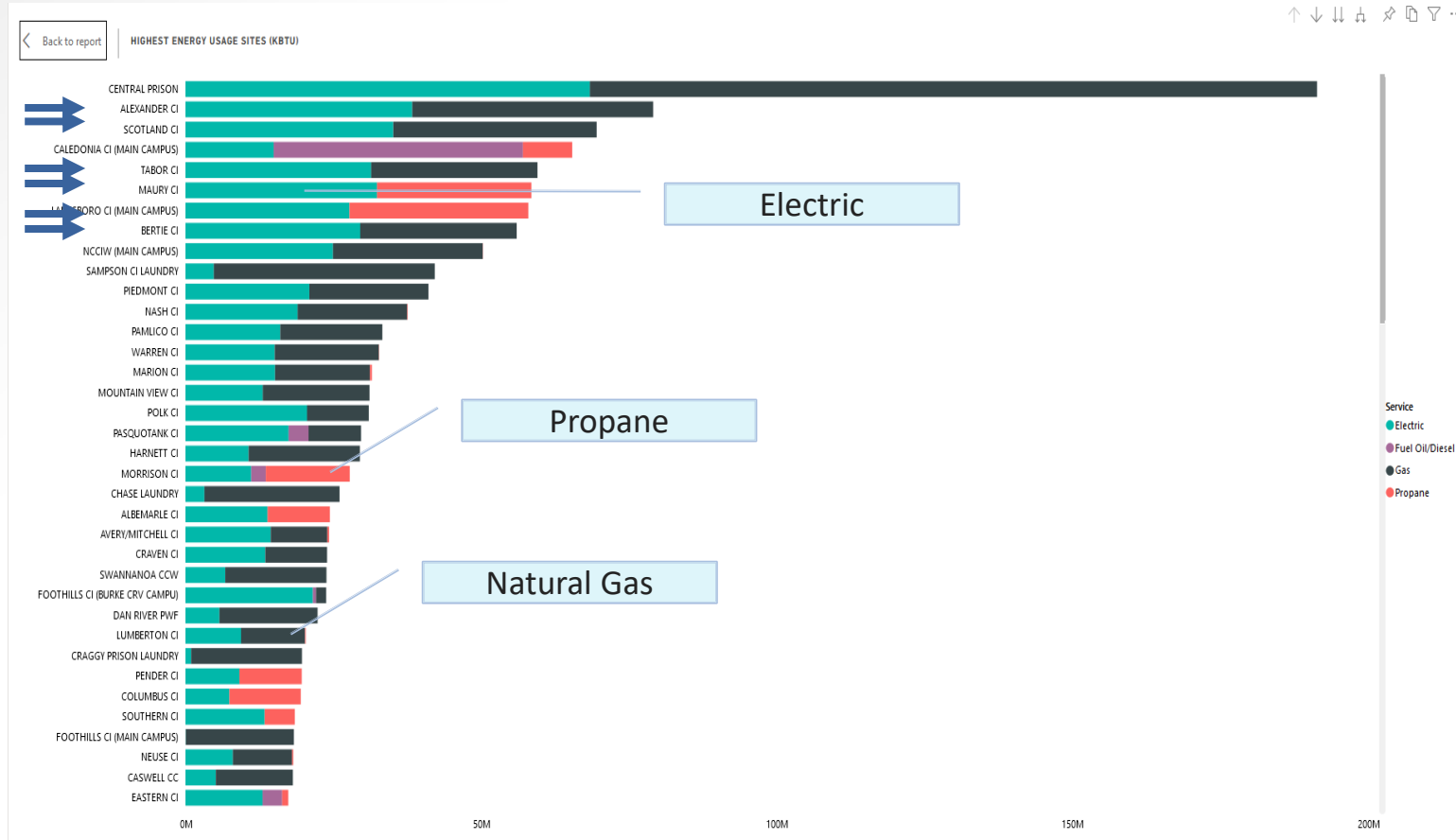
# The Dashboard:

## Biggest Utility Spend, Biggest Division Spend



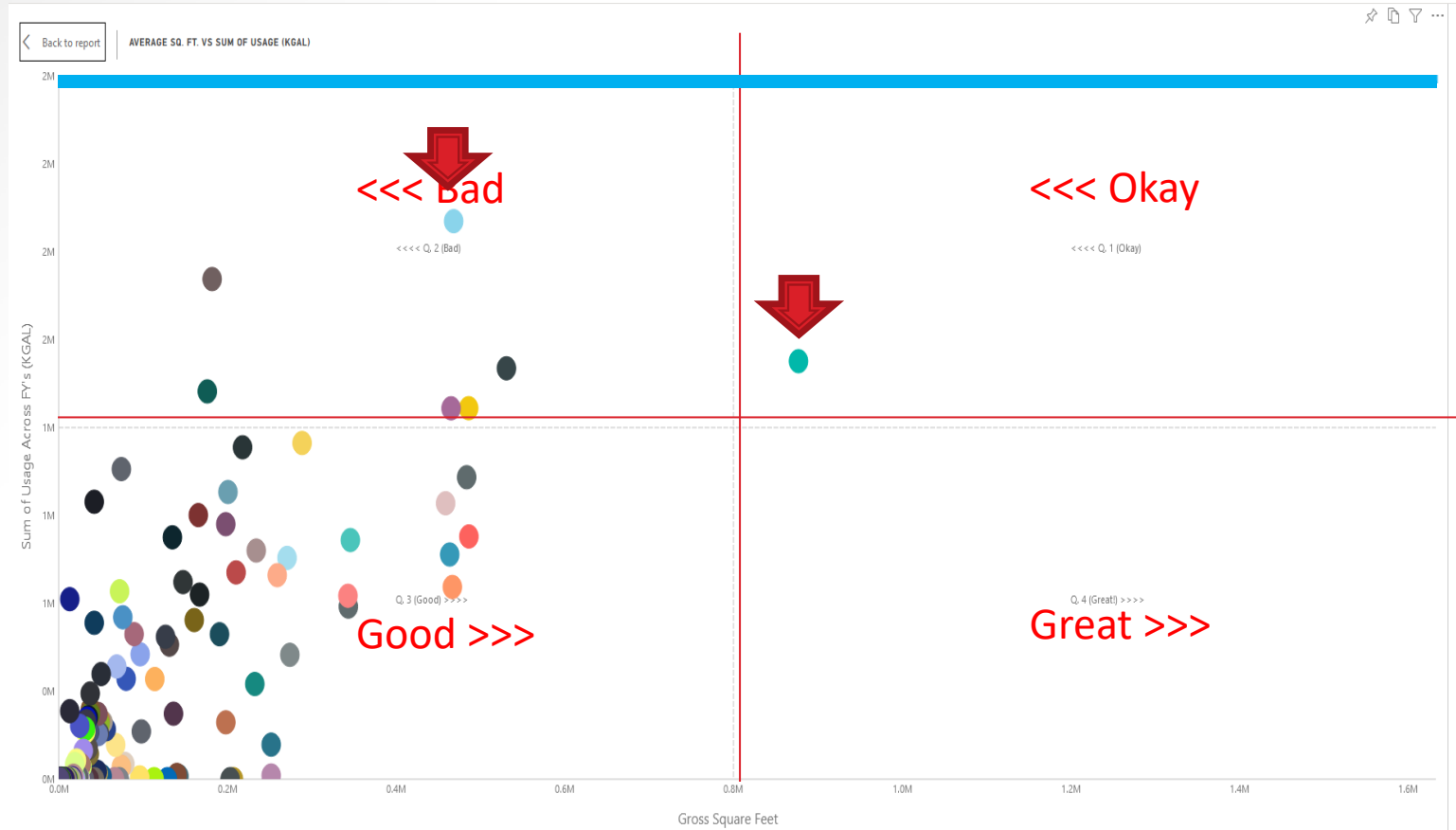
# The Dashboard

## The 20/80 Rule: Largest Usage



# The Dashboard

## The 20/80 Rule: Usage Per GSF



# The Dashboard

## The 20/80 Rule: Usage Per GSF FY 17-18



# The Dashboard

## The 20/80 Rule: Usage Per GSF FY 18-19



# The Dashboard

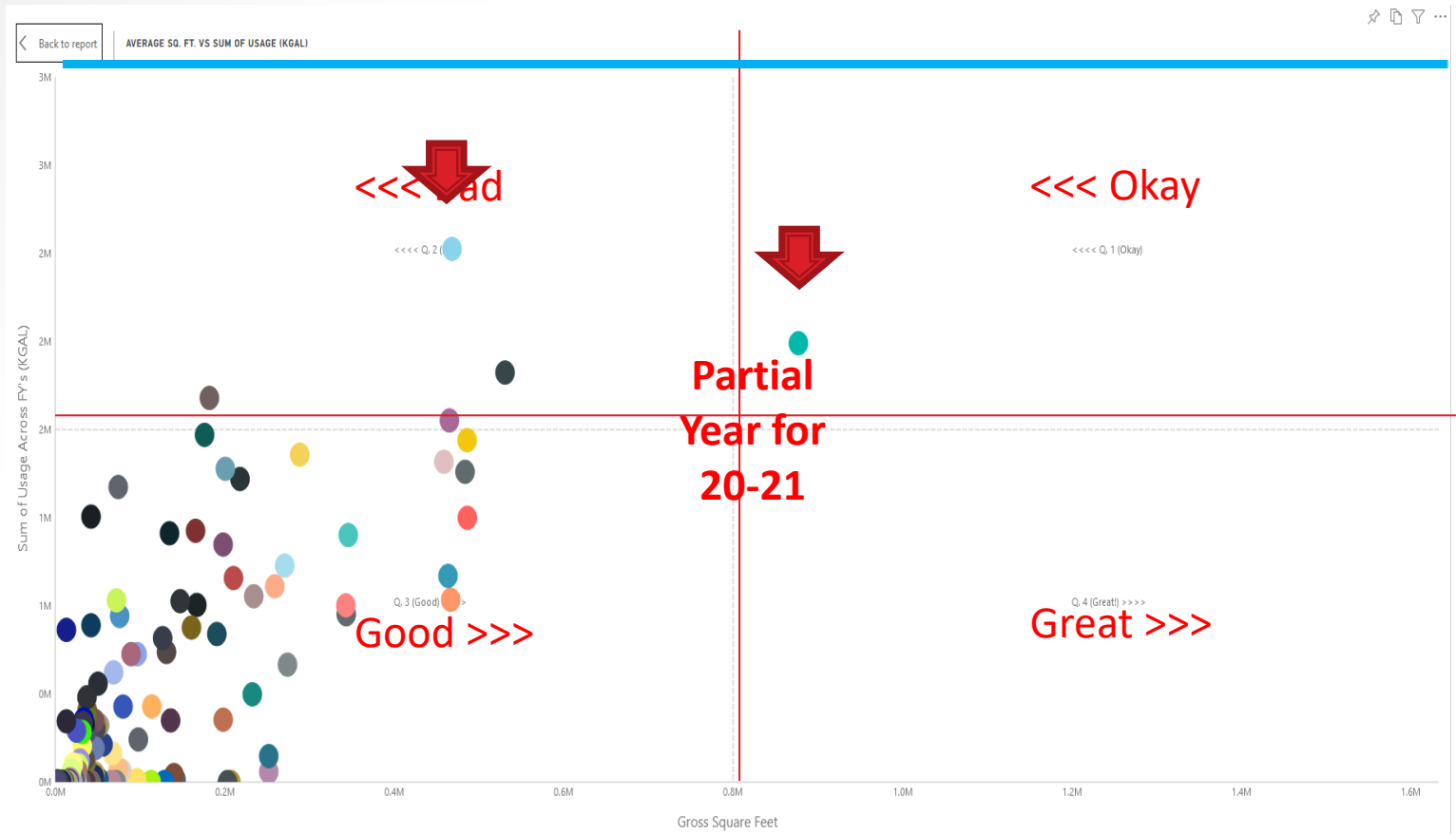
## The 20/80 Rule: Usage Per GSF FY 19-20



