

MARYLAND IN-STATE LOW CARBON POWER AND JOBS

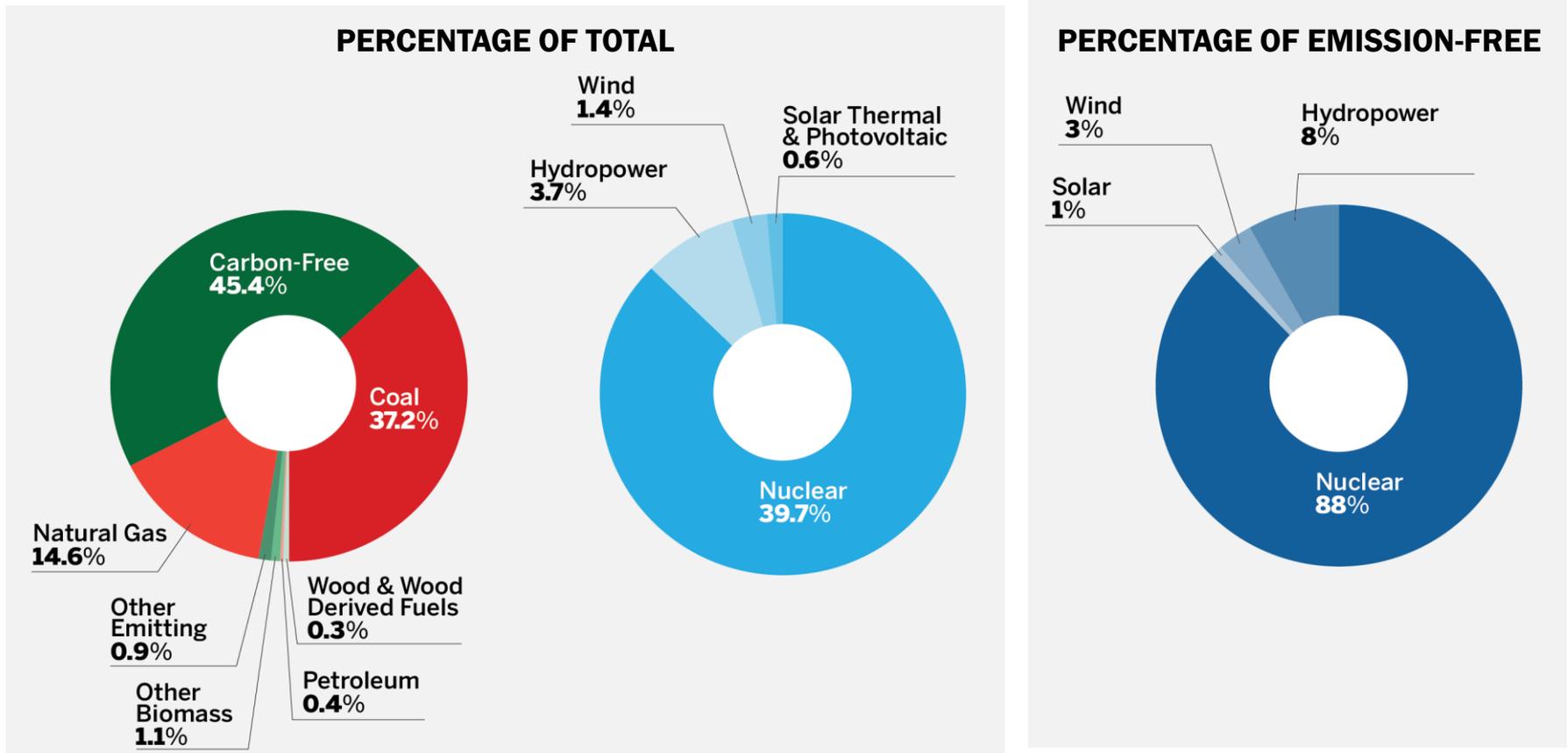
Maryland Commission on Climate Change, Mitigation Working Group

March 1, 2018



Maryland Electric Power Generation By Fuel (2016)

Most of Maryland's carbon-free electricity generation comes from Calvert Cliffs Nuclear Plant, Conowingo Dam and Exelon Wind.



