Maryland
Department of
the Environment

# Mitigation Working Group: Energy

February 21, 2020

# 2/21 MWG Energy Meeting

Agenda today:

1. Clean and Renewable Energy Standard (CARES)
2. Coal Generation in MD
3. GGRA Modeling Updates

# Topic 1: CARES

- Achieve 100% Clean Electricity
  - Draw upon all potential technologies to get there
- Find most cost-effective solution
  - Make technologies compete to get to 100%
- Foster home-grown energy
- Build upon and improve the RPS

# What does CARES do?

Before 2030:

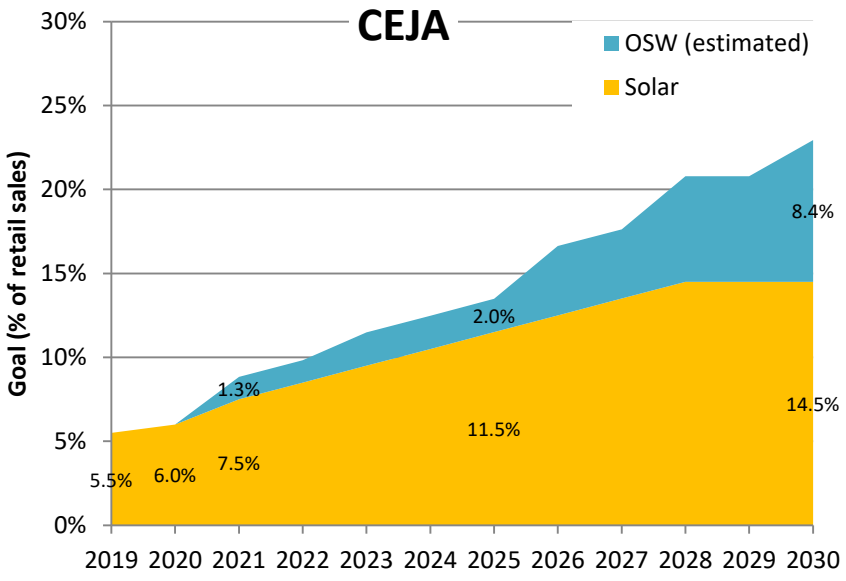
1. Build upon CEJA's Solar and Offshore Wind
2. Eliminate controversial Tier 1
3. Replace that Tier 1 with Maryland clean and renewable energy

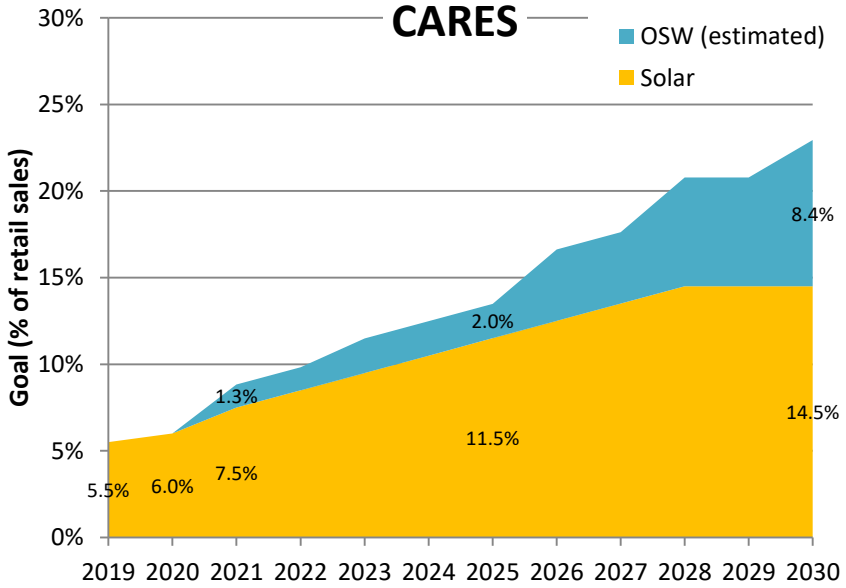
Through 2040:

4. Count existing nuclear (Calvert Cliffs), but don't credit it
5. Get to 100% by 2040

# 1. Building Upon the RPS/CEJA

- CARES fully incorporates existing MD solar and offshore wind goals
- New MD clean energy category would deploy even more solar



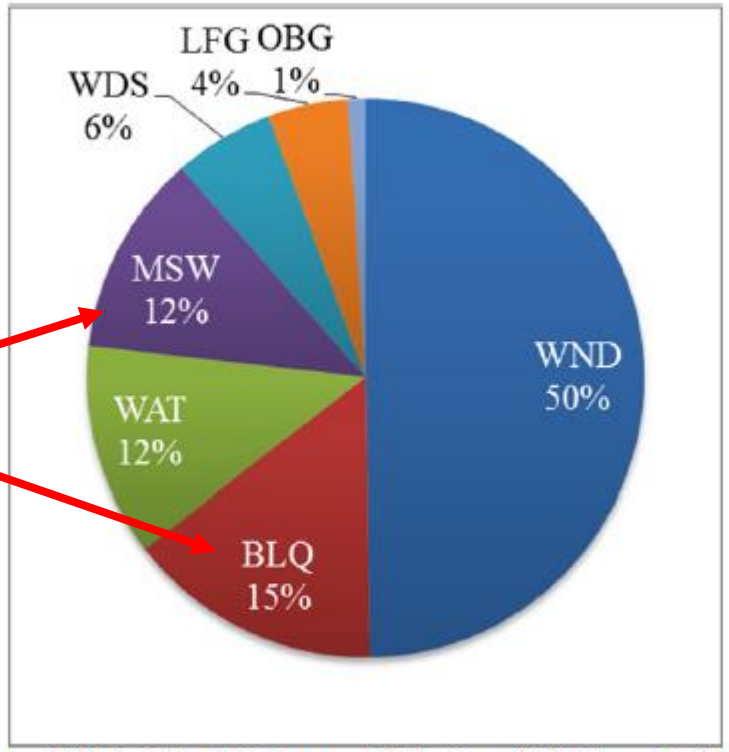




Note: OSW shown as estimated share of sales, but is MW requirement in law. Estimates here reflect already approved 368MW plus 1,200MW of round 2.

# 2. Eliminate Controversial Tier 1

- Eliminates Municipal Solid Waste and Black Liquor from Tier 1
- These resources have historically been used for ~25% to ~45% of non-carve-out Tier 1

