SCHOOL OF PUBLIC POLICY
CENTER FOR GLOBAL SUSTAINABILITY

Maryland Department of the Environment

The Renewable Energy Transition in Maryland: Implications for Energy Generating Facilities and Small Businesses

Presentation to the Energy Industry Revitalization Working Group

November 12, 2024

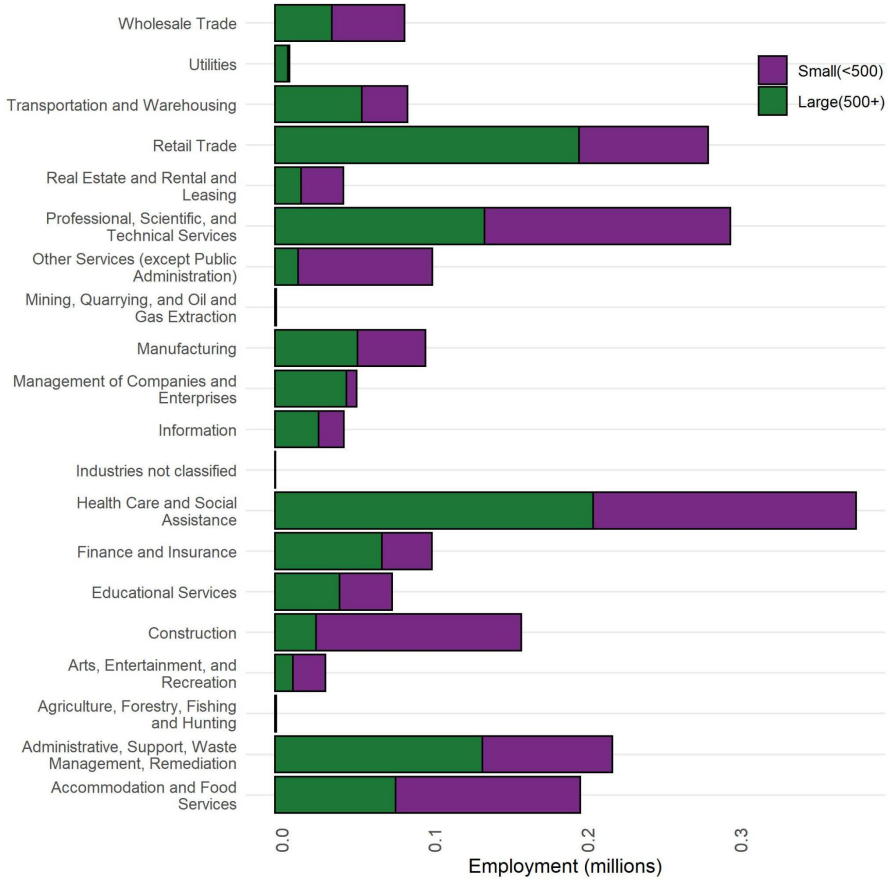
Agenda

- Small Businesses
- Energy Generating Facilities
- Discussion and Questions

Source: Flickr

Small Businesses

