



# Duke Energy IRP Planning Process Overview

CAPER Spring Meeting 2018



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# IRP 101: Planning Objectives

NCUC

FERC

PSCSC

EPA

PRIMARY PLANNING OBJECTIVES

RELIABLY MEET PEAK DEMAND AND  
ENERGY NEEDS TODAY AND INTO THE  
FUTURE

MINIMIZE TOTAL  
SYSTEM  
COSTS

IMPROVE  
ENVIRONMENTAL  
FOOTPRINT

# Resource Planning Overview

Growth in Customer Consumption



Resource Retirements

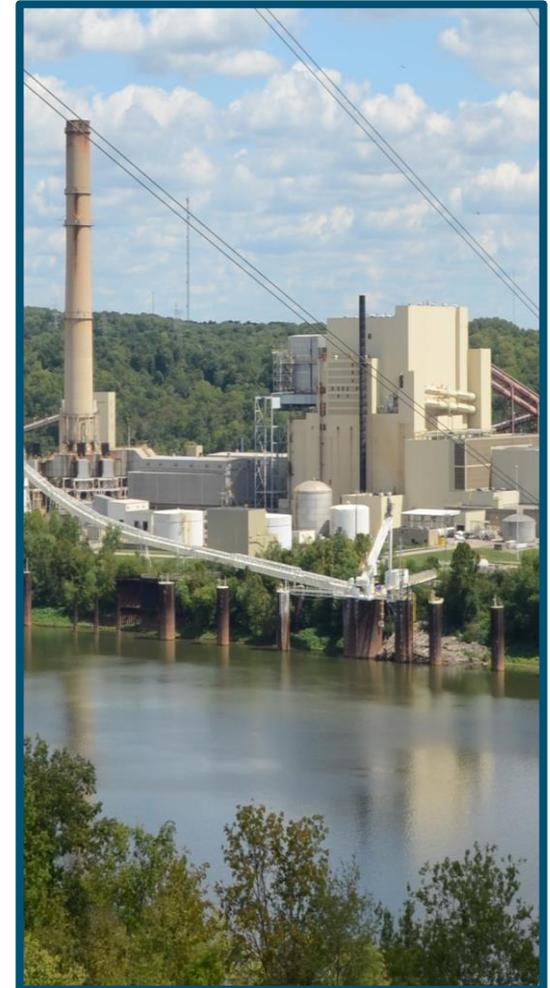


Resource Need

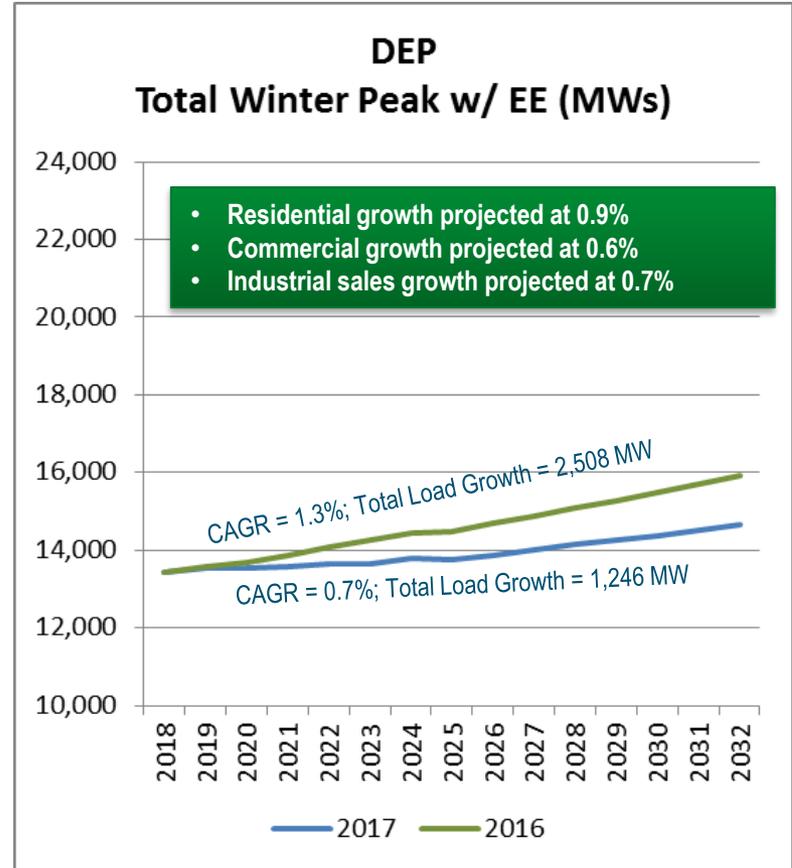
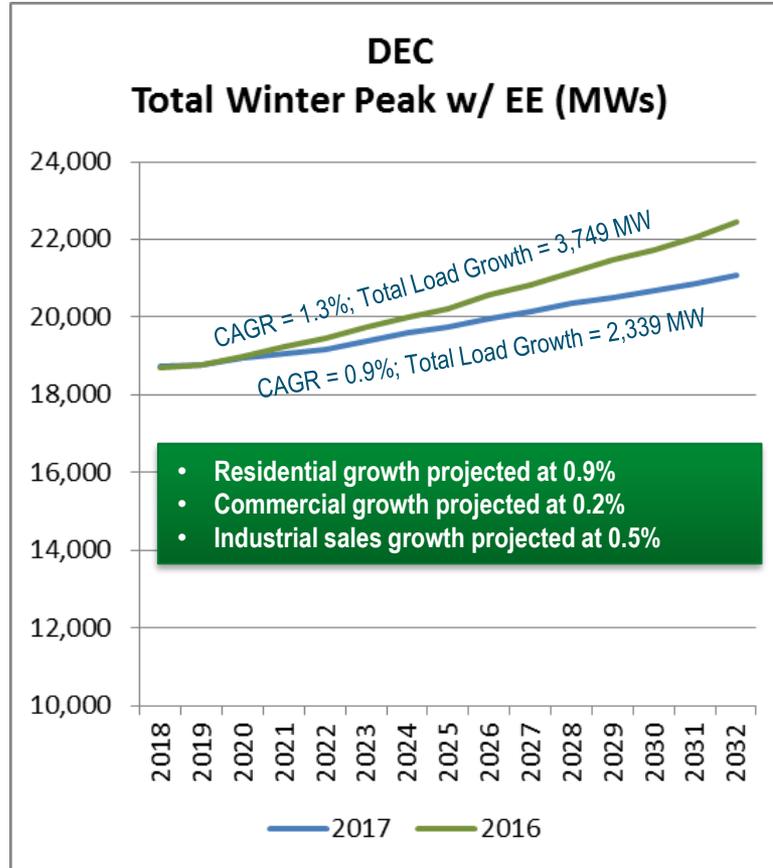


2017 Resource Plans

- Changes in Load Forecast
- Impacts of Energy Efficiency (EE)
- Impacts of Renewable Energy
  
- Plant Retirement
- Purchase Power Contract Expiry
  
- Load Resource Balance
  - Reserve Margin
- Non-conventional Resources
- Remaining Resource Gap
  
- Update Year
  - Base Plan w/ Carbon Tax
  - Base Plan w/o Carbon Tax