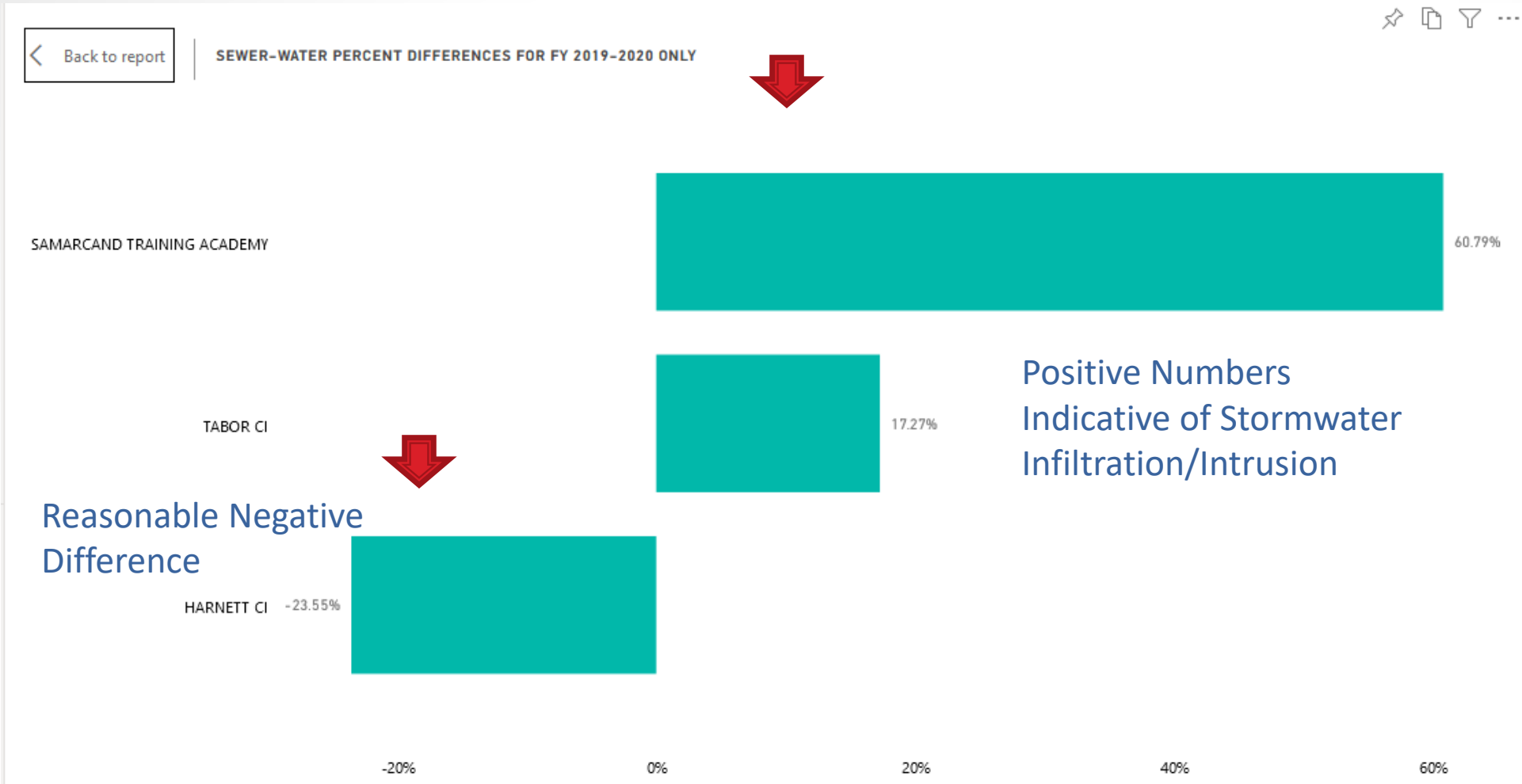


# The Dashboard

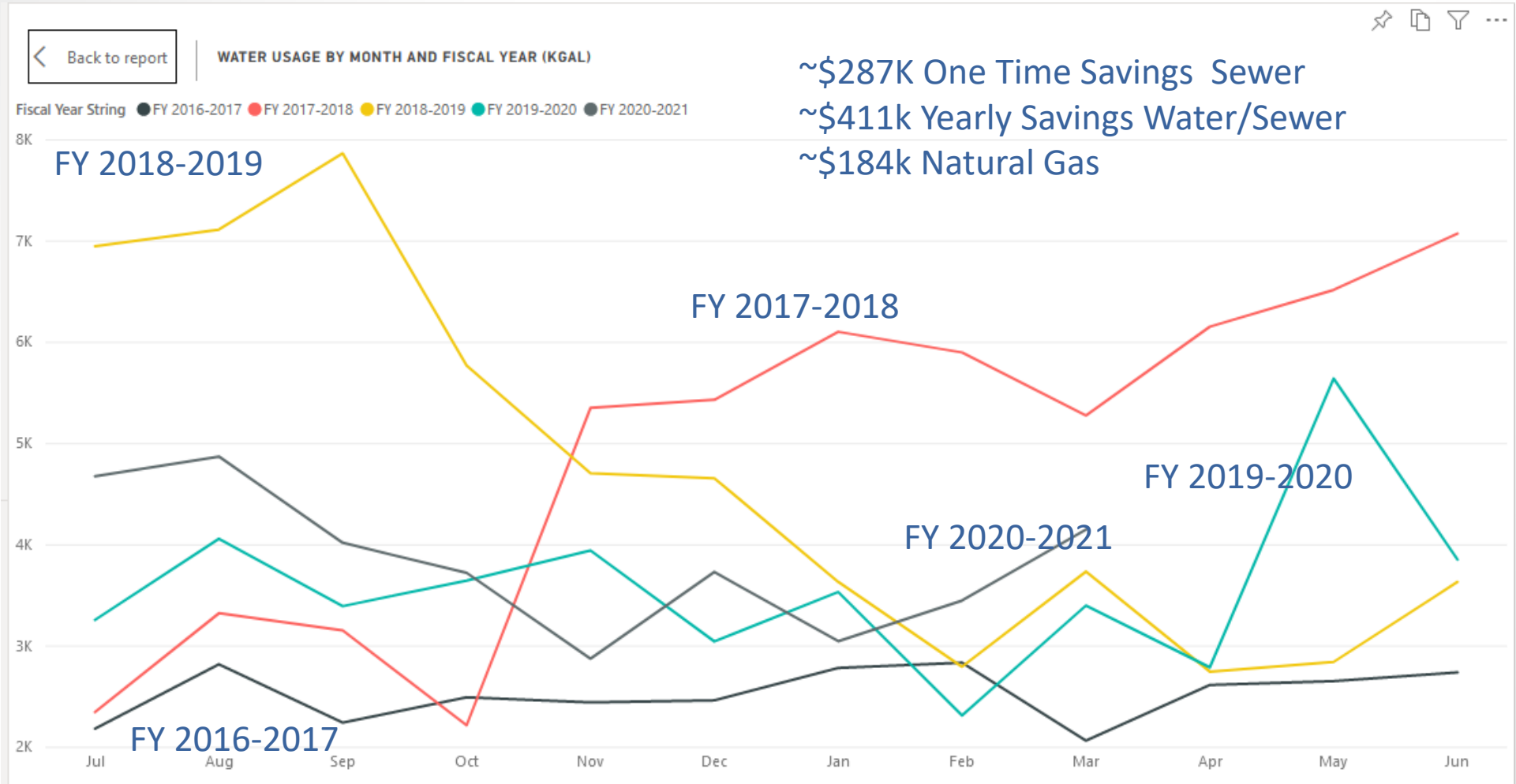
## The 20/80 Rule: Usage Per GSF FY 20-21