Source:
EIA State Historical Tables for 2016, revised December 2017

Clean Energy in Maryland

NUCLEAR (CALVERT CLIFFS)

- **14,760,000 MWh** per year
- 1,750 MW

HYDROELECTRIC

- **1,400,000 MWh** per year
- Conowingo: 572 MW
- Other Hydroelectric: 20 MW

ENERGY EFFICIENCY

- **1,244,360 MWh** in 2016
(*EmPower Maryland 2017 PSC Report*)

WIND

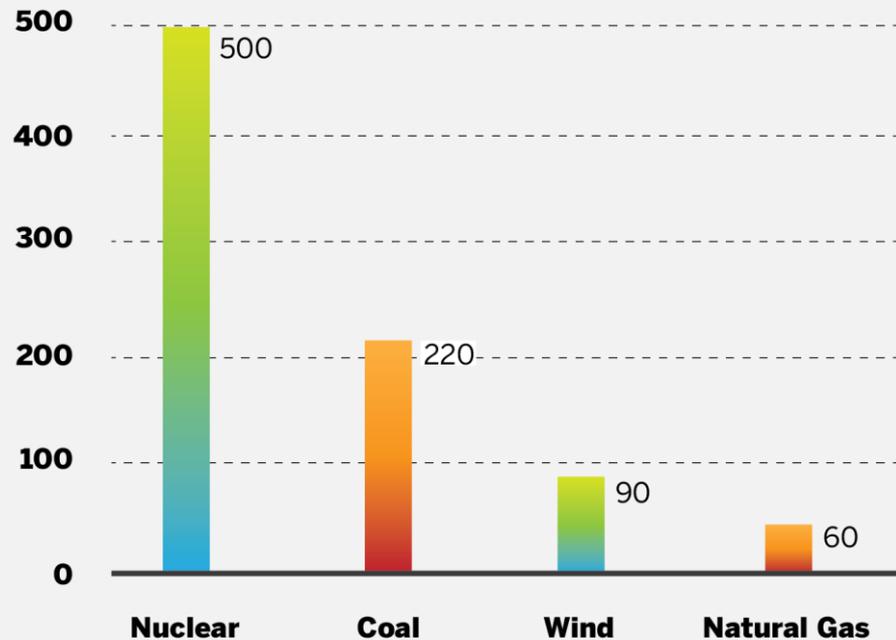
- **500,000 MWh** per year
- Exelon Wind: 140 MW
- Other Wind: 50 MW

SOLAR

- **210,000 MWh** per year
- Exelon Solar: 42 MW
- Other Solar: 120 MW

Jobs Created for Operating Energy Plants

Jobs per 1,000-megawatts of capacity



NABTU Presentation to MWG 7/13/2017

Sources:

Ventyx and U.S. Department of Energy

Calvert Cliffs Nuclear Power Plant

ABOUT CALVERT CLIFFS

- Calvert Cliffs' top values are **SAFETY** and **SECURITY**
- Generation: Two units, 1,750 MW
 - Unit 1: Licensed until 2034*
 - Unit 2: Licensed until 2036*
- Total electrical generating capacity is enough to power about 30% of all homes and businesses in state of Maryland
- Calvert continues to be a “base-load generator” supplying the Washington/Baltimore region
- 24-Month Fuel Cycles
- Equivalent energy output to power the city of Baltimore



LOCAL IMPACT

- Currently pays highest property taxes in Calvert County:
 - **CENG paid \$22.8 M in property taxes for Calvert Cliffs for fiscal year 2016**
- Annual aggregate employee salaries and benefits:
 - **Nearly \$180 M**
- Community Supporter:
 - **More than \$250,000** in local charitable contributions + countless employee volunteer hours
- To support each refueling outage:
 - **Approximately 1,500 additional workers** travel to Calvert for several weeks, filling nearby hotels to capacity and increasing foot traffic in restaurants and shops at a time when tourism is usually slow.
- Over half of Calvert's employees have been with the company **10 years or longer**.
- Calvert has 20 employees that have come through the **College of Southern Maryland training program**.