**Figure 2 2018 Tier 1 Retired RECs by Fuel Source[29]**

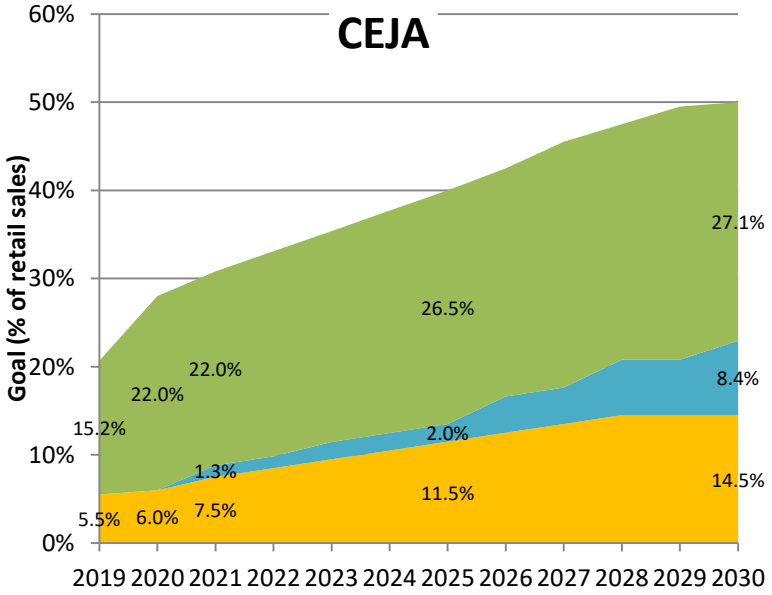


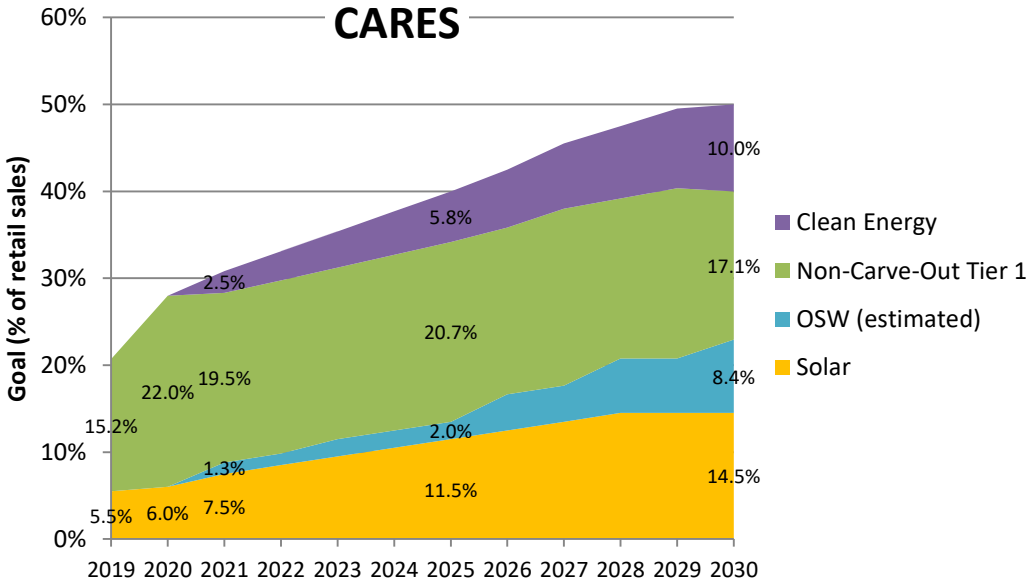

Abbreviations: BLQ, Black Liquor; LFG, Landfill Gas; MSW, Municipal Solid Waste; OBG, Other Biomass Gas; WAT, Small Hydroelectric; WDS, Wood and Waste Solids; WND, Wind.

Source: MD PSC most recent (2018) RPS report.

# 3. Replace MSW & BLQ with MD Clean and Renewable Energy

- CARES adds a new clean energy requirement in which new clean resources compete with MD renewables
- That requirement supplants non-carve-out Tier 1, approximately at MSW & BLQ shares



# 3 (cont'd). Maryland Clean and Renewable Energy

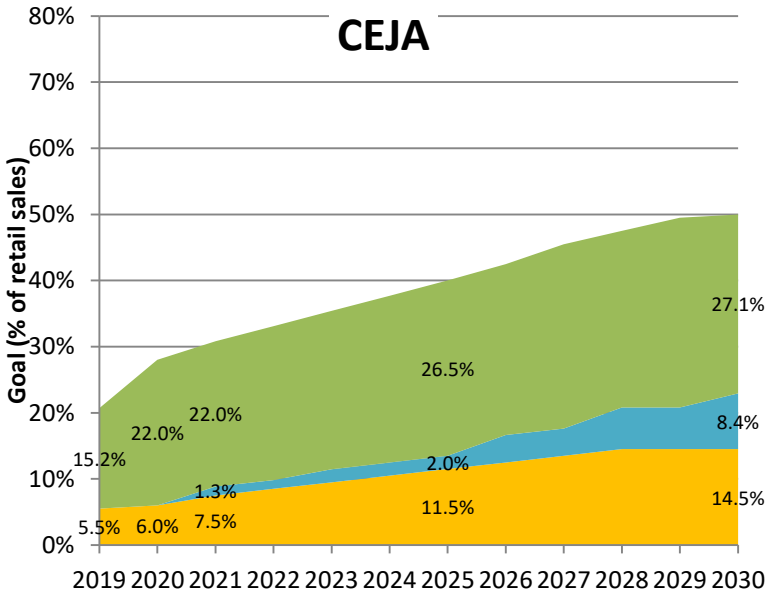
- Eligible resources for Clean Energy requirement
  1. RECs from any Maryland Tier 1 resource (including Solar)
  2. Clean Energy Resource Credits (CERCs) from MD:
     a) New nuclear power
     b) New efficient Combined Heat and Power (CHP)
        – Would need to apply new & emerging tech to achieve full credit
     c) Natural gas or qualifying biomass with Carbon Capture and Utilization or Storage (CCUS) that results in indefinite sequestration of captured CO2
        – Qualifying biomass also receives RECs
     d) Other emerging net-zero technology recognized by the PSC