# The Dashboard: Water/Sewer Meter Differential

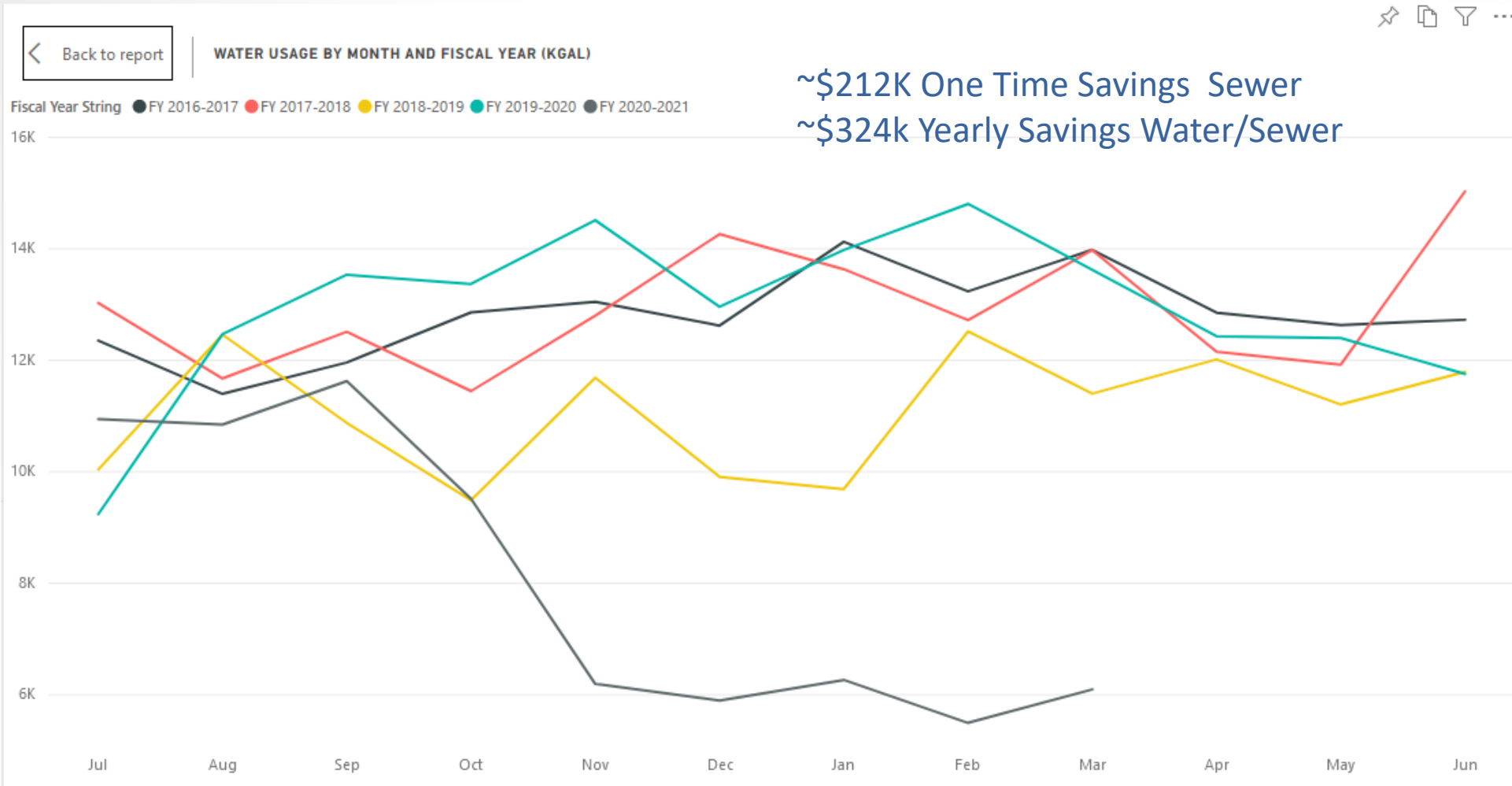


# The Dashboard: Nash CI Water Usage



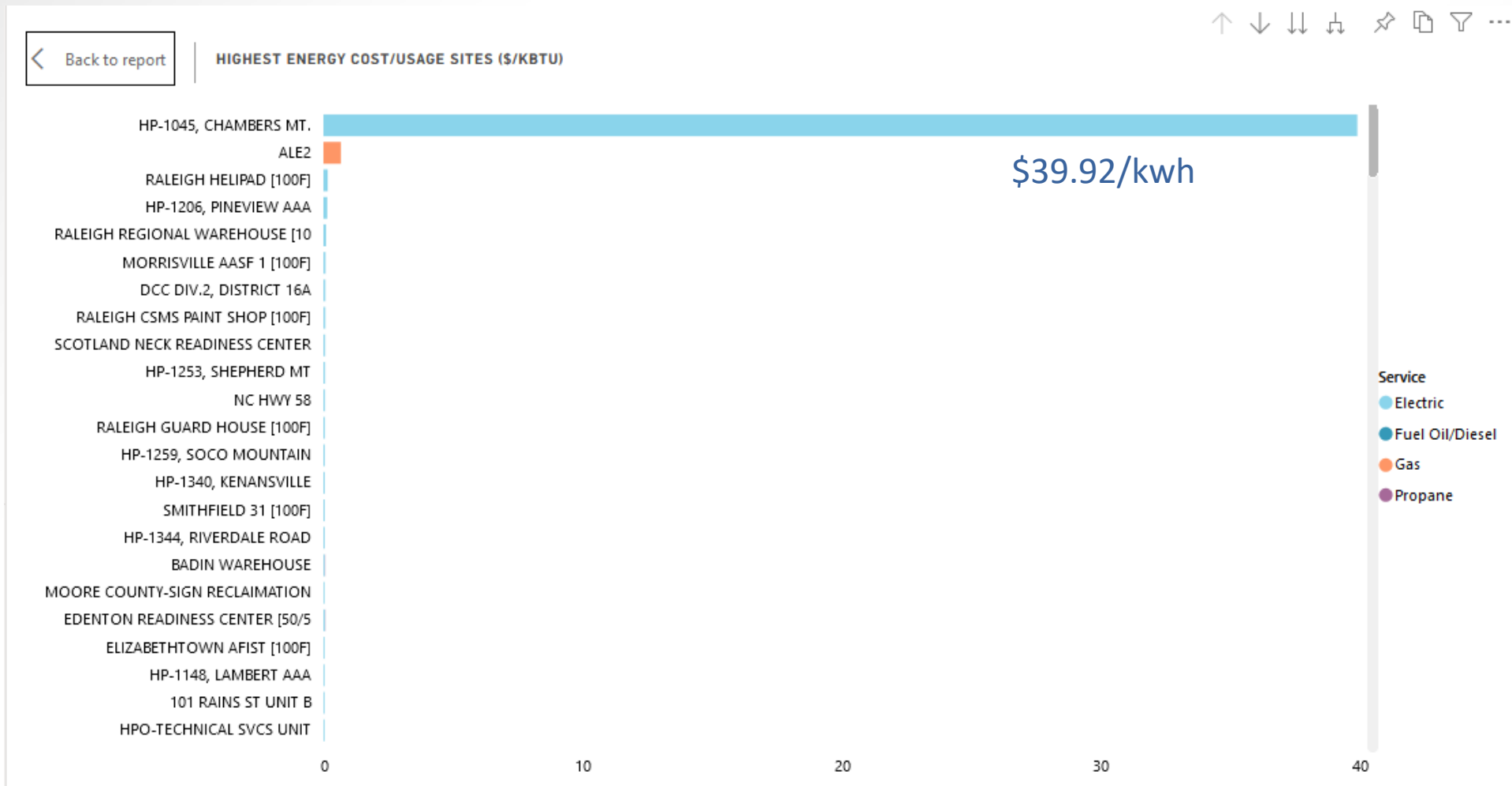
# The Dashboard:

## Biggest Utility Spend, Biggest Division Spend



# The Dashboard:

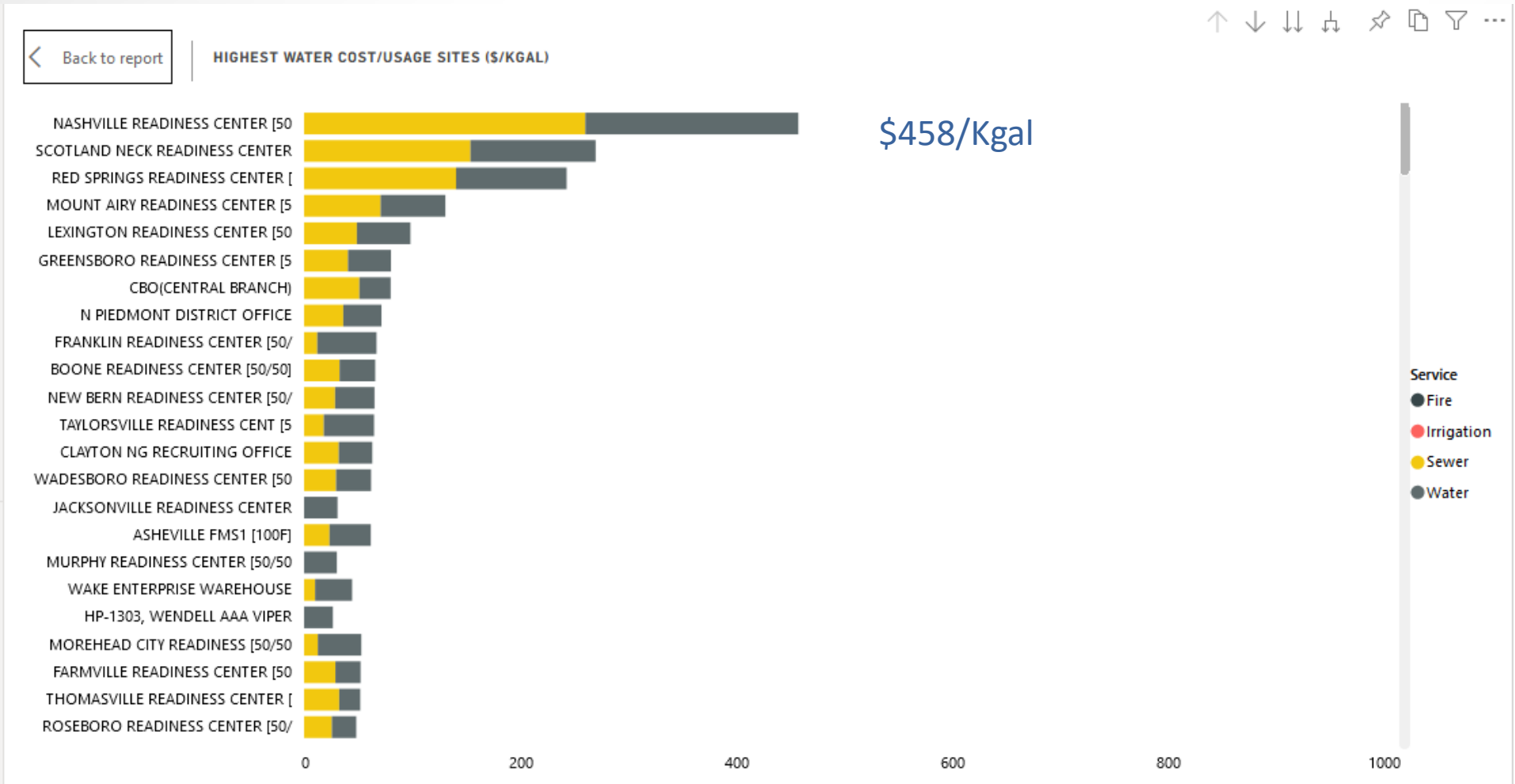
## Highest Energy Cost per Use: Electricity





# The Dashboard:

## Highest Energy Cost per Use: Water/Sewer



# What Have We Learned?

- ▶ The value of a dynamic dashboard
  - Focus:
    - Which utilities
    - Which division
  - Outliers:
    - Biggest users
    - Highest Cost per Use
    - Waster/Sewer anomalies
    - Tracking losses,/savings
    - **Not discussed: EO 80/ USI Reporting**

# About the Utility Billing Software

- ▶ The value of a utility billing software
  - The engine behind the dashboard
  - All bills electronically scanned
  - Outlier reporting
  - Billing errors
  - Comprehensive & accurate data set
  - Ability to properly capture fuel oil & propane

# Remember These Useful Concepts

- ▶ You cannot manage what you cannot measure.
- ▶ The Pareto principle (20/80 rule)
- ▶ GIGO: garbage In, garbage Out
- ▶ If you are mining data, you are not managing it (one stop shopping)
- ▶ You will never have enough people.
- ▶ Propane & Fuel Oil are commodities, not utilities

# Managing or Mining?

- ▶ My time:
  - Months to an hour
- ▶ USI time?
  - Excel? Paper? NCAS?
  - A month? Months?
- ▶ *If so, we are mining, not managing.*
  
- ▶ *Let's make this real....*



# Propane & Fuel Oil

Which Site?

Is It Natural Gas?

Is It "GLL", " ",  
"DOL" "1G", "5C",  
A76", "DOL", "EA",  
"GL", "GC"?

Is It Fuel Oil?

Is It Propane?

Is It for a Forklift?

Is It Gallons?

| CO   | Center   | Account | INVC DATE | INVC#         | Vendor                       | PO #?      | Amount   | UOM | Cost           | Expense Type         | Run Date From | Run Date To |
|------|----------|---------|-----------|---------------|------------------------------|------------|----------|-----|----------------|----------------------|---------------|-------------|
| 1901 | 13103930 | 532220  | 1/3/2012  | 1662          | VAN DERVEERS GAS SERVICE INC | NC10031848 | 47.00    | GLL | \$ 56.92       | PROPANE, TANKWAGON   | 7/1/2012      | 6/30/2013   |
| 1901 | 13104110 | 532220  | 1/25/2013 | CR-148165     | JENKINS GAS AND OIL COMPANY  | NC10005602 | 1,470.00 | GLL | \$ (1,549.68)  | PROPANE STC # 405A   | 7/1/2012      | 6/30/2013   |
| 1907 | 71005656 | 532220  | 6/25/2014 | 1417532824155 | FRONTIER NATURAL GAS COMPANY |            | -        |     | \$ 290.44      | PROPANESTC # 405A    | 7/1/2014      | 6/30/2015   |
| 1901 | 13103010 | 532220  | 4/9/2013  | 1344417       | HESS CORPORATION             |            | -        |     | \$ (43,083.84) |                      | 7/1/2012      | 6/30/2013   |
| 1901 | 13103600 | 532220  | 2/15/2014 | CM19075       | PIEDMONT PROPANE SERVICES    | NC10077230 | 334.00   | GLL | \$ (1,128.03)  | PROPANE STC # 405A   | 7/1/2013      | 6/30/2014   |
| 1907 | 71005656 | 532220  | 7/26/2014 | 1420632824155 | FRONTIER NATURAL GAS COMPANY |            | -        |     | \$ 302.81      | PROPANESTC # 405A    | 7/1/2014      | 6/30/2015   |
| 1907 | 71005656 | 532220  | 8/26/2014 | 1423732824155 | FRONTIER NATURAL GAS COMPANY |            | -        |     | \$ 311.06      | PROPANESTC # 405A    | 7/1/2014      | 6/30/2015   |
| 1907 | 71005656 | 532220  | 9/25/2014 | 1426732824155 | FRONTIER NATURAL GAS COMPANY |            | -        |     | \$ 698.25      | PROPANESTC # 405A    | 7/1/2014      | 6/30/2015   |
| 1901 | 13104580 | 532241  | 9/28/2016 | 0737826-IN    | GREAT LAKES PETROLEUM        | NC10315733 | 500.00   | GLL | \$ 909.32      | ULSD #2, DIESEL FUEL | 7/1/2016      | 6/30/2017   |

There is Cost But  
No Quantity?