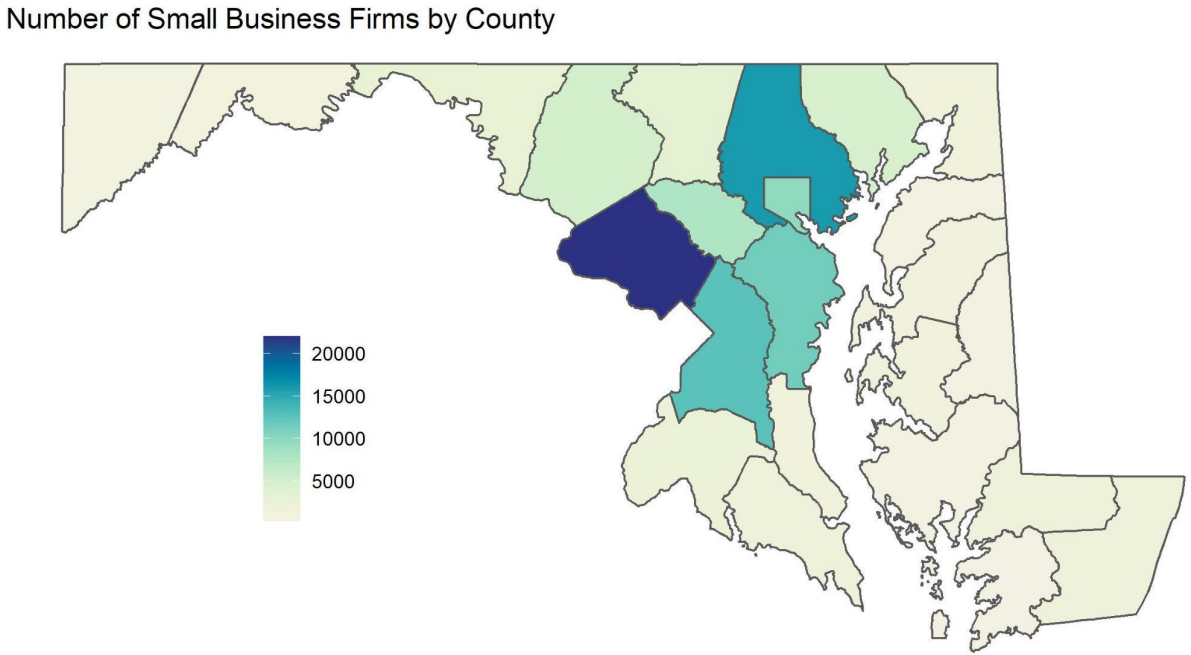
Small businesses account for 45% of employment and 97% of firms in Maryland



- Small businesses defined as <500 employees
- Small businesses are particularly prominent in certain sectors:
  - **Construction**: 83% of employment
  - **Professional, Scientific,Technical Services**: 54% of employment

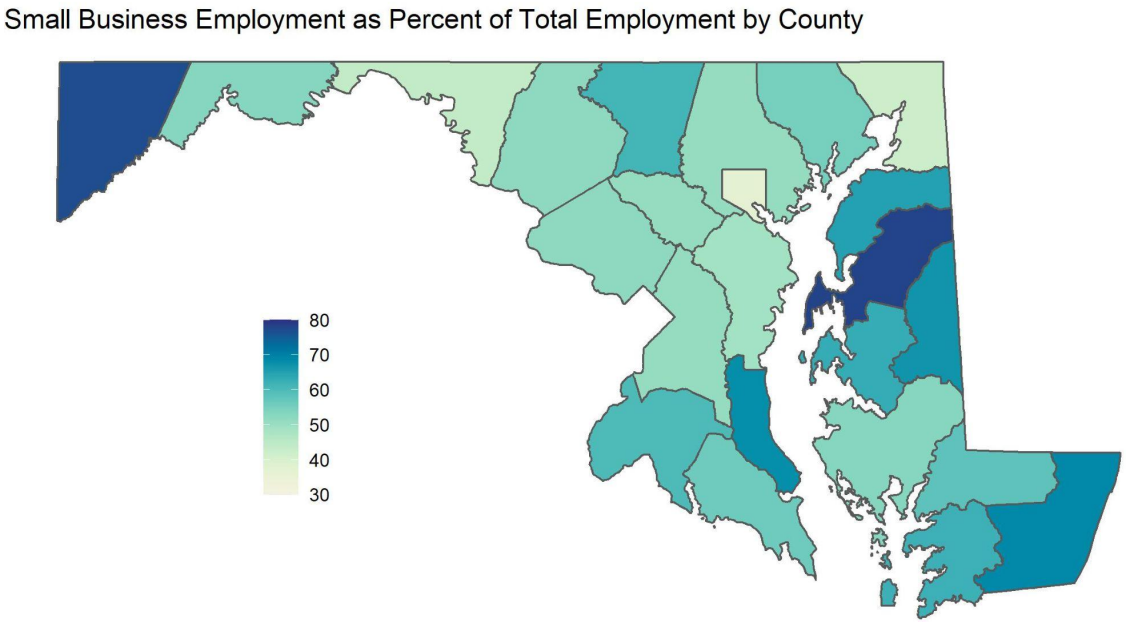
Source: Census Bureau Statistics of US Businesses, 2021