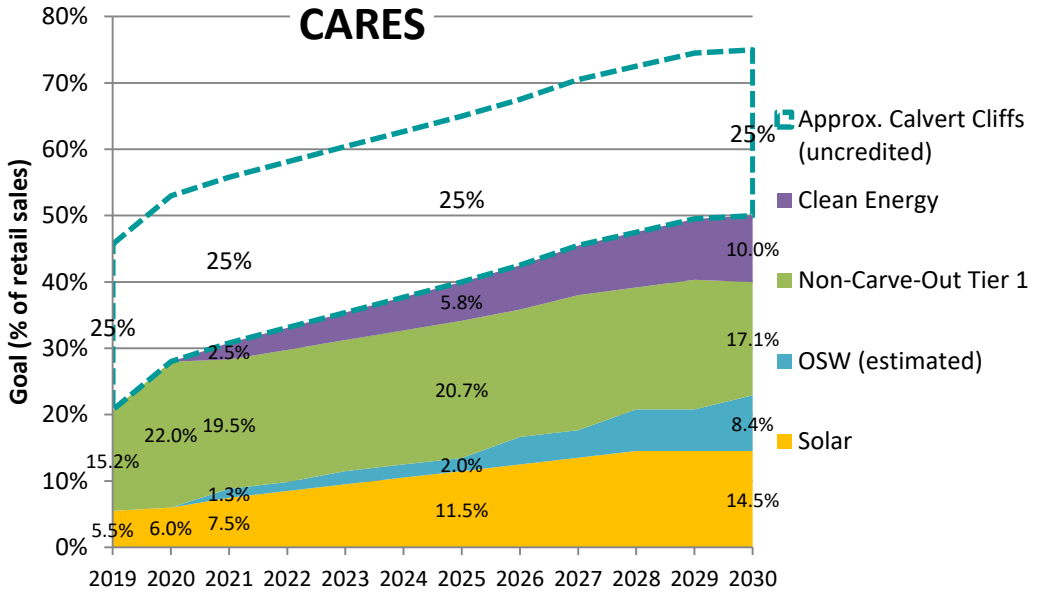
# 3 (cont'd). What resources will be deployed for Clean requirement?

- RPS and CARES are market mechanisms, so the least-cost resource mix ought to be deployed
  - (Utilities will purchased cheapest credits available)
- CARES requirement accepts any CERCs or MD RECs
  - MD Solar is likely most plentiful/lowest cost growth opportunity in that category