  - Nuclear Relicensing Cases



# Load Forecast - System Winter Peak Comparison (2017 vs 2016)



- Because of naturally occurring efficiency trends and government mandates, energy usage per customer is slightly negative over the planning horizon.
- Much of the growth in residential sales is driven by increase number of customers

# Reserve Margin Study

Reserve Margin = (Installed Generation – Peak Demand)/Peak Demand

Completed Reserve Study in 2016, and both DEC and DEP are now Winter Planning Utilities (*not necessarily winter peaking*)

Minimum reserve margin in order to reliably meet peak winter demand is now 17%

Drivers prompting the need for the shift to Winter Planning include:

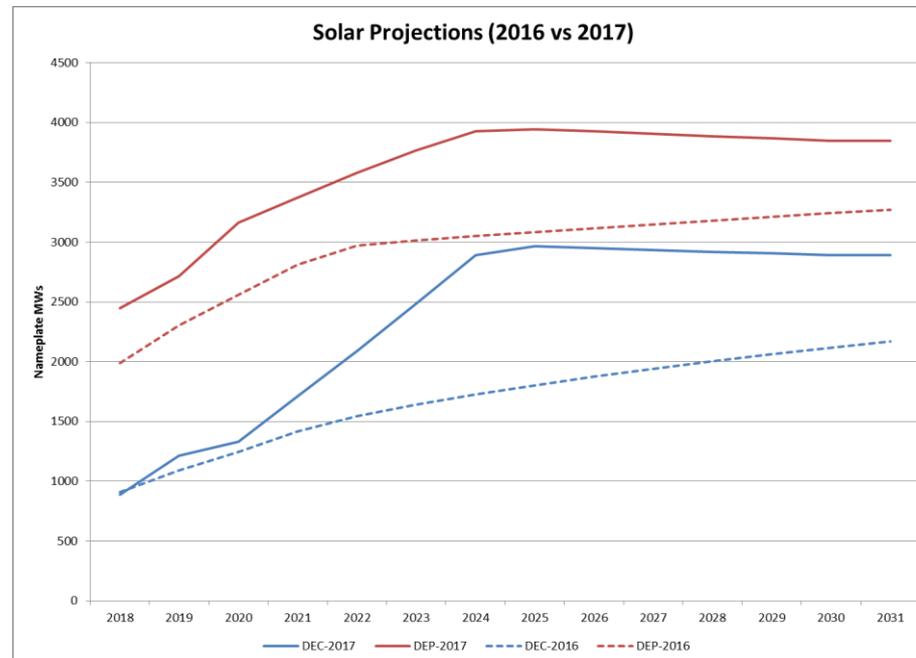
- Increasing amounts of solar, and other summer-only resources, connected to the systems and in the queue
- Extreme cold temperatures and associated impacts on load experienced over recent winter seasons