DC-Baltimore corridor dominates small business activity by number of firms…



Source: Census Bureau County Business Patterns, 2021

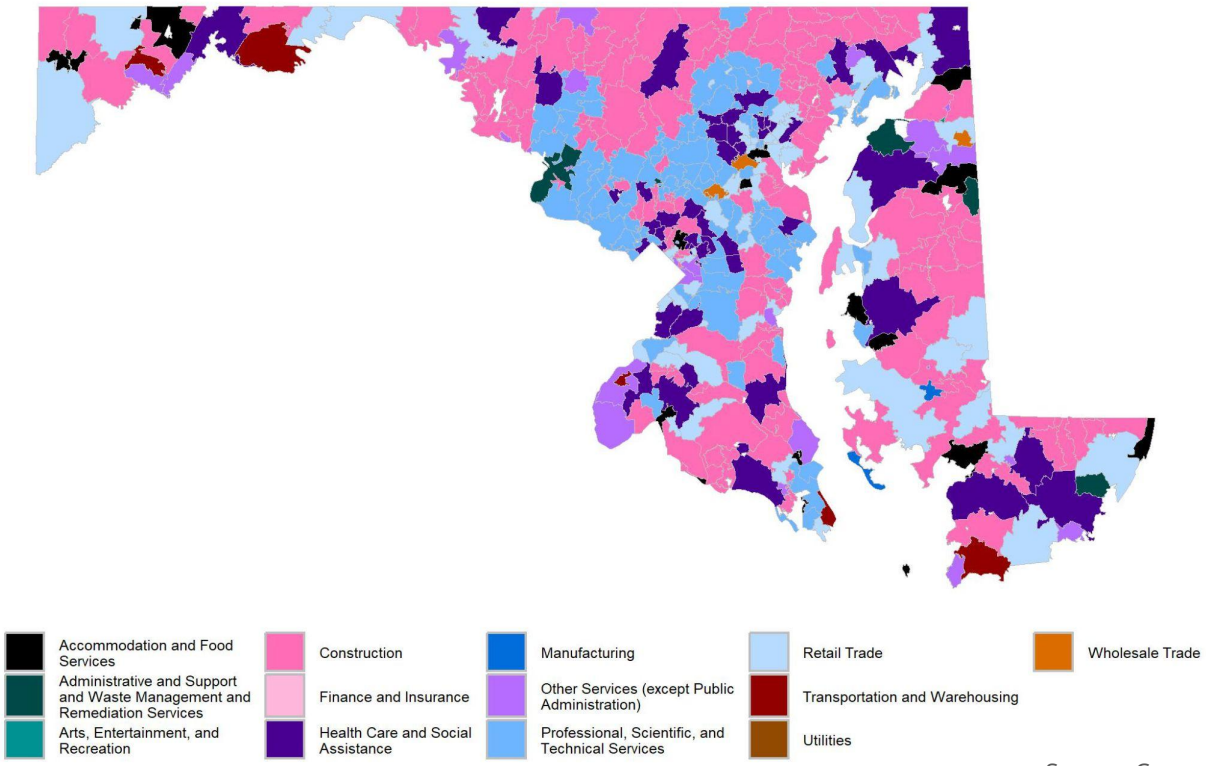
...but as a percentage of total employment, small businesses are more concentrated in rural areas



- Indicates small businesses are particularly important part of economic activity in more rural areas

Source: Census Bureau County Business Patterns, 2021

Most common small business activities vary across the state



Top 3 most common activities were:

- Construction
- Professional, Scientific, and Technical Services
- Retail Trade

Source: Census Bureau County Business Patterns, 2021

Small Businesses Affected by the Energy Transition

Direct Supply of Energy

Businesses involved in directly generating, selling, or otherwise supplying energy.

Case Study

Partnerships can support the transition of direct supply businesses, helping move the energy transition forward and fostering local economic growth.

RSAUTOMOTIVEINC

Provision of Energy Services

Businesses that provide ancillary services to the energy industry described in the direct supply category.