IMPACTS ON STATE ECONOMY

- Provides highly skilled workforce and provider of long-term, head of household jobs:
 - about **900 direct in-state full time jobs**
 - about **2,300 in-state full time jobs** (direct and indirect)
 - Nearly **\$15 million in net state tax revenues** annually
- Contributes **\$397 million** to the state's gross domestic product (GDP)
- Average annual carbon dioxide emissions would be about **9 million tons higher** absent the generation from Maryland's nuclear plant
 - Worth an additional \$392 million annually (using U.S. government's estimate for the social cost of carbon)
- Nuclear energy in Maryland also keep electricity prices lower:
 - Savings of **\$40 million annually for in-state customers**
 - **Savings of ~\$430 million annually** for the region
- **Keeping power prices lower is the primary means by which nuclear power boosts Maryland's economy and jobs.**

Source: *Maryland Nuclear Power Plant's Contribution to the State Economy*. The Brattle Group. (Sept. 2015)

Conowingo Generating Station

For nearly 90 years, the Conowingo Dam has been a source of clean, reliable energy for thousands of residents and businesses.

Location: Lower Susquehanna River, Darlington



- Began operation: 1928
- 4,468 feet long and 104 feet tall
- 11 generators
- Current Capacity: 572 megawatts
- 2016 Generation: **1.4 million megawatt hours**
 - Enough to power more than 140,000 typical households for an entire year.
- Long term license expired: 2014
 - Operating under annual license
- New 46-year license application filed: 2012

Sources:

¹National Economics Research Associates, Nov. 2012, *Socioeconomic Gains to Maryland of the Conowingo Hydroelectric and Muddy Run Projects*

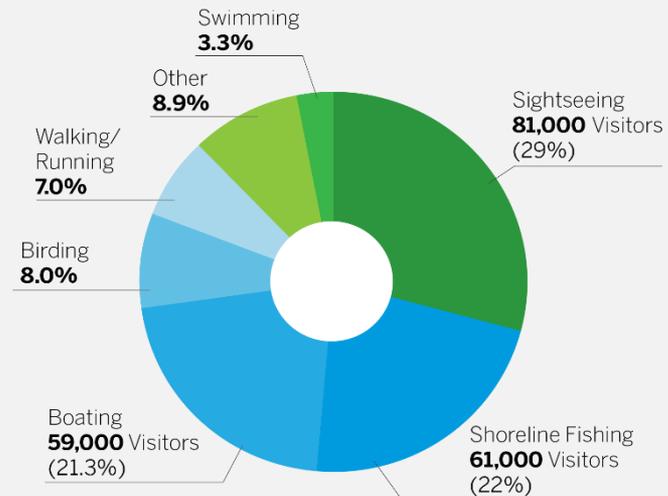
²Tourism Economics, Oxford Economics Company: *The Economic Impact of Tourism in Maryland 2010*

CONTRIBUTIONS TO THE MARYLAND ECONOMY

Conowingo delivers \$273 million in annual economic benefits to Maryland and its local communities.¹

- Directly and indirectly contributes **265 full-time equivalent jobs.**¹
- Pays **\$10 million** in state and local taxes annually, including \$3.5 million in property taxes.

Helps drive the tourism economy in Cecil and Harford Counties by attracting **250,000 recreational visitors** a year.



NABTU Presentation to MWG 7/13/2017

Maryland Wind

Three of the four Maryland wind projects are owned by Exelon.



1 Criterion Wind Project

Backbone Mountain (Exelon)

- 70 MW
- 28 Turbines
- Began commercial operation December 2010
- Old Dominion Electric Cooperative has 20-year PPA to purchase the output and RECs

2 Fair Wind Project

Oakland (Exelon)