Is It Diesel?

Is It for Building  
Heat?

Which Division?

Is It for  
Generators?

# A Typical Utility Bill



**Town of Mooresville**  
 PO Box 878 • 413 N. Main Street  
 Mooresville, NC 28115  
 Phone: (704) 663-3800  
 Office Hours: Mon-Fri 8:30 a.m. - 5:00 p.m.  
 www.mooresvillenc.gov

## UTILITY STATEMENT

### Account Summary

|                               |                 |
|-------------------------------|-----------------|
| Previous Balance              | 153.18          |
| Payments/Credits              | 153.18          |
| Penalties                     | 0.00            |
| <b>Past Due Balance</b>       | <b>0.00</b>     |
| <b>Current Charges:</b>       | <b>157.64</b>   |
| Town of Mooresville Utilities | 157.64          |
| Municipal Services            | 0.00            |
| Miscellaneous Fees            | 0.00            |
| <b>Total Current Charges</b>  | <b>157.64</b>   |
| <b>Total Balance Due</b>      | <b>\$157.64</b> |

|                 |                 |
|-----------------|-----------------|
| Account Number  | 101755          |
| Customer Number | 300351          |
| Service Address | 261 W MOORE AVE |
| Statement Date  | 04/01/2021      |
| Amount Due      | \$157.64        |

**To receive future statements electronically, visit**  
<https://mooresville.estmt.net>  
**Your Registration ID:**  
5047-507W-LZZ8

TOWN OFFICES WILL BE CLOSED IN OBSERVANCE OF GOOD FRIDAY ON APRIL 2

### Town of Mooresville Utilities

Meter Information: Feb.2 to Mar.2 (25 days)

| METER    | PREVIOUS READING | CURRENT READING | USAGE x100 GAL |
|----------|------------------|-----------------|----------------|
| 12513294 | 36,311           | 36,334          | 23             |

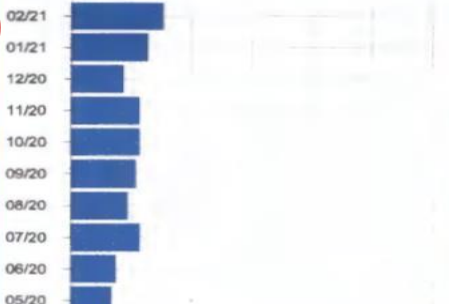
**WATER SERVICE**

Base Amount: 56.88  
 Volume Amount: 11.20  
 Rate Code: IC4  
 Subtotal: 68.08

**SEWER**

Base Amount: 75.12  
 Volume Amount: 14.44  
 Rate Code: IC4  
 Subtotal: 89.56

### Usage Graph



### Municipal Services

### Miscellaneous Fees

# Harnett CI Water/Sewer Account Paper Bill

459864 4\1250

| ACCOUNT NUMBER | SERVICE ADDRESS      | BILLING DATE | DATE FROM | DATE TO  | DAYS |
|----------------|----------------------|--------------|-----------|----------|------|
| 611            | 1210 EAST MCNEILL ST | 04/30/21     | 03/17/21  | 04/20/21 | 34   |

NC DEPT. OF PUBLIC SAFETY  
PO BOX 968  
ATTN: C&I DEPARTMENT  
MANDAN, ND 58554

**TOWN OF LILLINGTON**  
102 EAST FRONT ST.  
PO BOX 296  
LILLINGTON, NC 27546-0000

| METER NUMBER | PREVIOUS READING | CURRENT READING | USAGE   | UNITS | DESCRIPTION              | AMOUNT   |
|--------------|------------------|-----------------|---------|-------|--------------------------|----------|
|              |                  |                 |         |       | BALANCE FORWARD          | 0.00     |
|              |                  |                 |         |       | LATE FEE/PENALTY DUE NOW | 0.00     |
|              |                  |                 |         |       | NEW CUSTOMER CONNECTION  | 0.00     |
| 60797674     | 400000           | 400000          | 0       | 1     | WATER - PRISON/JAIL IN   | 6699.10  |
| 70295909     | 229165785        | 231737623       | 2571838 | 1     | WATER - PRISON/JAIL IN   | 25201.93 |
| 210B01589    | 85126000         | 87163000        | 2037000 | 1     | SEWR PRISON/JAIL IN      | 29799.84 |
| 1427095      | 36102100         | 36384700        | 282600  | 1     | WATR-COM/IND/SCH 2" IN   | 1449.28  |
| 1433136      | 7392000          | 7398000         | 6000    | 1     | WATER-COM/IND/SCH 6" IN  | 180.86   |
| 1427095      | 36102100         | 36384700        | 282600  | 1     | SEWR COM/IND/SCH 2" IN   | 2030.77  |
| 1433136      | 7392000          | 7398000         | 6000    | 1     | SEWR COM/IND/SCH 6" IN   | 220.45   |

NO SECOND NOTICE GIVEN.  
DELINQUENT ACCOUNTS WILL BE CUT OFF ON 05/26/2021 AM.  
TOWN HALL WILL BE CLOSED 05/31/2021 FOR MEMORIAL DAY.  
HAPPY SPRING!

|                       |                 |
|-----------------------|-----------------|
| TOTAL ACCOUNT BALANCE | 65582.23        |
| PREVIOUS BALANCE      | 0.00            |
| LATE FEE/PENALTY      | 0.00            |
| <b>TOTAL DUE</b>      | <b>65582.23</b> |

| DETACH HERE AND RETURN THIS PORTION WITH YOUR REMITTANCE |           | ACCOUNT NUMBER | SERVICE ADDRESS      |
|--|-----------|----------------|----------------------|
|  |           | 611            | 1210 EAST MCNEILL ST |
| BILLING DATE   | DATE FROM | DATE TO        | DAYS                 |
| 04/30/21   | 03/17/21  | 04/20/21       | 34                   |

NC DEPT. OF PUBLIC SAFETY  
PO BOX 968  
ATTN: C&I DEPARTMENT  
MANDAN, ND 58554

|                      |          |            |          |
|----------------------|----------|------------|----------|
| <b>DUE DATE</b>      | 05/15/21 | <b>PAY</b> | 65582.23 |
| <b>IF PAID AFTER</b> | 05/20/21 | <b>PAY</b> | 65582.23 |

0000000061100655822300655822300007

|                    |  |
|--------------------|--|
| <b>AMOUNT PAID</b> |  |
|--------------------|--|



# Harnett CI Water/Sewer Account Electronic Scan – Page 1

| INVOICE #  | SCAN DATE   | STATUS | DUE DATE            |
|--|-------------|--------|---------------------|
| 414093599  | May 5, 2021 | Live   | May 15, 2021        |
| Payment Date                                     |             |        | 05/07/2021          |
| <b>Water - commercial</b>                        |             |        |                     |
| 03/18/21 - 04/20/21 Bill Period: 202104          |             |        |                     |
| HARNETT CI (193805) - Gallons                    |             |        | \$ 6,699.10         |
| HARNETT CI (193805) - Gallons                    |             |        | \$ 25,201.93        |
| HARNETT MEAT PROCESSING PLANT (195805) - Gallons |             |        | \$ 1,449.28         |
| HARNETT MEAT PROCESSING PLANT (195805) - Gallons |             |        | \$ 180.86           |
| <b>Current Water - commercial Charges</b>        |             |        | <b>\$ 33,531.17</b> |
| <b>Sewer - commercial</b>                        |             |        |                     |
| 03/18/21 - 04/20/21 Bill Period: 202104          |             |        |                     |
| HARNETT CI (193805) - Gallons                    |             |        | \$ 29,799.84        |
| HARNETT MEAT PROCESSING PLANT (195805) - Gallons |             |        | \$ 2,204.42         |
| HARNETT MEAT PROCESSING PLANT (195805) - Gallons |             |        | \$ 46.80            |
| <b>Current Sewer - commercial Charges</b>        |             |        | <b>\$ 32,051.06</b> |
| <b>Total Due</b>                                 |             |        | <b>\$ 65,582.23</b> |

## HARNETT CI (193805)

### WATER - COMMERCIAL

| METER #  | LOCATION          | READING DATE | CURRENT READING | PREVIOUS READING | DIFFERENCE | METER MULTIPLIER | ACTUAL UNIT OF USAGE MEASURE | COST         | COST % |
|----------|-------------------|--------------|-----------------|------------------|------------|------------------|------------------------------|--------------|--------|
| 60797674 | 1210 E MCNEILL ST | 04/20/21     | 400000          | 400000           | 0          | 1                | 0 Gallons                    | \$ 6,699.10  | 21.00  |
| 70295909 | 1210 E MCNEILL ST | 04/20/21     | 231737623       | 229165785        | 2571838    | 1                | 2,571,838 Gallons            | \$ 25,201.93 | 79.00  |

Total: **\$ 31,901.03** 100.00

Optimized Cost (Actual): \$ 31,901.03 (Override):

Usage (Actual): 2571838 Gallons (Override):  \$ 0.0124/Gallons

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# Harnett CI Water/Sewer Account Electronic Scan – Page 2

| METER #  | LOCATION          | READING DATE | CURRENT READING | PREVIOUS READING | DIFFERENCE | METER MULTIPLIER | ACTUAL UNIT OF USAGE MEASURE | COST         | COST % |
|----------|-------------------|--------------|-----------------|------------------|------------|------------------|------------------------------|--------------|--------|
| 60797674 | 1210 E MCNEILL ST | 04/20/21     | 400000          | 400000           | 0          | 1                | 0 Gallons                    | \$ 6,699.10  | 21.00  |
| 70295909 | 1210 E MCNEILL ST | 04/20/21     | 231737623       | 229165785        | 2571838    | 1                | 2,571,838 Gallons            | \$ 25,201.93 | 79.00  |

**Total:** **\$ 31,901.03** **100.00**  
 Optimized Cost (Actual): \$ 31,901.03 (Override):  Usage (Actual): 2571838 Gallons (Override):  \$ 0.0124/Gallons

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## SEWER - COMMERCIAL

| METER #   | LOCATION          | READING DATE | CURRENT READING | PREVIOUS READING | DIFFERENCE | METER MULTIPLIER | ACTUAL UNIT OF USAGE MEASURE | COST         | COST % |
|-----------|-------------------|--------------|-----------------|------------------|------------|------------------|------------------------------|--------------|--------|
| 218B01589 | 1210 E MCNEILL ST | 04/20/21     | 87163000        | 85126000         | 2037000    | 1                | 2,037,000 Gallons            | \$ 29,799.84 | 100.00 |

**Total:** **\$ 29,799.84** **100.00**  
 Optimized Cost (Actual): \$ 29,799.84 (Override):  Usage (Actual): 2037000 Gallons (Override):  \$ 0.0146/Gallons

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## HARNETT MEAT PROCESSING PLANT (195805)

### WATER - COMMERCIAL

| METER # | LOCATION          | READING DATE | CURRENT READING | PREVIOUS READING | DIFFERENCE | METER MULTIPLIER | ACTUAL UNIT OF USAGE MEASURE | COST        | COST % |
|---------|-------------------|--------------|-----------------|------------------|------------|------------------|------------------------------|-------------|--------|
| 1427095 | 1210 E MCNEILL ST | 04/20/21     | 36384700        | 36102100         | 282600     | 1                | 282,600 Gallons              | \$ 1,449.28 | 88.91  |
| 1433136 | 1210 E MCNEILL ST | 04/20/21     | 7398000         | 7392000          | 6000       | 1                | 6,000 Gallons                | \$ 180.86   | 11.09  |

**Total:** **\$ 1,630.14** **100.00**  
 Optimized Cost (Actual): \$ 1,630.14 (Override):  Usage (Actual): 288600 Gallons (Override):  \$ 0.0056/Gallons

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### SEWER - COMMERCIAL

| METER # | LOCATION          | READING DATE | CURRENT READING | PREVIOUS READING | DIFFERENCE | METER MULTIPLIER | ACTUAL UNIT OF USAGE MEASURE | COST        | COST % |
|---------|-------------------|--------------|-----------------|------------------|------------|------------------|------------------------------|-------------|--------|
| 1427095 | 1210 E MCNEILL ST | 04/20/21     | 36384700        | 36102100         | 282600     | 1                | 282,600 Gallons              | \$ 2,204.42 | 108.55 |
| 1433136 | 1210 E MCNEILL ST | 04/20/21     | 7398000         | 7392000          | 6000       | 1                | 6,000 Gallons                | \$ 46.80    | 2.30   |

**Total:** **\$ 2,251.22** **100.00**  
 Optimized Cost (Actual): \$ 2,251.22 (Override):  Usage (Actual): 288600 Gallons (Override):  \$ 0.0078/Gallons





# What Does This Mean?

- ▶ Every bill is scanned - it is accurate
- ▶ Every detail is captured:
  - KWH, KW,
  - All units of measure are consistent (therms, gallons, kwh)
  - All energy units are converted to common unit (btus)
  - Every meter is captured including lighting bills
  - Other data:
    - The rate
    - Billing address, meter address
    - ALL COSTS: Facility charges, off-peak, on-peak, etc.
- ▶ AND:
  - Billing error reporting
  - Outlier reporting

# Not Yet Covered: Outcomes

- ▶ What about the value of a **unified data collection system**?
- ▶ **Cloud/commercial based vs. In-House Solutions**
  - The challenges of utility data collection

# Opportunities & Challenges: Cloud/Commercial Based

## ▶ Disadvantages:

- High cost per bill?
- Security?