Case Study

Local governments can play a role in helping energy service providers connect to individuals and other small businesses that are navigating the transition.

Elysian Energy

Energy Intensive Business

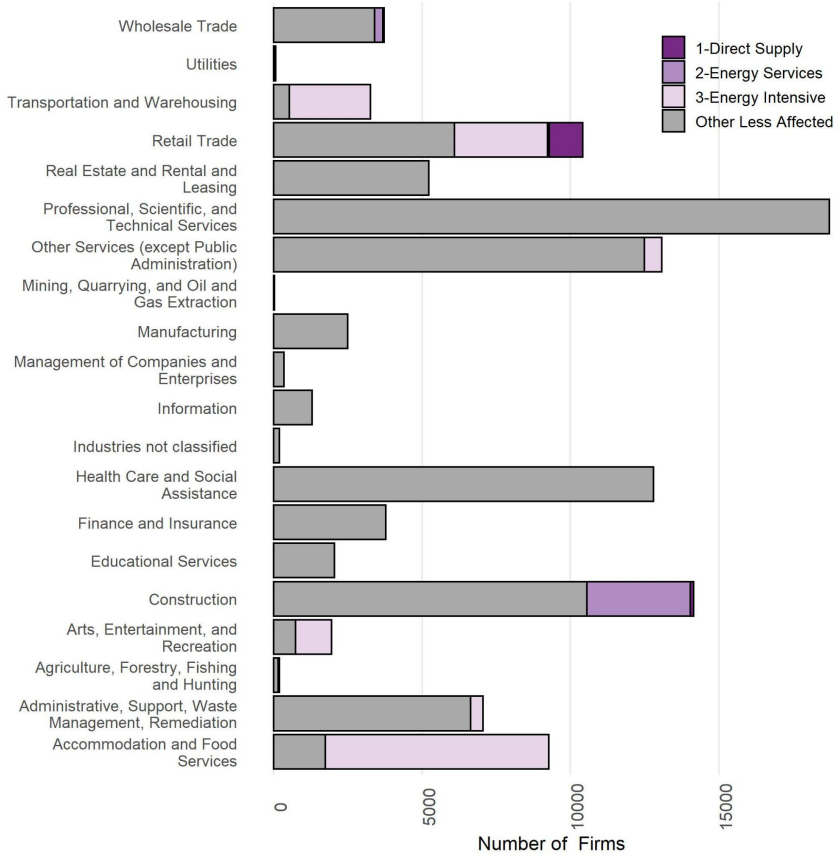
Businesses where value production is heavily dependent on energy inputs.

Case Study

The state will need to lower barriers and help small businesses navigate energy transition resources.