- 30 MW
- 12 Turbines
- Began commercial operation November 2015

3 Fourmile Wind Project

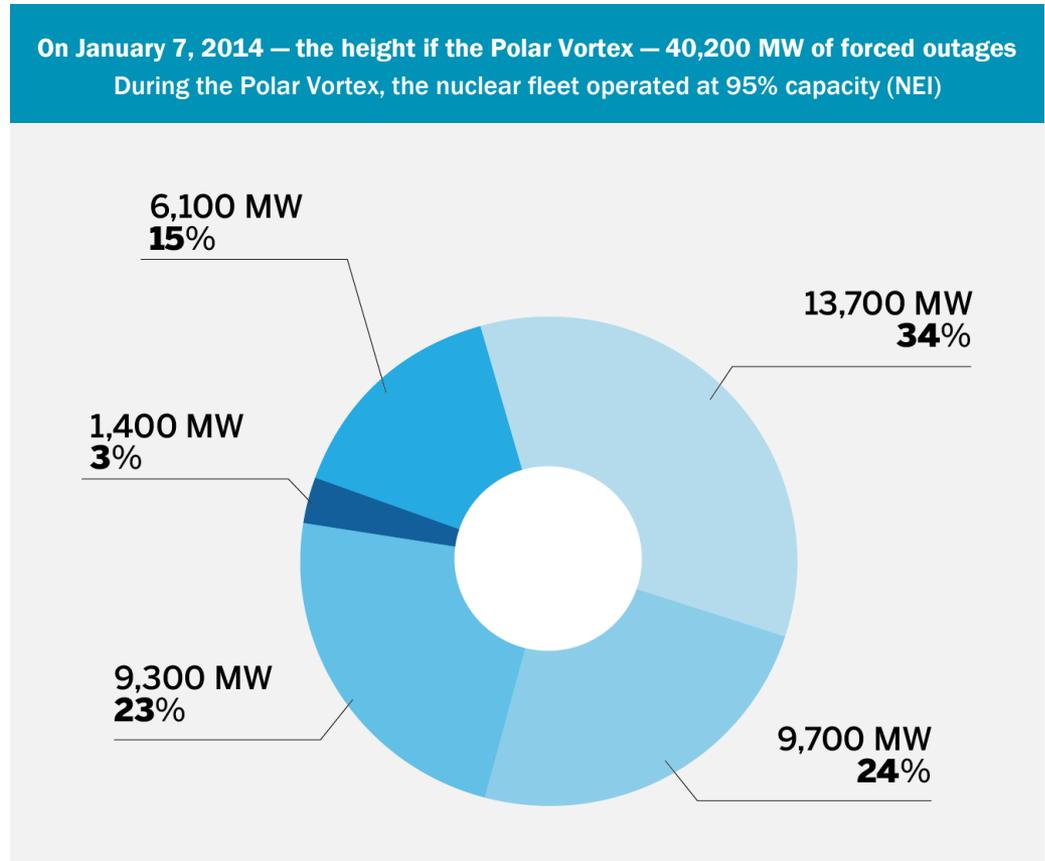
Frostburg (Exelon)

- 40 MW
- 16 Turbines
- Began commercial operation December 2014

Nuclear Energy's Unparalleled Reliability

Families, communities and businesses depend on the reliable electricity provided by the nation's nuclear plants

- Nuclear plants operate at the highest capacity factor of any source, over 90%, regardless of weather or time of day, and can go 18-24 months without refueling.
- This kind of reliable base-load output is not provided by any other "always on" generation source.
- During the Polar Vortex, coal, natural gas and oil generator outages were high due to lack of fuel and other issues.
- Nuclear units have consistent availability and a secure on-site fuel supply.



Sources:

Terry Boston, President and CEO PJM, MACRUC 6/22/2014, Mike Kormos, FERC Technical Conference (4/1/2014), Monitoring Analytics, SOM 2014q1.
Forbes, Polar Vortex - Nuclear Saves The Day, 1/12/2014

Baseload Nuclear Energy in America

 ADDS **\$60 BILLION** TO THE COUNTRY'S GDP

SAVES CONSUMERS AN AVERAGE OF **6 PERCENT** ON ELECTRICITY BILLS

SUPPORTS **475,000 JOBS**

 THAT'S MORE JOBS THAN ANY OTHER POWER GENERATION SECTOR 

CONTRIBUTIONS EACH YEAR

\$10 BILLION & **\$2.2 BILLION**
IN FEDERAL TAXES & IN STATE TAXES

NUCLEAR AVOIDS OVER **1/2 BILLION TONS** OF CARBON EMISSIONS EACH YEAR.