## ▶ Advantages:

- In addition to what has been discussed:
  - Discount bulk pricing
  - Best practices
  - Customer Service

# Opportunities & Challenges: In-House

- ▶ Advantages:
  - Lower (Total) Costs?
  - Security
  - Tailored to our needs?
- ▶ Disadvantages?

# Questions To Ask



- ▶ Will :
  - All bills be scanned and all granular data captured?
  - Unit conversions occur and what will be the standards?
  - Third party billing be accurately captured (Natural Gas transportation)
  - HDD and CDD be included?
  - Energy Management Portfolio integration be supported?
  - Same or next day customer service?

# Questions To Ask

- ▶ Yearly updates to accommodate latest best practices?
- ▶ Long term support costs to support the system (LCC?)
- ▶ Capture latitude and longitude?
- ▶ Custom fields?
- ▶ Accurately calculate greenhouse gas emissions?



**END**



# *UNC System Perspective*

## **David King, CEM**

Western Carolina University  
Energy Manager / Building Automation Systems  
Facilities Management  
828-227-2645 (office)  
dbking@wcu.edu

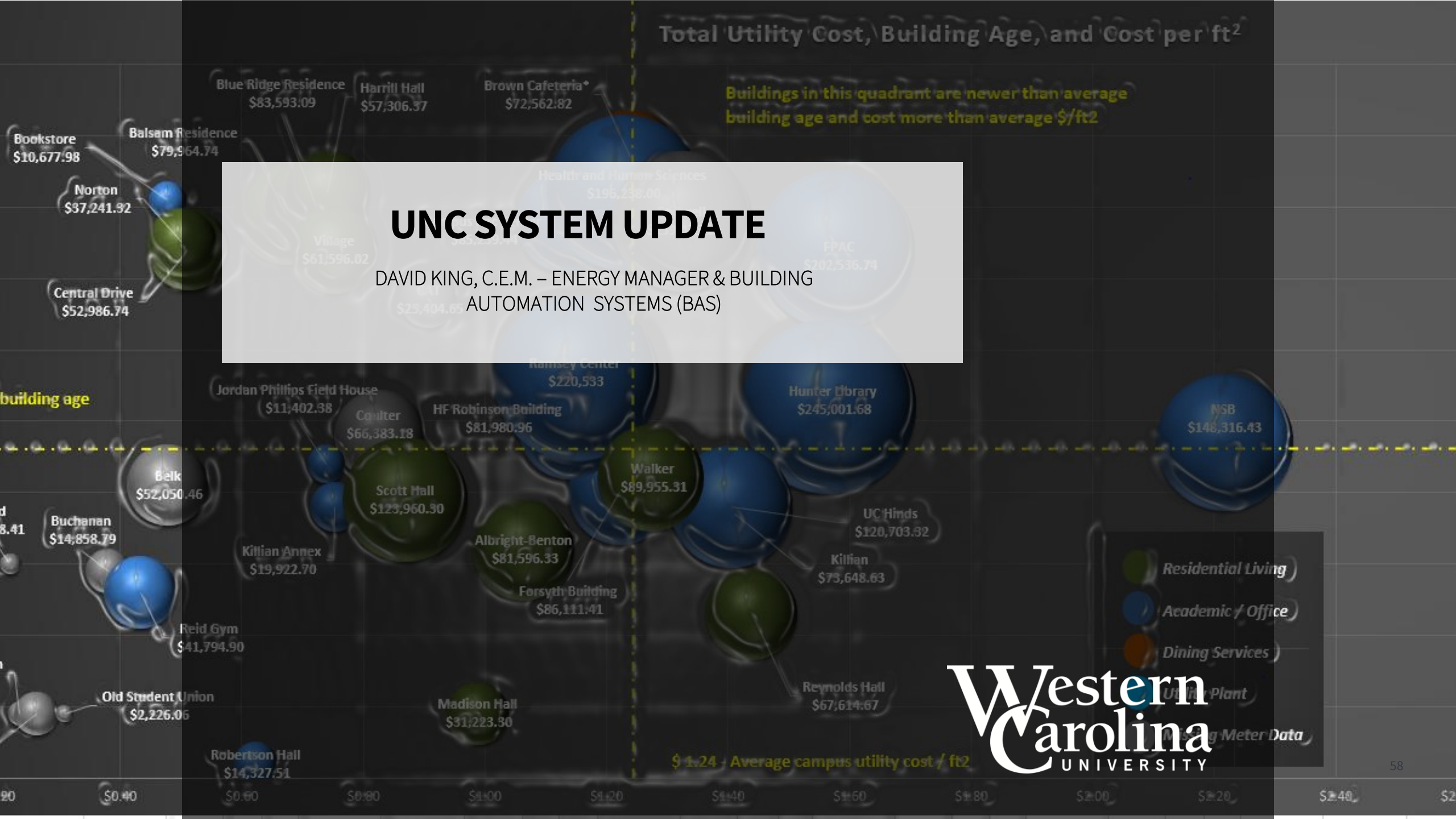


# Total Utility Cost, Building Age, and Cost per ft<sup>2</sup>

Buildings in this quadrant are newer than average building age and cost more than average \$/ft<sup>2</sup>

## UNC SYSTEM UPDATE

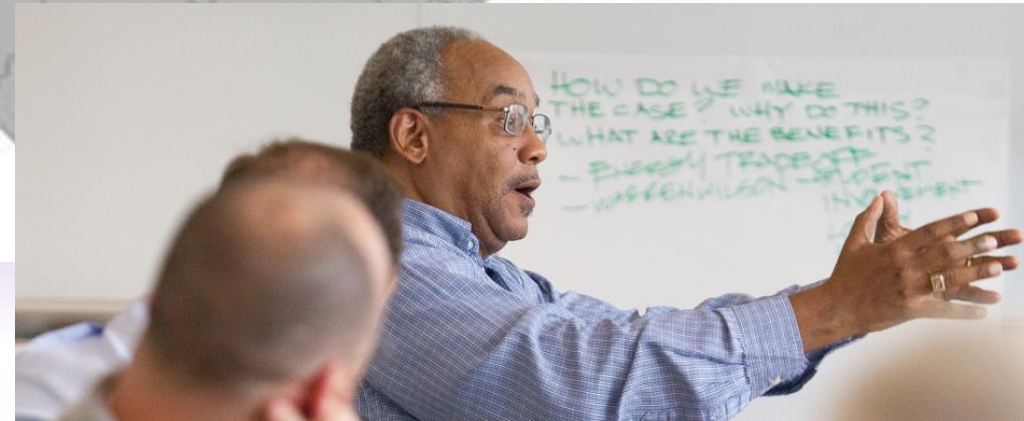
DAVID KING, C.E.M. – ENERGY MANAGER & BUILDING AUTOMATION SYSTEMS (BAS)



# Appalachian Energy Summit

APPALACHIAN STATE UNIVERSITY

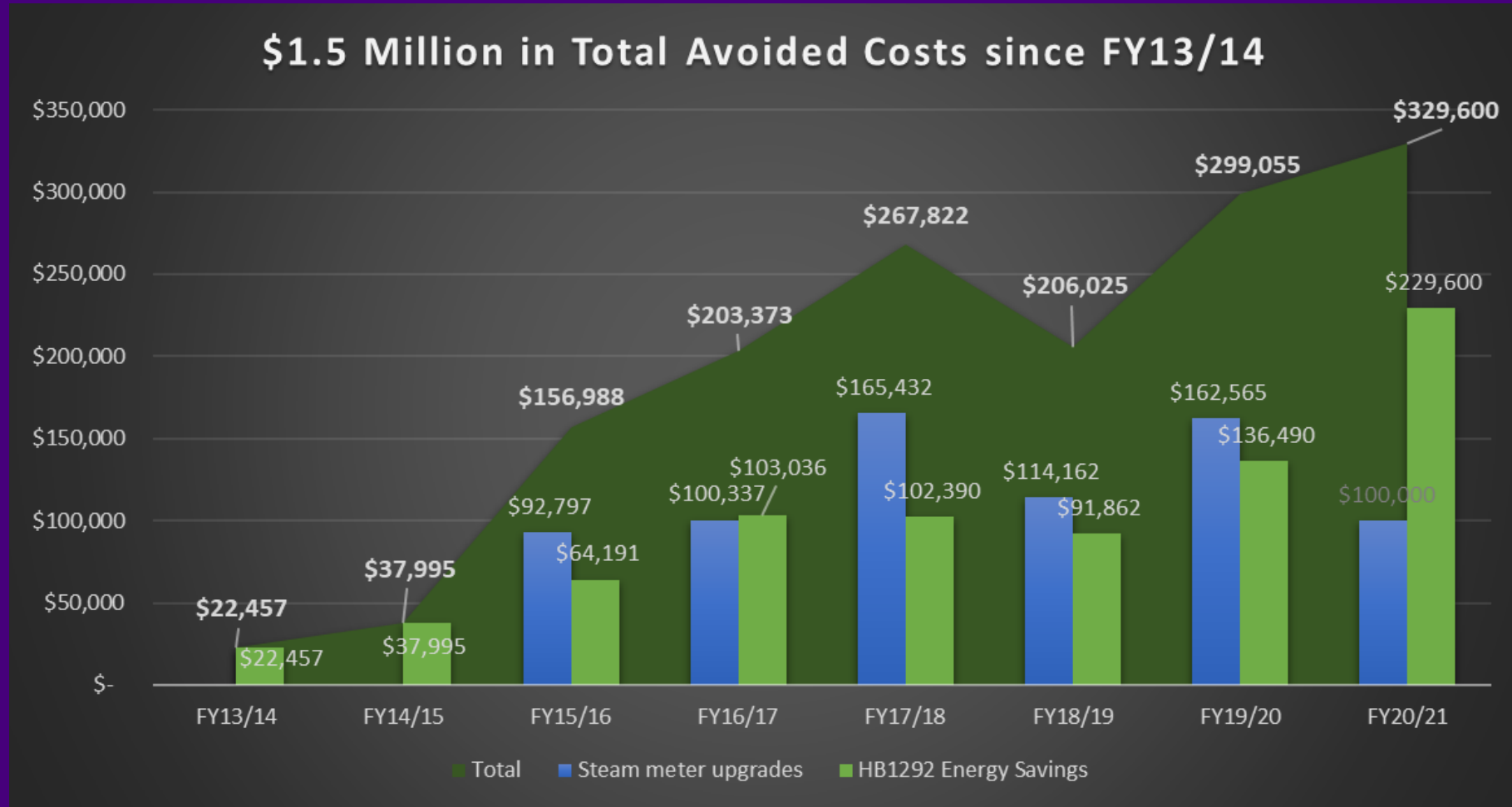
- Working groups : Energy Efficiency, Campus Design, Academic Integration, Transportation, Finance & Energy Generation, Waste Reduction
- Educate students to be leaders of tomorrow
- Collective goal - save \$1 billion by 2020 ; \$2 billion by 2025
- Over 500 attendees representing 28 universities & community colleges, 8 states