# 4. Count existing nuclear, but don't credit it

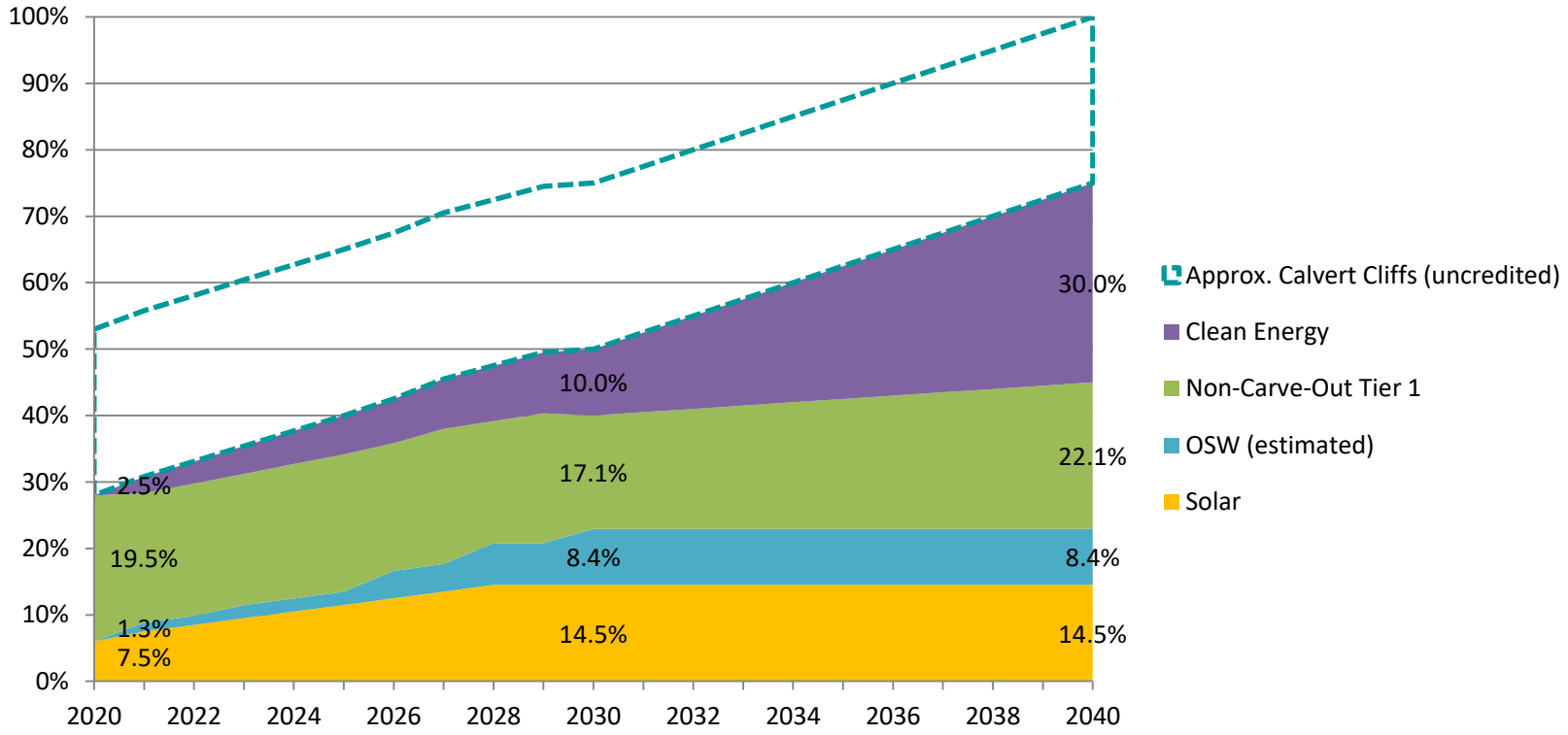
- Existing nuclear provides ~22% - ~25% of retail sales.
- CARES counts that generation toward the goal, and increases the goal accordingly
- CARES <u>does not provide credits for that generation</u>



# 5. Get to 100% by 2040

- From 2030 to 2040, CARES increases the new clean energy carve-out (eligibility includes all clean resources and all MD renewables) to reach 100%



# Technology-Specific Considerations

- Hydropower
- Existing Nuclear
- New Nukes and Carbon Capture
- Bioenergy with Carbon Capture (BECCS)
- Combined Heat and Power (CHP)

# Hydropower

- CARES bill incorporates all hydro into Tier 1
- Lots of feedback on that already
- Open to improvements to that approach

# Existing Nuclear

- CARES intends to account for only MD Nuclear
- RPS definition of “MD” may include nearby PA resources
- MDE & MEA working on clarifying language

# New Nukes & Carbon Capture

- May or may not be technically or economically feasible
  - Would compete with other clean energy and MD renewables, so would not be deployed unless competitive
- CARES credits CCUS in proportion to share of carbon captured (e.g. capturing 50% of emissions gets 50% credit)
- CCUS Crediting requires either permanent storage or utilization that results in indefinite sequestration

# Bioenergy with Carbon Capture (BECCS)

- Potential negative-emissions technology
- Gets double-credit under CARES
- Qualifying biomass facilities with CCUS get:
  - 1 REC for burning qualifying biomass
  - 1 CERC for capturing the carbon (depends on % captured)