THAT'S GREATER THAN THE TOTAL U.S. POWER SECTOR CARBON REDUCTION COMMITMENT IN THE PARIS ACCORD

PREVENTS **650,000 TONS OF NO_x** & **1 MILLION TONS OF SO₂ EMISSIONS**

THAT'S 50% MORE THAN SOLAR, WIND, HYDRO AND GEOTHERMAL COMBINED



The Largest Source of Zero Emission Energy is Challenged

While performing at exceptional efficiency, nuclear generation is in jeopardy of closing prematurely because it does not receive fair and adequate compensation for valuable attributes like clean and reliable electricity, with consequent loss of jobs, baseload power, fuel diversity and around-the-clock reliability.

THE CHALLENGES INCLUDE:



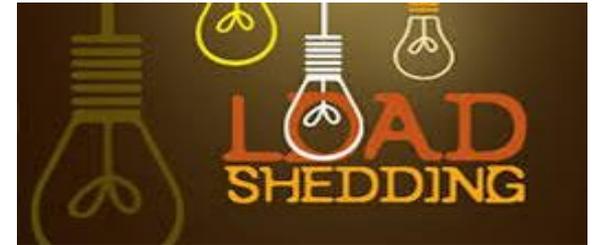
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Natural gas production has increased significantly and prices have declined dramatically. Natural gas frequently sets the marginal price of electricity for all generating sources; its lower price suppresses electricity prices across the market.



2

Federal policies and mandates subsidizing other clean electricity, primarily wind and solar, distort energy markets causing other clean generators to operate at a loss.



3

Load growth is down or flat - markets are shrinking. Between 2008 and 2016, the market has declined year after year.

Merchant Nuclear Plants in all Regions of the Country Face a Shortfall of Market Revenues Relative to Costs

Average 2016 Nuclear Costs (\$/MWh)⁽¹⁾



2020 Forward All-In Nuclear Market Prices (\$/MWh)⁽³⁾



Source:

(1) Nuclear Energy Institute, "Nuclear Costs in Context," August 2017

(2) Contingency (or risk) is calculated as 10% of total costs plus \$4/MWh

(3) Based on 10/20/17 ICE forward energy prices for relevant hub less 2016 average basis differential to nuclear plants

Conclusion

96%

Of Maryland's carbon-free generation is from existing nuclear power and hydroelectric resources

These resources support about

2,600

career full-time in-state jobs

Nuclear energy is CRITICAL

to Maryland's greenhouse gas reduction goals, to the reliability and resilience of PJM's power grid, and to the health of the Maryland economy

RECOMMENDATION FOR MWG REPORT:



Include all zero-carbon energy sources in strategies to reduce greenhouse gas emissions



Participate in regional programs to limit greenhouse gases



Assure clean energy portfolio expansion does no harm to existing clean energy

Appendix

Calvert Cliffs Environmental Stewardship

- 1,500 acres of pristine forest and shoreline
- Wildlife Habitat Certification
- ISO 14-001 Certified
- 2006 Presidential Award for Environmental Excellence
- Calvert Cliffs was awarded 1st Place for 2016 Calvert County Recycling Award for Large For-Profit Business by the Calvert County Commissioners.
- Annual Horseshoe Crab Guard Installation
- Eastern Bluebird Monitoring - 85 Bluebirds produced this year
- LED Installation Project
- Storm Drain Insert Program
- Bat Box Monitoring



Calvert Cliffs Community Support

More than \$250,000 to community in dollars and hours

- Raised nearly **\$145,000** for United Way
- Raised more than **\$34,000** for Believe in Tomorrow
- Donated more than **\$15,000** to Health Care/Research Support (Alzheimer's Walk, Breast Cancer Walk, etc.)
- Donated **122 pints of blood** to the American Red Cross
- Hosted 12 volunteer events for Christmas in April and raised almost **\$35,000**
- Volunteered at United Way Day of Caring --**more than 50 employees!**
- **Supported 160 kids** through Tree of Angels
- **Donated 600 PJ's** via Pajama Drive
- Beat SMECO at Dragon Boat Racing (End Hunger Calvert)
- Donated more than **\$30,000** to local charities
- Raised more than **\$300** and **420lbs of food** through Trunk or Treat

CONTACT

ANNE M. LINDNER

Director, State Government Affairs

Office: 410-470-4540

Mobile: 410-227-9004

anne.lindner@exeloncorp.com