Appalachian  
STATE UNIVERSITY



# HOUSE BILL 1292



- House Bill 1292 ; \$100k starts conversations
- Combined 2.7 million kWh/yr. saved ; equivalent of adding 2MW or \$4,000,000 of solar to campus



## BUILDING TUNE-UPS

- **Commercial Buildings waste on average 30% of their energy– [EPA, 2010](#)**
- **Demand-Side Management (low cost proven conservation and efficiency measures first) – eliminate waste! (e.g. heating / cooling empty spaces)**
- **80% of short term energy costs and utilization opportunities reside on Demand-Side Management– Education Advisory Board, 2014**
- **Accomplished via Building Automation System (BAS) or controls that operate campus HVAC equipment (typically 40-50% of a building’s usage – EIA, 2017)**



# BUILDING TUNE-UPS - DATA VISUALIZATION

| Building                       | Built / Last Major Renovation | Utility Cost | % of Campus Co |
|--------------------------------|-------------------------------|--------------|----------------|
| Hunter Library                 | 1982                          | \$ 315,092   | 6.5%           |
| Ramsey Center                  | 1986                          | \$ 245,683   | 5.1%           |
| Bardo Arts Center              | 2004                          | \$ 219,825   | 4.6%           |
| Courtyard Dining Hall          | 2009                          | \$ 218,730   | 4.5%           |
| Belk                           | 1971                          | \$ 211,342   | 4.4%           |
| Stillwell                      | 2008                          | \$ 198,094   | 4.1%           |
| NSB                            | 1977                          | \$ 167,007   | 3.5%           |
| Health and Human Science       | 2012                          | \$ 158,143   | 3.3%           |
| Scott Residence Hall           | 1969                          | \$ 126,857   | 2.6%           |
| Balsam Residence Hall          | 2009                          | \$ 121,334   | 2.5%           |
| Coulter                        | 1978                          | \$ 120,981   | 2.5%           |
| Walker Residence Hall          | 1972                          | \$ 94,524    | 2.0%           |
| Albright-Benton Residence Hall | 1962                          | \$ 93,165    | 1.9%           |
| Campus Rec Center              | 2008                          | \$ 92,061    | 1.9%           |
| UC Hinds                       | 1968                          | \$ 90,114    | 1.9%           |

Top 5 buildings represent 25% of campus utilities  
\$1,210,673

Top 15 buildings represent 50% of campus utilities  
\$2,472,953

- Five buildings account for 25% of campus utilities
- Top 5 approach has helped focus our efforts

Similar to your car at 100,000 miles, time to check belts, hoses, etc., but for buildings ; 5 year intervals

WESTERN CAROLINA UNIVERSITY

## BUILDING TUNE-UP OF HEALTH AND HUMAN SCIENCE BUILDING (LEED GOLD)



**Existing comfort complaints, over-pressurization; issues = opportunities**



**Optimize existing system without major capital upgrades or lengthy commissioning reports (already Cx in 2012).**



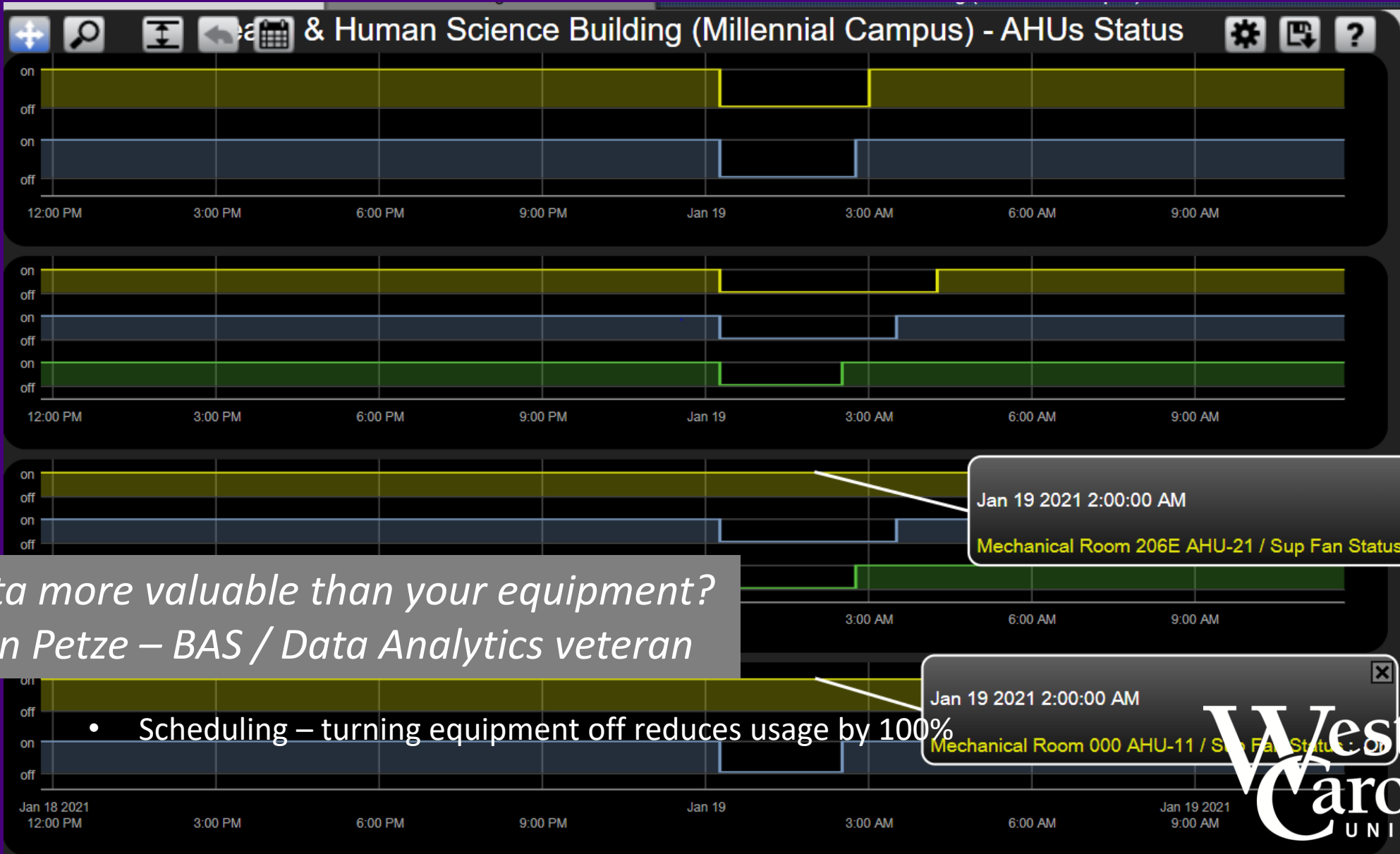
**Hired Chris Martin Jr. P.E. with McKim & Creed**



**Applied lessons learned to other buildings and BAS upgrades ; create positive feedback loop for energy and savings**

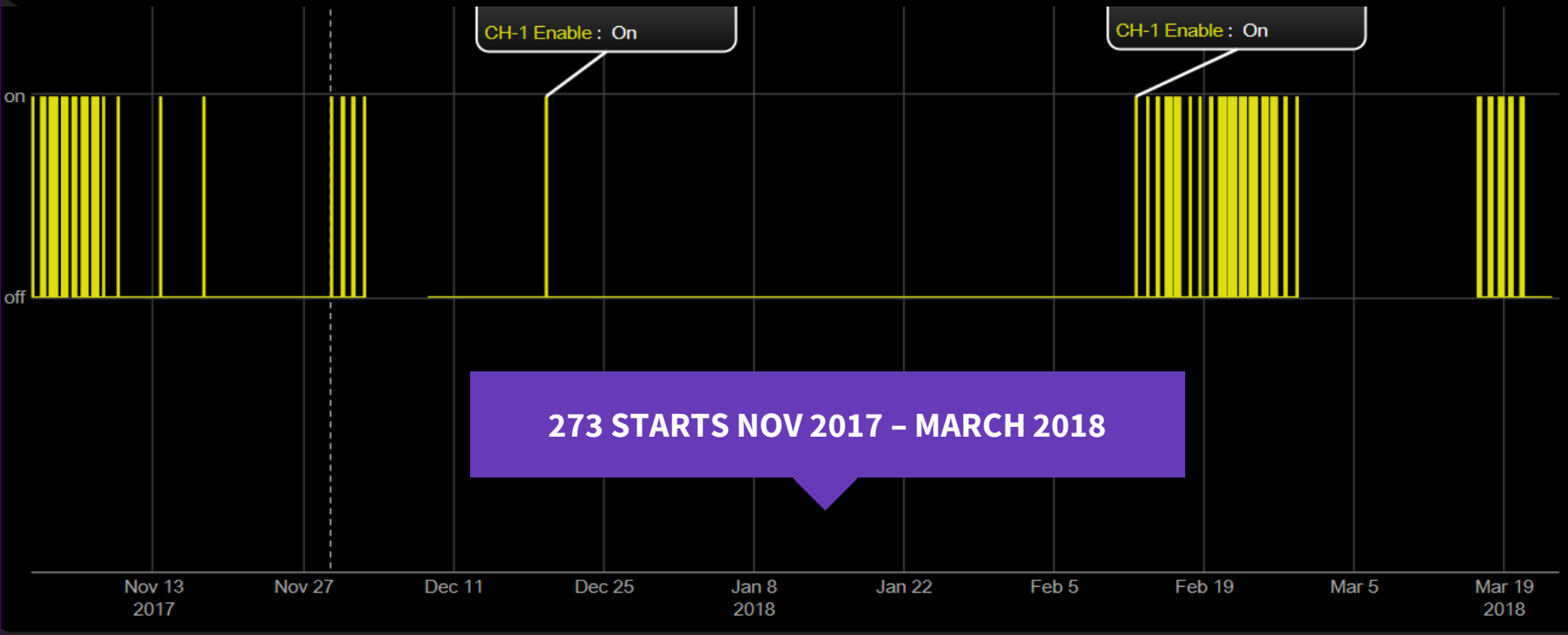
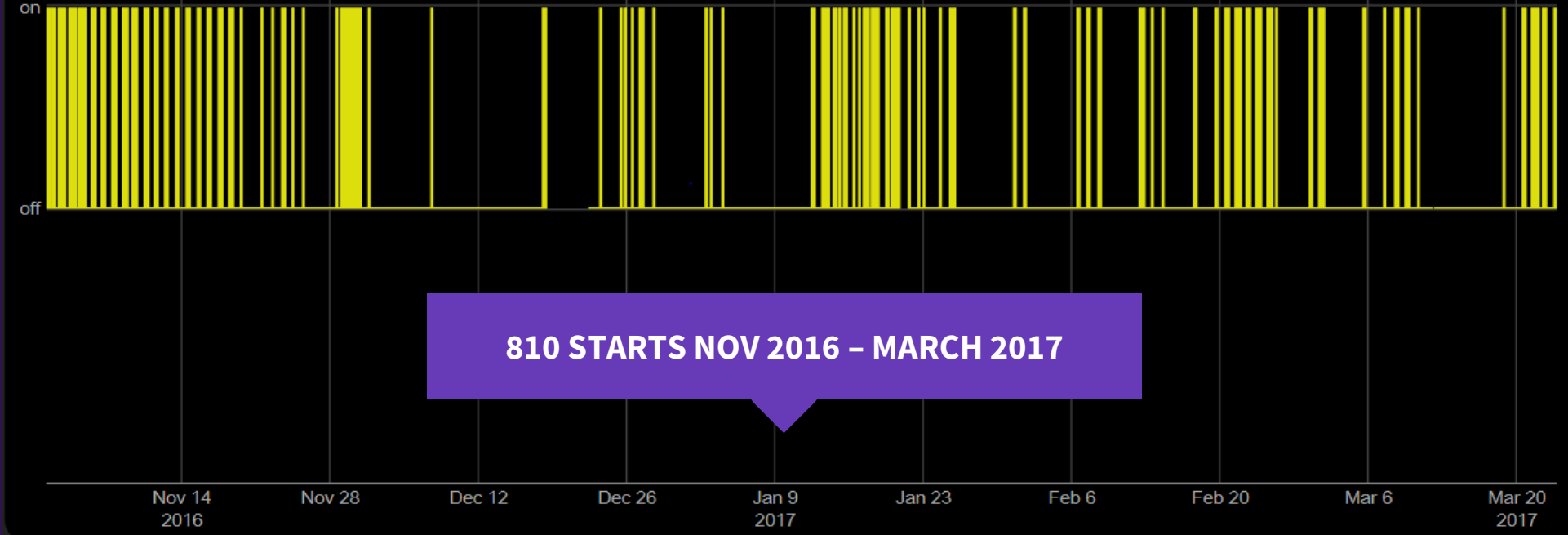