# Nuclear Assumptions

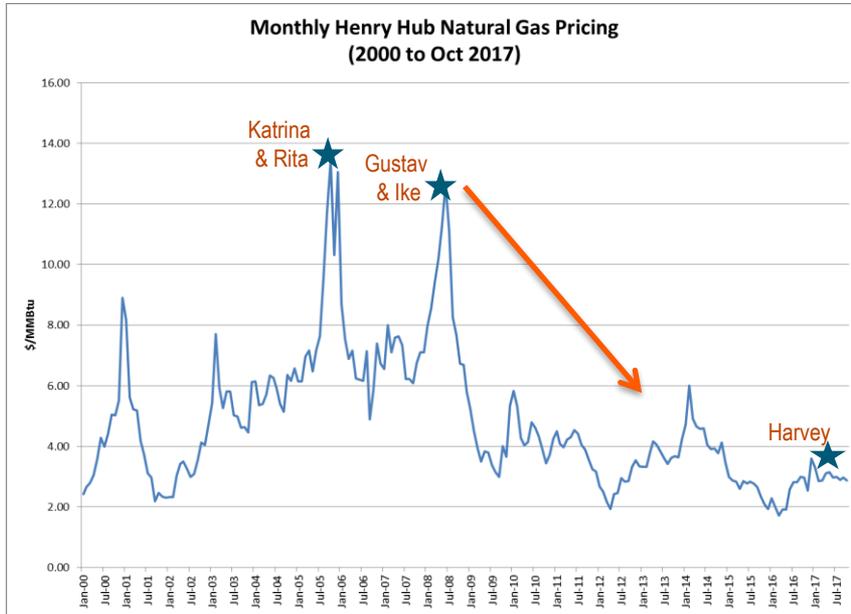
- DEC has filed a request to cancel the Lee Nuclear Project as originally envisioned
- Oconee (DEC), Robinson 2 (DEP), Brunswick 1&2 (DEP) licenses up for renewal in the early to mid 2030's
  - License extensions would potentially allow units to operate for another 20 years and would extend life of units to 80 years
  - Duke Energy has been working closely with the NRC on the process to relicense 60 year old units
  - Oconee is the first nuclear station being considered for relicense renewable
  - A final decision for relicensing Oconee, or any of the other Duke nuclear plants, has not been made
- Consideration of new nuclear construction dependent on three main factors
  - Outcome of relicensing efforts
  - Natural gas prices
  - Carbon legislation
- Base Case IRP – Update to last year, includes new nuclear in the early 2030s; no relicensing of existing nuclear assets
  - Scenarios run both with and without relicensing under a carbon and no carbon scenario

# Renewable Assumptions

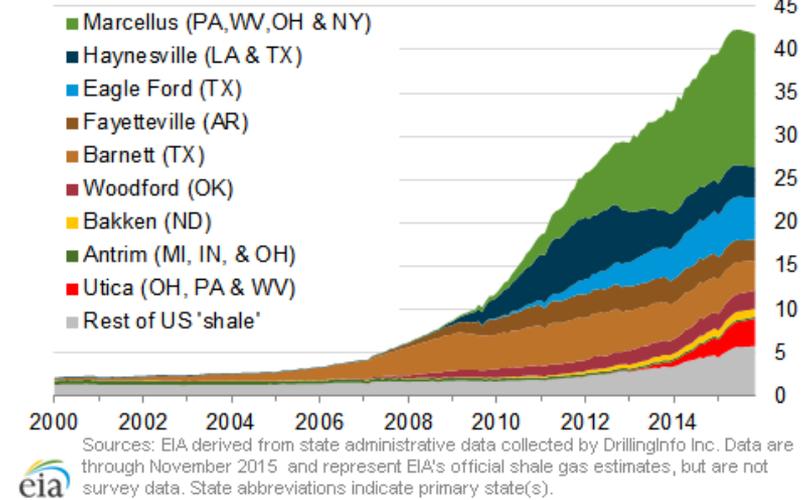
- House Bill 589 – Competitive Energy Solutions for NC (HB589) is a piece of legislation that introduces a competitive procurement process to more economically procure solar
- PURPA reform was acceptable to stakeholders like solar developers, environmental advocates, and academia if continued renewable development was promulgated
- Allows for “controllable” solar versus “non-controllable” solar that is predominant in the Carolinas today
- Bill also introduced an 18-month wind moratorium in NC, updates to Net Metering, cost recovery changes, an energy storage study, and various other customer offers (i.e. Large Customer Program; Solar Rebates, Community Solar, Leasing)
- Bottom line...more solar, sooner....