# Combined Heat and Power

- Partial credit based on efficiency:
  - >90% efficiency gets full credit (1 CERC per MWh)
  - 75% to <90% gets ¾ credit (0.75 CERC per MWh)
  - 60% to <75% gets half credit (0.5 CERC per MWh)
  - <60% efficiency gets no credit
- Recent installations in Maryland averaged 77% efficiency (0.75 CERC per MWh)
- Above 90% efficiency extremely difficult to achieve using conventional gas-powered CHP

# Topic 1 Discussion

# Topic 2: Coal Generation in MD

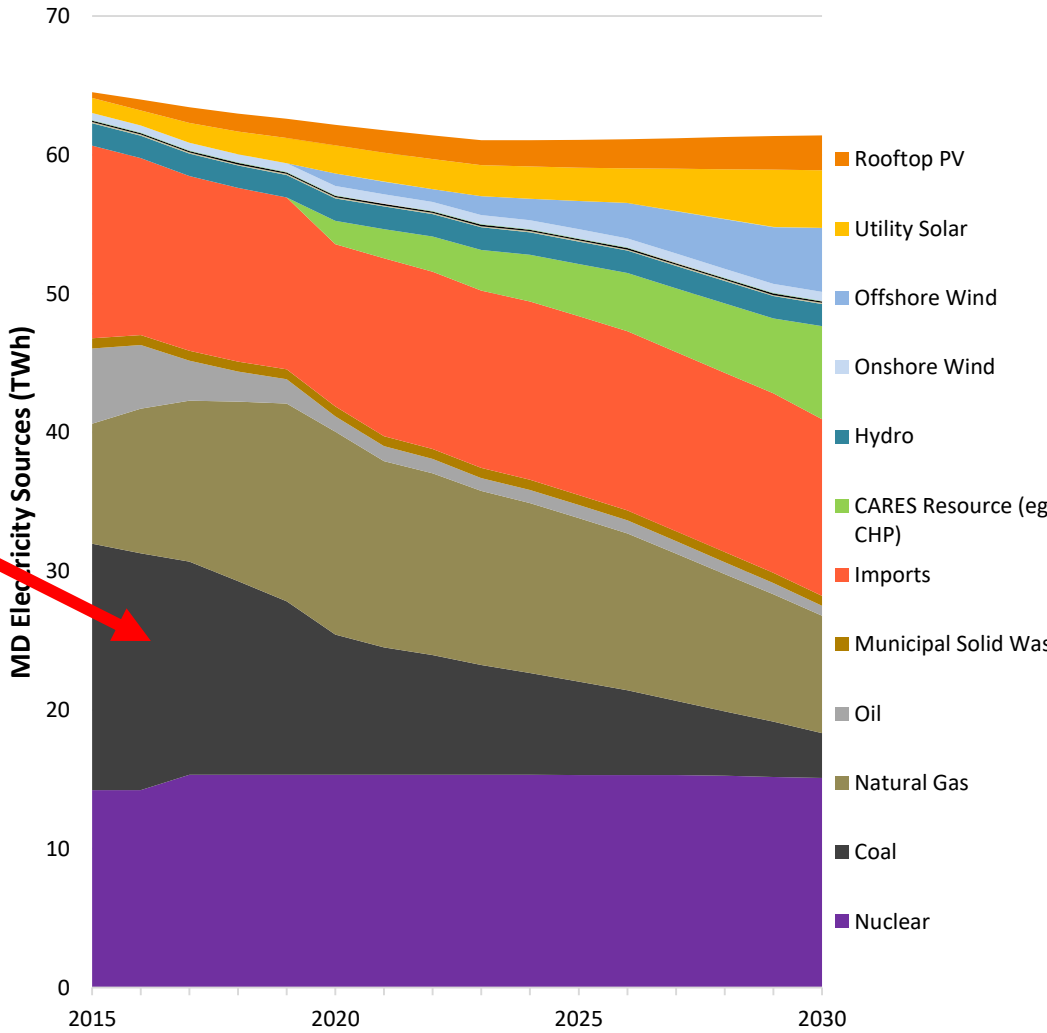
GGRA Draft Plan Estimates

Coal generation declines by ~67% over next decade

- 2014: 17.6 TWh
- 2020: 10.1 TWh
- 2030: 3.23 TWh

Decline due to:

- Markets (cheap gas & renewables)
- Policies (RGGI, RPS, CARES, air regs)




Maryland electricity generation and imports in GGRA Draft Plan through 2030. CARES and RGGI reduce fossil generation and increase clean & renewable generation.
**Analysis assumes no new nuclear or carbon capture before 2030**

# Topic 2 Discussion

# Topic 3: GGRA Modeling Updates

MDE will update emissions modeling, including:

1. More recent data sources
2. Most recent emissions inventory (2017 instead of 2014)
3. Specific policy details

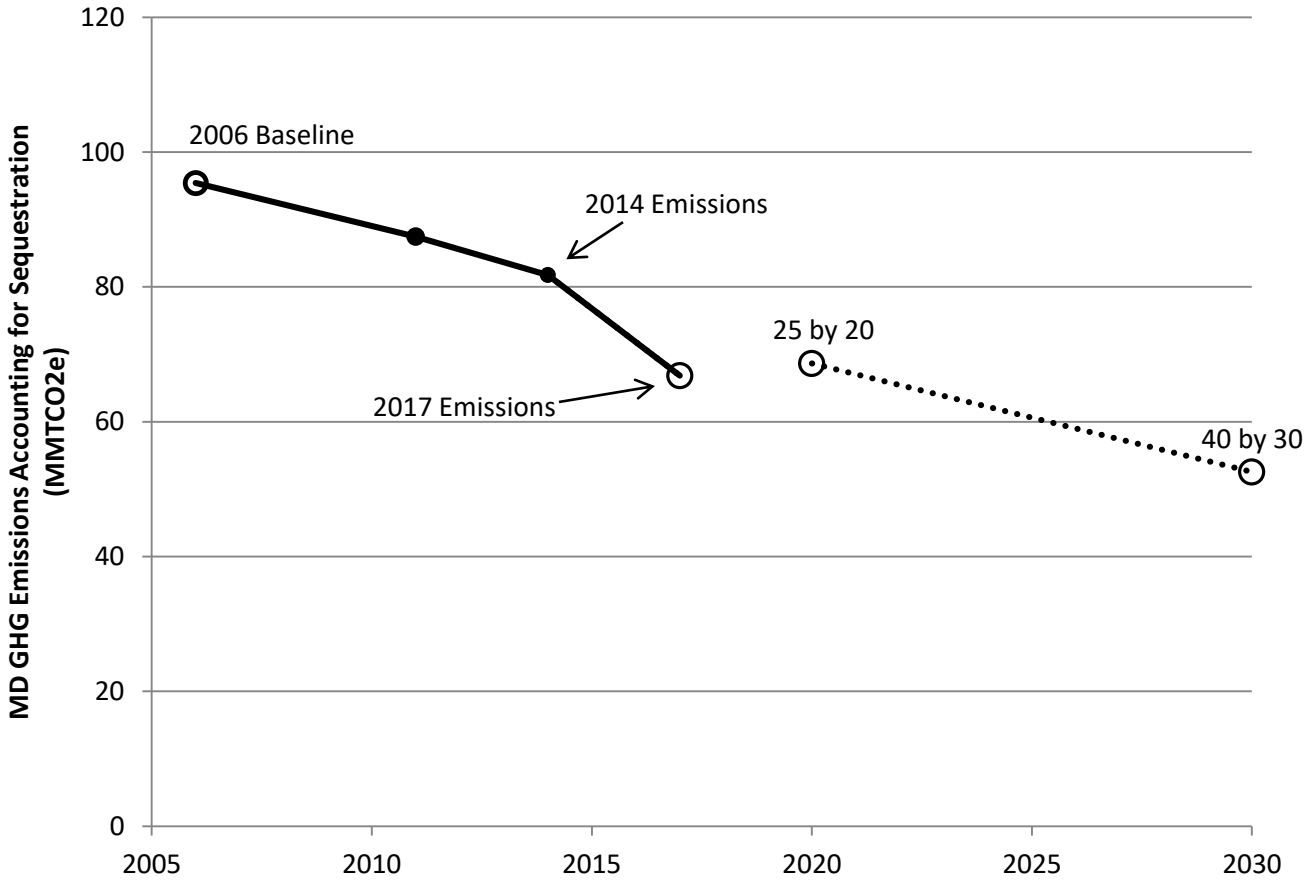
Goal: Update background assumptions to start on updated reference case (results as early as next MWG)