## Trend 1 - Scheduling - Are Air Handlers Shutting down?

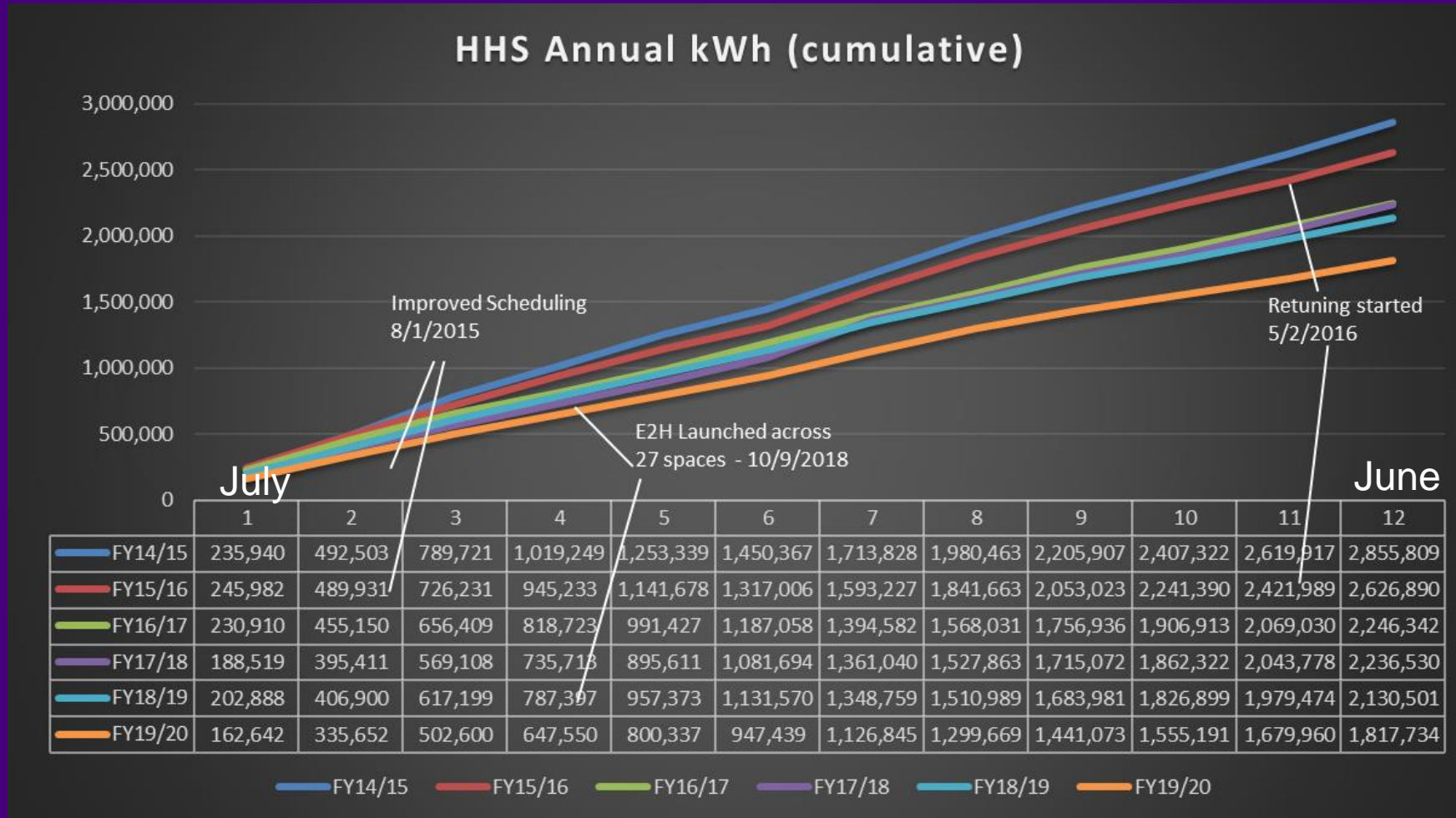


*Is data more valuable than your equipment?  
– John Petze – BAS / Data Analytics veteran*

- Scheduling – turning equipment off reduces usage by 100%



# BUILDING TUNE-UP OF HEALTH AND HUMAN SCIENCE BUILDING



- Now at ENERGY STAR level of usage for an office building (below 46 kBtUs / ft<sup>2</sup>)
- \$250,000 in avoided costs since 2012 and \$50,000/yr.



# EXECUTIVE ORDER 80 - CO2 SAVINGS PER DOLLAR SPENT

| Project                     | Description                     | Annual Savings | Investment   | Savings to Investment Ratio (SIR) or ROI | Simple Payback (years) | Total Reduction CO2 Lbs. | Cost effectiveness CO2 Reduction Lbs. per dollar spent |
|-----------------------------|---------------------------------|----------------|--------------|--|------------------------|--------------------------|--|
| <b>HHS Clinic Schedule</b>  | unoccupied at 5pm and weekend   | \$ 12,444      | \$ 100       | 12444%                                   | 0.01                   | 258,688                  | 2586.9   |
| <b>Bardo Theatre Schedu</b> | Reducing runtime to events only | \$ 13,205      | \$ 500       | 2641%                                    | 0.04                   | 327,808                  | 655.6  |
| <b>Events to HVAC</b>       | Space scheduling software       | \$ 23,110      | \$ 5,013     | 461%                                     | 0.22                   | 418,933                  | 83.6   |
| <b>HHS Tune-Up</b>          | Tune-Up / Optimization of HVAC  | \$ 30,000      | \$ 30,996    | 97%                                      | 1.03                   | 623,600                  | 20.1   |
| <b>Ramsey VFD install</b>   | Added VFDs to 25 air handlers   | \$ 25,000      | \$ 250,000   | 10%                                      | 10.00                  | 593,904                  | 2.4  |
| <b>LED lighting</b>         | LED upgrade                     | \$ 219,228     | \$ 3,300,000 | 7%                                       | 15.05                  | 4,925,749                | 1.5  |
| <b>Solar installation</b>   | 10 kW                           | \$ 900         | \$ 25,000    | 4%                                       | 27.78                  | 14,776                   | 0.6  |

Less than a 4 hour payback!



# BUILDING TUNE-UPS - BARRIERS

this quadrant are newer than average building age and cost more than average \$/ft<sup>2</sup>



- Lack of awareness of existing opportunities
  - Identify buildings with new HVAC and BAS ; bigger targets = bigger opportunities ; no perfect building ; LEED buildings potential candidates
- Lack of access and training to programming tools ; contrary to most BAS vendors business model for service sales
  - Create a **Building Tune-Up report template w/ Trend examples** that can be shared with building owners ; they can request this report to be completed by BAS / controls vendor
- Replacement of end-of-life BAS systems at 20-30 years ; HVAC renovation needed— major capital investment
- Organizational Structure – BAS / Controls shop not under Energy Management
- Benchmarking and need for additional metering and data collection



# 2021 State Agency Resilience Strategy Reports

*Marlena Byrne, NCORR*





NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCY

**NORTH CAROLINA DEPARTMENT OF PUBLIC SAFETY**  
OFFICE OF RECOVERY AND RESILIENCY

# Agency Resilience Strategy Reports

Marlena Byrne  
Deputy Chief Resilience Officer  
May 26, 2021



# The 2020 Climate Risk Assessment and Resilience Plan

Publish an Agency Resilience Strategy Report Annually in March

Builds on the 2020 Plan and the previous year's report

Includes any updates to the agency's climate vulnerabilities and risks assessment

Reports progress made in the last year on implementing the agency's resilience strategies and priorities

Describes the agency's next steps for the coming year

## Guidance Provided by NCORR, October 2020

### No One-Size-Fits-All

- Annual reports are iterative and reflect each agency's mission, needs, and resources
- A way for the agency to report its accomplishments, priorities, and plans to other agencies, state leadership, and the public
- The report is not the work itself; rather, it is an accountability measure

# Interagency Resilience Team

Discussed report requirement and guidance at two IRT meetings in Fall 2020

NCORR held virtual “office hours” in February 2021 to answer agency questions

Reports finalized by end of March 2021 (deadline extended due to covid)



# Agencies Submitting First Reports

---

Department of  
Administration

Department of  
Agriculture and  
Consumer  
Affairs

Department of  
Commerce

Department of  
Environmental  
Quality

Department of  
Health and  
Human Services

Department of  
Information  
Technology

Department of  
Natural and  
Cultural  
Resources

Department of  
Public Safety

Department of  
Revenue

Department of  
Transportation

# Next Steps

**NCORR is conducting one-on-one debriefs with agency staff by request to**

- Give feedback on the reports
- Get feedback on the process

**Interagency Resilience Team to discuss**

- Changes to process, including NCORR providing a more detailed template
- Integrating reports into agency budgeting and strategic planning

**Reports can be found at [deq.nc.gov](http://deq.nc.gov) by going to the “climate change” page and clicking on the link to the “NC Climate Risk Assessment and Resilience Plan”**

- [deq.nc.gov/energy-climate/climate-change/nc-climate-change-interagency-council/climate-change-clean-energy-4](http://deq.nc.gov/energy-climate/climate-change/nc-climate-change-interagency-council/climate-change-clean-energy-4)

# Thank You

---

**Marlena Byrne**  
Deputy Chief Resilience Officer  
[marlena.byrne@ncdps.gov](mailto:marlena.byrne@ncdps.gov)

(919) 741-8762



# Department of Natural and Cultural Resources

*Misty Buchanan, DNCR; and Deans Eatman, DNCR*



ARTS  
HISTORY  
LIBRARY  
NATURE



NC DEPARTMENT OF  
NATURAL AND CULTURAL RESOURCES



# Department of Natural and Cultural Resources

## Resilience Strategy Report 2021

Misty Buchanan and Deans Eatman

### Report organization:

- Two main sections:
  - Cultural Resources
  - Natural Resources
- Reviewed observations and recommendations from the 2020 Risk Assessment and Resilience Plan
- Reported accomplishments from March 2020-March 2021





# 2020 Recommendations

## HISTORY

### Cultural Resources

- Protect cultural assets from “water where it doesn’t belong”.
- Build resilience into assets owned by DNCR.
- Increase technical assistance to locally-owned cultural resources.
- Build federal, state, local, private partnerships.