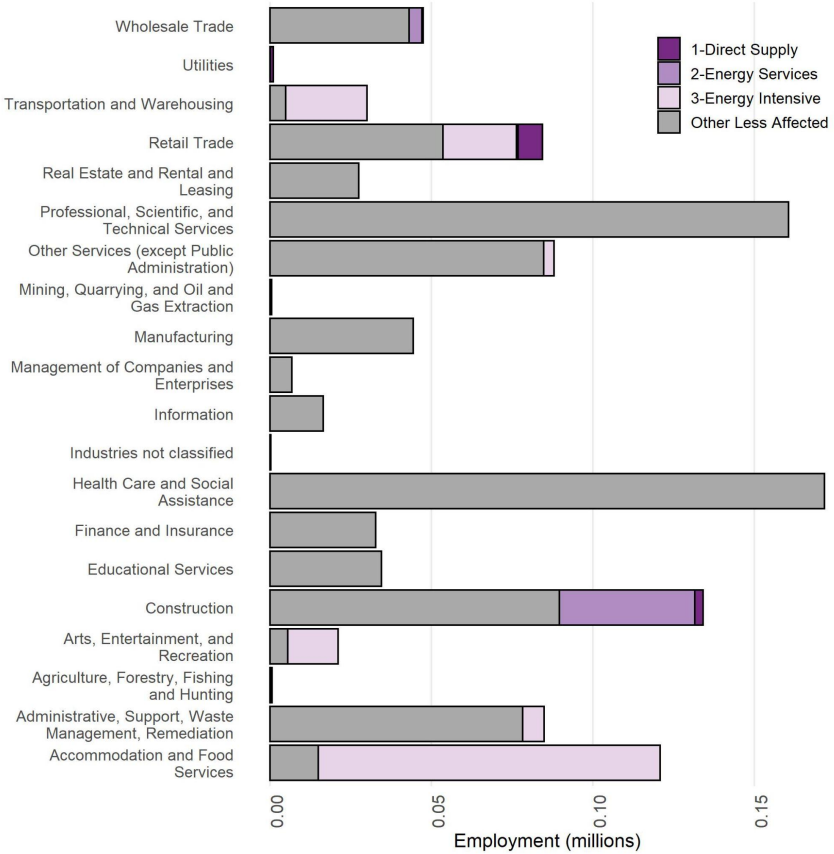
Garden & Garnish Catering

We identify 24% of small businesses as affected by the energy transition (21,551)



- Direct Supply: 1,331 firms
  - Primarily retail trade and construction
- Energy Services: 3,940 firms
  - Primarily wholesale trade and construction
- Energy Intensive: 16,280 firms
  - Primarily accommodation & food services, transportation & warehousing, and retail trade

Businesses in affected industries employed 252,205 Marylanders in 2021



- Direct supply: 11,580 employees
- Energy Services: 49,137 employees
- Energy Intensive: 191,488 employees

Economic Impacts

- Prior analysis by the Regional Economic Studies Institute (RESI) at Towson University indicates that the transition may provide significant economic benefits between 2024 and 2031:
  - Net gain of 27,400 jobs
  - $2.5 billion increase in total personal income
  - $5.3 billion increase in state Gross Domestic Product (GDP)
- Highest growth was found to be in:
  - Construction - annual average gain of 2,033 jobs through 2035
  - Transportation - annual average gain of 2,016 jobs through 2035
- Health benefits associated with air quality improvements due to the energy transition

Policy Frameworks in Maryland

Resource/Platform-based Programs

- Maryland Entrepreneur Hub
- MEA's Clean Buildings Hub
- Small-Business Anti-Displacement Network
- Maryland Green Registry

Loans/Grants

- Households
- Businesses
- Broadly accessible

Federal programs:

- Department of Energy loans
- Small Business Administration loans
- Small Business Voucher Pilot Program