(policy case updates wait until outreach complete)

# Updating Inventory Year

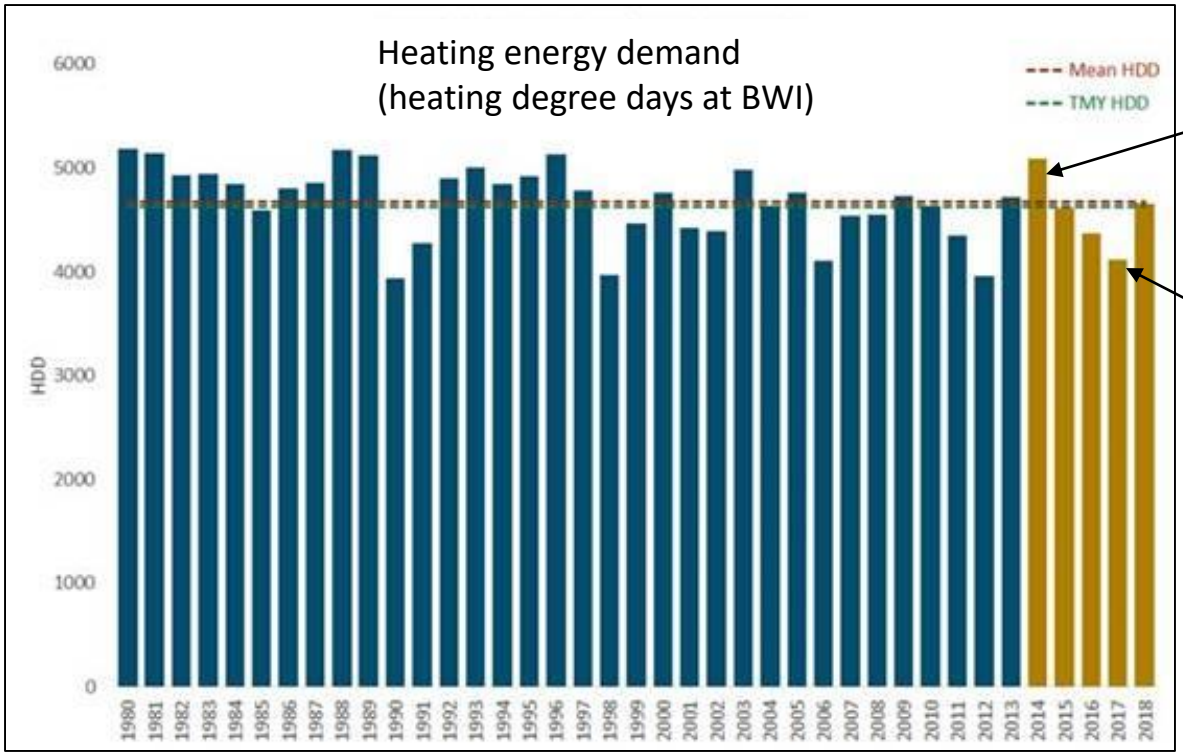
PATHWAYS (& GGRA Draft) built upon the 2014 inventory

– We should update to latest inventory, HOWEVER 2017 was low…



# 2014 vs 2017 Weather

## Emissions are partially weather-driven




2014 winter was rough (polar vortex)

2017 winter was mild (power and building emissions were low)

# MDE Proposal

Update PATHWAYS to 2017 inventory, except:

- Building Emissions: Base on 2018 data (if available) or 2015-2017 average
- Electricity Emissions: Base on 2018 or 2019 data
  - Note that 2019 electricity emissions were similar to 2017.

# Other Updates

- Updated technology costs:
  - renewable costs (NREL)
  - fuel costs (EIA)
  - and EV costs (TCI modeling)
- Population & energy growth (MDP, EIA, others)
- Policy specifics: CARES and TCI (policy cases updated after outreach process)
- Federal policies

# Topic 3 Discussion