# Natural Gas Prices



**Monthly dry shale gas production**  
billion cubic feet per day

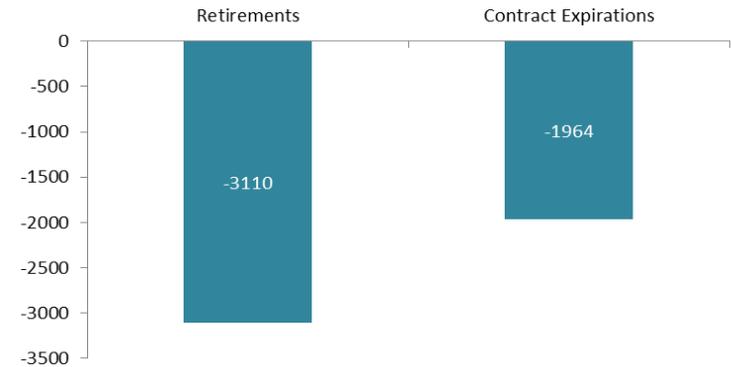


- Rise in shale gas production has led to a sustained drop in natural gas prices
- Natural Gas prices continue to be, and are expected to remain, at historic low levels
- Price increases from impacts of hurricanes on gas production appears to have also been mitigated as source of natural gas has moved north