## NATURE

### Natural Resources

- Increase support for land conservation, restoration, and management- especially floodplains and fire-prone areas.
- Monitor environmental variables and ecosystem response.
- Manage stormwater and storm flow to account for increased precipitation.

# Accomplishments

## Cultural Resources

- **Education/Outreach/Training:**

- Identification and protection of government records (based on FEMA-Approved curriculum)
- SHPO Restoration Branch YouTube Videos - disaster recovery assistance available, GIS data for natural disasters, case studies of building elevations, how to dry out a flooded historic building, etc.

- USACE South Atlantic Coastal Study: at-risk cultural resources analysis- historic and archaeological sites vulnerable to coastal storm damage and sea level rise

- Historic Architectural surveys – 6 counties receiving FEMA disaster declarations lacking historic architectural survey (Hoke, McDowell, Montgomery, Person, Polk, Vance)



# Accomplishments



## Cultural Resources cont.

- NC Coastal Cemetery Survey- state lands in Dare, Hyde, Beaufort, Pam Carteret, Onslow, Pender, New Hanover, Brunswick.
- Coastal shorescape archaeological survey – document resources within 200’ of shoreline.
- Began coordination with National Park Service on preservation of Ocracoke Lighthouse Complex.
- Cultural Resources Emergency Support Team (CREST) – added a regional cache of disaster recovery supplies to help the northeast region and Outer Banks cultural heritage collections recover from natural disasters.

# Accomplishments



## Cultural Resources cont.

- Submitted federal funding proposals for damage restoration and increased resilience: Battleship USS NC, Galen Stone Hall at Charlotte Hawkins Brown Memorial, Douglas Complex at Tryon Palace, Harper House at Bentonville Battlefield
- \$17M Federal grant funding to provide recovery assistance to historic resources damaged by Florence and Michael funded 22 proposals.
- Brunswick Town Fort Anderson Wave Attenuator project

# Accomplishments

## Natural Resources

- NC Land and Water Fund awarded \$20,041,287 for 56 projects including
  - 11,869 acres of land protection including Game Lands, State Parks, and local greenways,
  - 44,785 feet of streams restored including trout waters and saltwater fisheries,
  - Innovative stormwater projects and planning efforts
- State Parks – land management for resilience:
  - Prescribed fire on 2,928 acres across 41 properties
  - Removed 215-acre pine plantation and restored native species
  - Controlled invasive species at 24 park properties
  - Restored native ground cover on 150 acres of park lands





# Accomplishments

## Natural Resources

- Natural Heritage Program and DPR conducted biological surveys that can be used to help detect change over time, especially for vulnerable species,
  - high elevation sites (Mt. Mitchell, Elk Knob)
  - low-lying coastal plain areas (Big Swamp, Atlantic Natural Area)
  - T&E species in national forests (with funding from USFS)
  - T&E species throughout state parks
- Training for FEMA and NCDEQ on accessing maps of protected areas and endangered species during emergency response and cleanup





# Next year:

## Add:

- More regular discussion and coordination among representatives from each Division
- Recommendations and priorities for upcoming year
- Identify opportunities to work across NC Agencies for better coordination and greater impact



NC DEPARTMENT OF  
NATURAL AND CULTURAL RESOURCES

# Department of Transportation

*Colin Mellor, NCDOT*





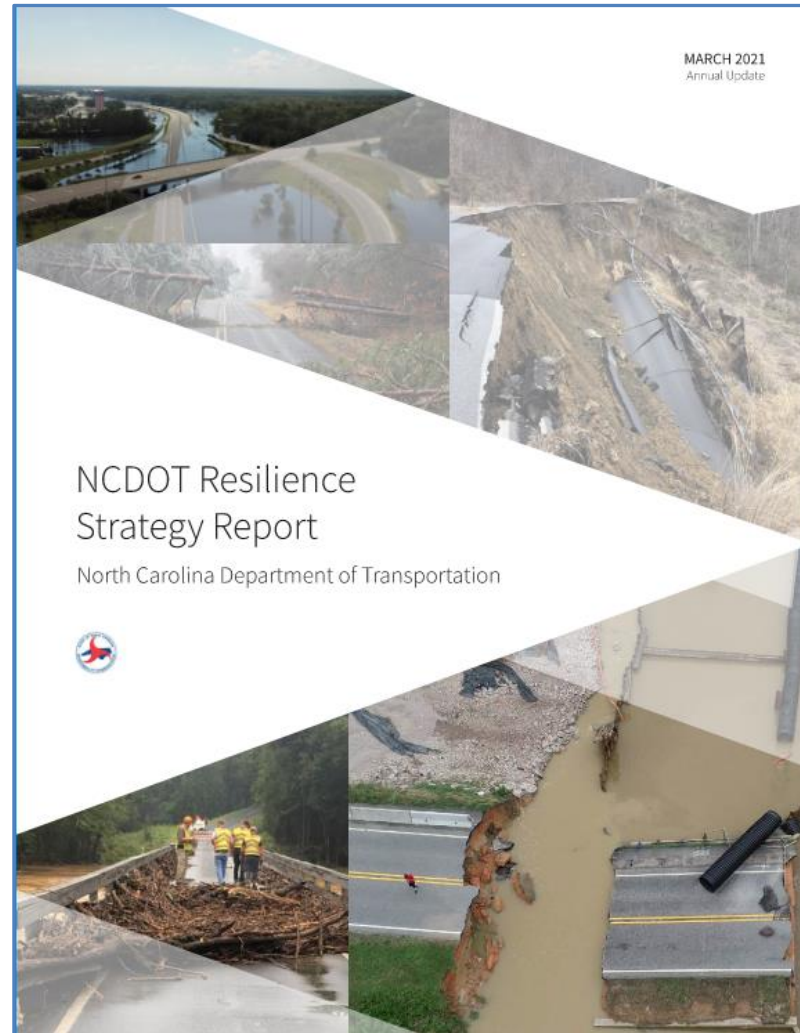
**NORTH CAROLINA**  
Department of Transportation



# NC Climate Change Interagency Council NCDOT Agency Resilience Strategy Report, 2021

**Colin Mellor**  
Environmental Policy Unit

# NCDOT Resiliency Strategy Report





# NCDOT Resiliency Strategy Report





## Resilience - definition

*A resilient North Carolina is a state where our communities, economies, and ecosystems are better able to rebound, positively adapt to, and thrive amid changing conditions and challenges, including disasters and climate change; to maintain and improve quality of life, healthy growth, and durable systems; and to conserve resources for present and future generations.*

NC Climate Risk and Resilience Plan, Executive Summary

**resilience** - *the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions*

Federal Highway Administration

# NCDOT Resiliency Strategy Report



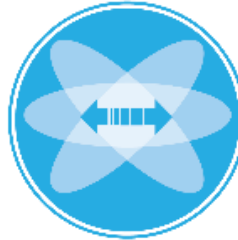
**SCOPING**

**CONSTRUCTION**



**PLANNING**

**CROSS  
CUTTING**



**OPERATIONS**



**DESIGN**

**MAINTENANCE**





**PLANNING**



**DESIGN**



**OPERATIONS**



**MAINTENANCE**

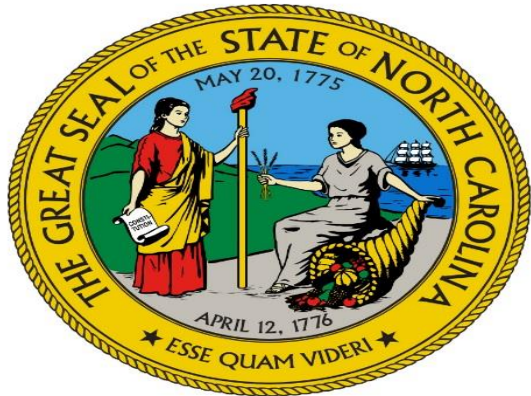


# Department of Health and Human Services

*Lauren Thie, NCDHHS*







NC Department of Health and Human Services

# Climate Resilience Strategy

**Lauren Thie, MSPH**

**Manager, Climate and Health Program**

**May 26, 2021**

# Climate and Health in the News

LOCAL

## Burn ban issued for 26 North Carolina counties due to hazardous forest fire conditions



SOURCE: WNCT9, CDC



# Strategy Report

- **Resilience Strategy Review**
  - **NC DHHS Climate Resilience Workgroup**
  - **Looked for progress on major strategies**
  - **Coordination across Divisions**
    - **Challenges**
    - **Surprise benefits**
  - **What I want to see in future**

# Strategy Report

| Previously Identified Areas of Progress   | New Resilience Strategies                                | Climate Justice Foci  | Next Steps   |
|---|--|---|--|
| Disseminated clean energy education to medical community  | Responding to COVID-19 using equity lens                 | Responding to COVID-19 using equity lens  | Continue COVID-19 response   |
| Demonstrating impacts on early childhood development  | Obtain future CDC Climate and Health funding for 2021-26 | Progress on climate resilience plan climate justice strategies                                  | Obtain future Climate and Health funding   |
| Engaging partners with climate and health data  | Describe health impacts of harmful algal blooms          | Early Childhood Action Plan   | Provide local climate and health adaptation support  |
| Heat-health alert systems, wildfire education curriculum, state-wide heat illness situational reports | Black River flooding forecast development                | Ongoing toxic exposure characterization and health protection                                   | Support teleworking and other ways to reduce air pollution in NC DHHS and the climate and health program |
| Clean Energy Plan implementation  |  | Heat-health alert systems, wildfire education curriculum, heat illness reporting considerations |  |
|   |  | Disaster response   |  |

**SOURCE:**

# New Things

- **Heat Response Plan**
- **ECAP**
- **Future BRACE work through 2026**

**SOURCE:**

# Future CDC Climate and Health Work

- **Build on existing heat-health and wildland fire adaptation work**
- **Incorporate climate justice**
- **Focus on flooding effects building on current Sandhills partnerships**
- **Clean Air Starts Early – developmental education energy partnership**
- **Climate and Health Data Dashboard**

# Future Strategy Report Directions

- Continue to connect to 2020 plan
- Continue to describe our role in disaster recovery, public health infrastructure
- Tell story more explicitly about what DHHS' work is (public audience)
- Elaborate on DHHS work on climate resilience
- Continue to connect climate justice and DHHS work
- Make more connections between food security, housing insecurity
- Provide basic health info on climate change

# Questions?

**Lauren Thie**  
**Manager, NC Climate and**  
**Health Program**  
[Lauren.thie@dhhs.nc.gov](mailto:Lauren.thie@dhhs.nc.gov)  
**919-368-1288**





# Closing Remarks

- **Recent EO80 Reports:**

- Power Sector Carbon Reduction: An Evaluation of Policies for North Carolina (EO80, Section 4), March 2021, <https://nicholasinstitute.duke.edu/publications/power-sector-carbon-reduction-evaluation-policies-north-carolina>
- Building Energy Consumption Report (EO80, Section 8), January 2021, [https://files.nc.gov/ncdeq/2020\\_DEQ\\_SEO\\_Comprehensive\\_Energy\\_Program\\_Report\\_Final\\_1-27-21.pdf](https://files.nc.gov/ncdeq/2020_DEQ_SEO_Comprehensive_Energy_Program_Report_Final_1-27-21.pdf)
- North Carolina Energy Regulatory Process Report (EO80, Section 4), December 2020, <https://deq.nc.gov/cep-nerp>
- Today's slides will be posted at: <https://deq.nc.gov/energy-climate/climate-change/nc-climate-change-interagency-council>.
- Next Council meeting tentatively scheduled for September 2021.

## Contacts

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**Sharon Martin, DEQ**  
Deputy Secretary for Public Affairs  
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# Public Engagement

*Individuals and organizations may provide input to cabinet agencies on their implementation of EO 80*

*(Limit: 2 minutes)*