# 2017 IRP - Retirements and Contract Expirations

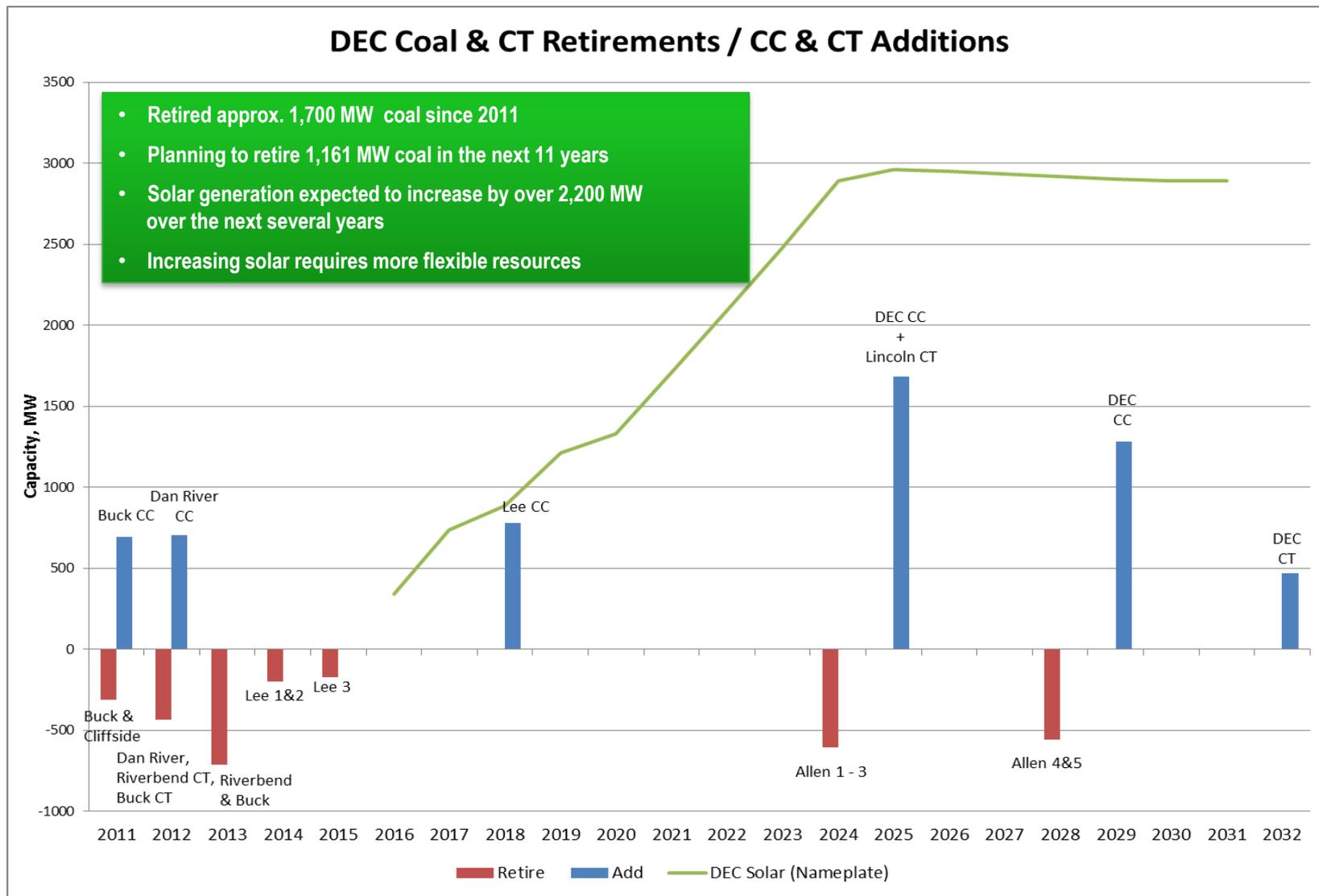


DEC	Retirements	Contract Expirations
2018	-	-
2019	-	41 MW
2020	-	3 MW
2021	-	86 MW
2022	-	6 MW
2023	-	6 MW
2024	604 MW (Allen)	-
2025	-	1 MW
2026	-	6 MW
2027	-	-
2028	526 MW (Allen)	2 MW
2029	-	14 MW
2030	173 MW (Lee 3)	-
2031	-	-
2032	-	8 MW

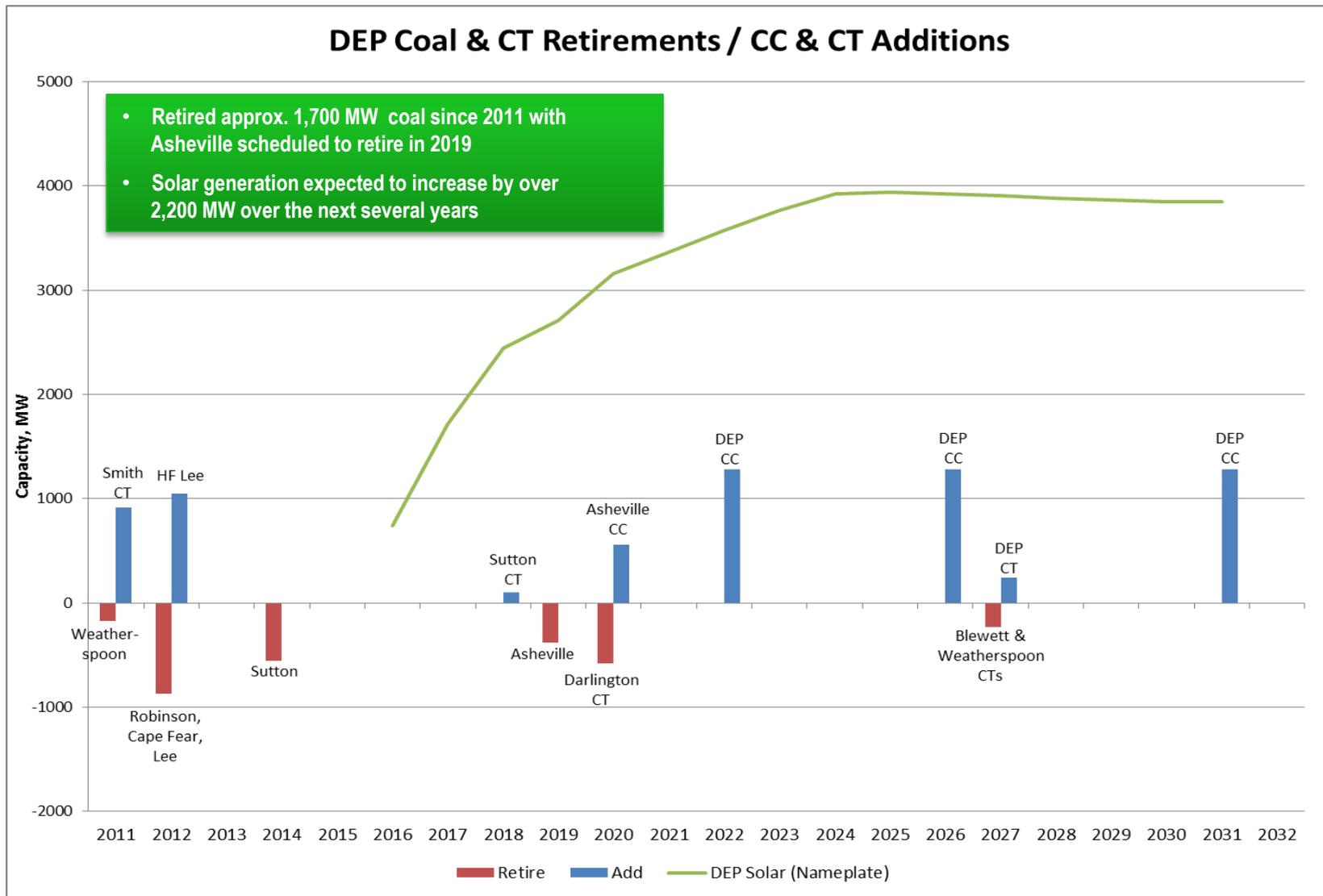


DEP	Retirements	Contract Expirations
2018	64 MW (Sutton)	-
2019	384 MW (Asheville)	313 MW
2020	580 MW (Darlington)	2 MW
2021	-	567 MW
2022	-	379 MW
2023	-	260 MW
2024	-	-
2025	-	-
2026	-	1 MW
2027	232 MW (Blewett/ Weatherspoon)	3 MW
2028	-	4 MW
2029	-	-
2030	797 MW (Robinson)	1 MW
2031	-	6 MW
2032	1,053 MW (Roxbor 1&2)	428 MW

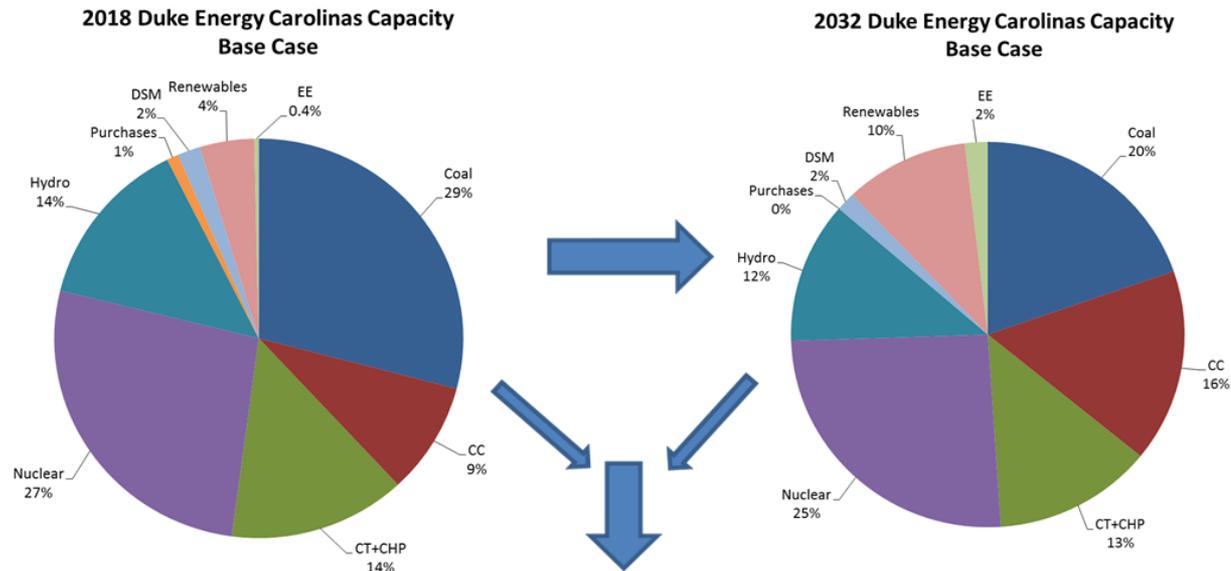
# Pacing Retirements and Building New Generation - DEC



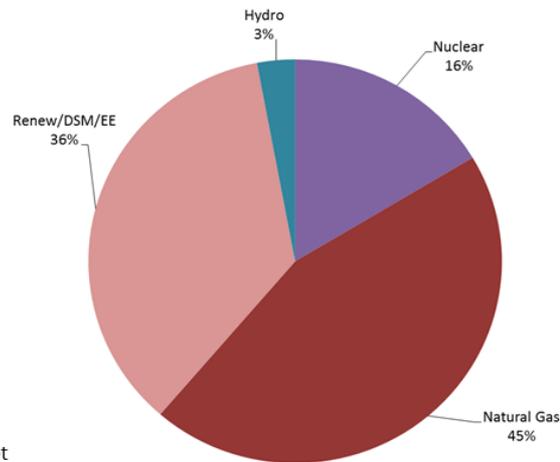
# Pacing Retirements and Building New Generation - DEP



# Generation Resource Diversity in the DEC System



Resources Added Over the 15 Year Planning Horizon - Winter

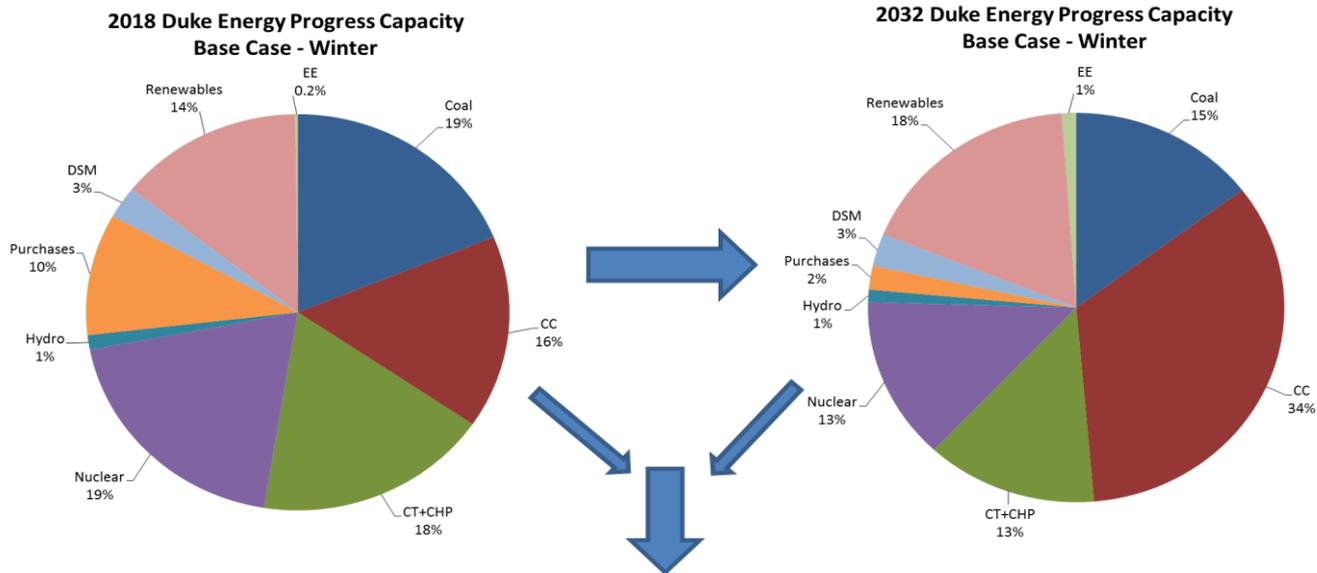


- *A diverse resource mix allows for flexibility in daily dispatch dependent upon market conditions*

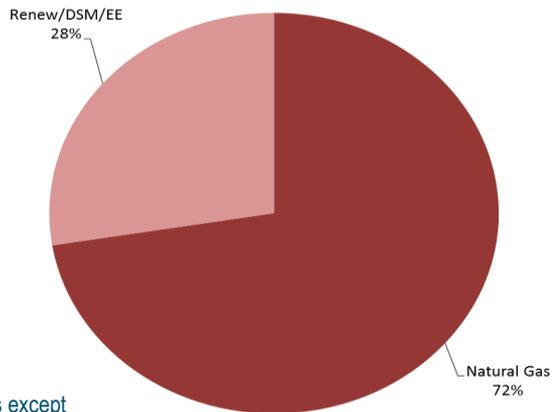
- *Provides an ability to react to both short-term and longer-term changes in fuel prices dampening impacts of cyclical fuel prices*

Note: All capacity based on winter ratings except renewables which are based on nameplate

# Generation Resource Diversity in the DEP System



## Resources Added Over the 15 Year Planning Horizon



- *Newer resources, along with modifications to existing resources, create more operational flexibility...*

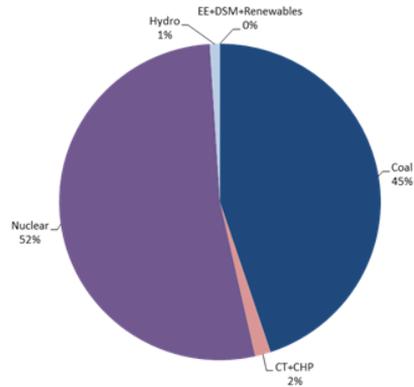
- *...which is critical in helping to integrate increasing levels of intermittent generation*

Note: All capacity based on winter ratings except renewables which are based on nameplate

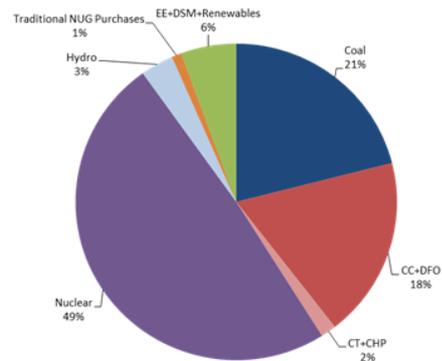
# An Evolving System – A 30 Year View

## Evolution of Total System Energy Mix

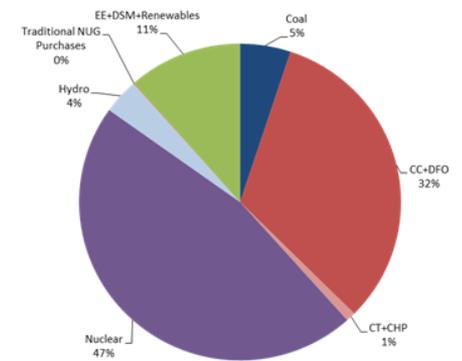
2002 DEC + DEP Energy Mix



2018 DEC + DEP Energy Mix

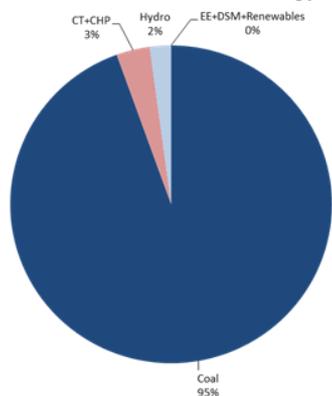


2032 DEC + DEP Energy Mix

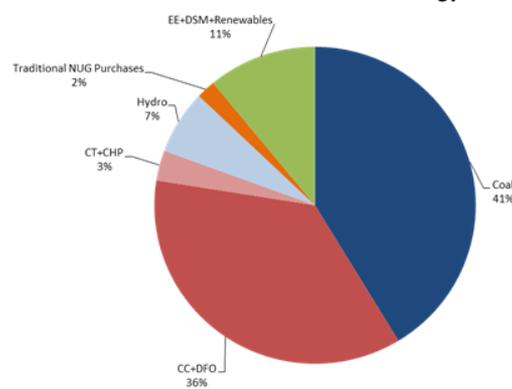


## Evolution of Non-Nuclear System Energy Mix

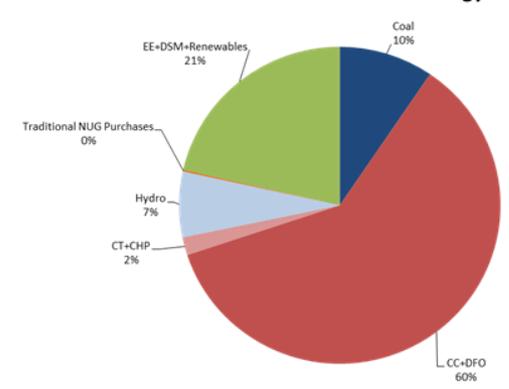
2002 DEC + DEP Non-Nuke Energy Mix



2018 DEC + DEP Non-Nuke Energy Mix



2032 DEC + DEP Non-Nuke Energy Mix



# Primary IRP Takeaways

- Load forecast is lower in 2017, but resource retirements and expiring purchase contracts continue to drive the need for new generation in the early to mid 2020's.
- Continued support for winter planning across DEC and DEP
- HB589 will accelerate the speed in which renewable generation expands in North and South Carolina while also likely increasing the overall level of renewable generation in the Duke Energy territories.
- The addition of distributed solar resources paired with the retirement of central generation over the planning horizon will require significant investment in the transmission and distribution systems to accommodate changing power flows.
- Gas prices remain in the \$3 per MMBtu range, and prices are expected to remain low into the future.
- While gas prices and environmental regulations are projected to continue to lower coal plant output, Duke Energy continues to maintain a diverse and flexible operating portfolio with significant increases in renewable and natural gas based resources.

## Questions / Comments