Counties may also have distinct supportive programs

Policy Recommendations

Funding & Financing

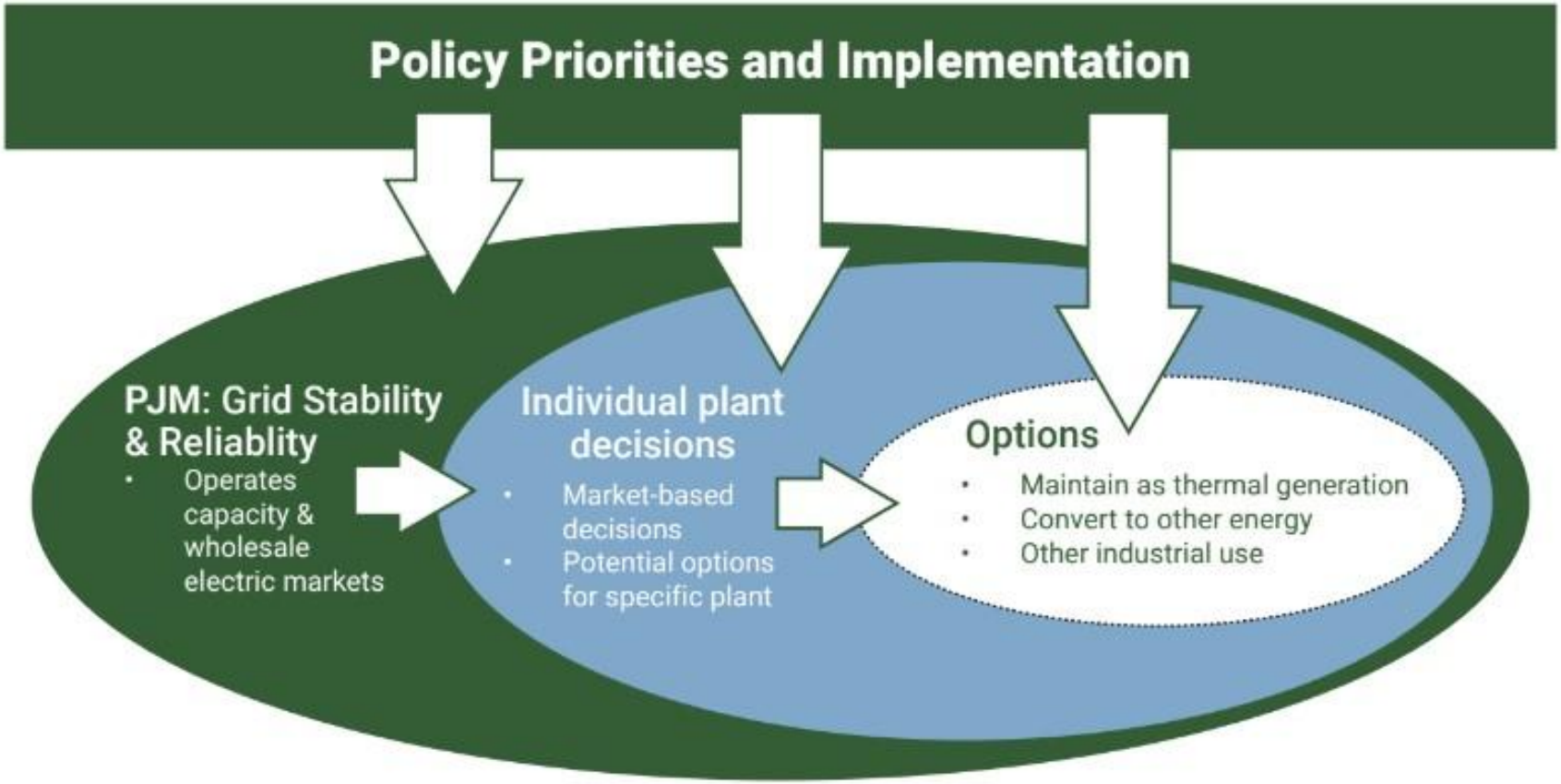
Maryland should support small businesses by providing access to funding and helping them navigate and **utilize existing resources**. Financial mechanisms such as **green banks** can play a critical role by leveraging public and private capital to offer low-interests loans for clean energy projects. Maryland has existing green banks, and these be further supported to enable more small businesses to access financial assistance for clean energy projects.

Engagement and Technical Assistance

Maryland should establish mechanisms for sustained engagement and technical assistance, supporting affected small businesses through the processes of **needs assessments, funding applications, and project implementation** for the energy transition. These policies should be **flexible and inclusive** enough to ensure a wide range of industries can participate. Engagement and technical assistance will also be important in spreading awareness of what the energy transition is, what that means for businesses, and what resources are available at the federal, state, and local levels to assist small businesses through the energy transition.

Energy Generating Facilities

Context for Facility Retirements



Policy Context

Renewable Portfolio Standard (RPS)

The RPS requires Maryland to source 50% of its electricity consumption from renewable energy by 2030. The RPS defines renewables as solar, wind, qualifying biomass, methane from a landfill or wastewater treatment plant, geothermal, ocean, hydroelectric, poultry litter-to-energy, waste-to-energy, and refuse–derived fuel.

EPA Regulations

The EPA's 2024 rule for new and existing fossil-fueled power plants requires that coal plants adopt carbon capture and storage (CCS) by January 1, 2032. For natural gas and oil steam generating units, the EPA set an emissions intensity standard (pounds of CO_2 released per MWh of electricity produced) based on capacity factor.

Regional Greenhouse Gas Initiative (RGGI)

RGGI is a a multistate, market-based program designed to reduce carbon dioxide emissions from the power sector 30% below 2020 levels by 2030.

Proposed: 100% Clean Energy Standard

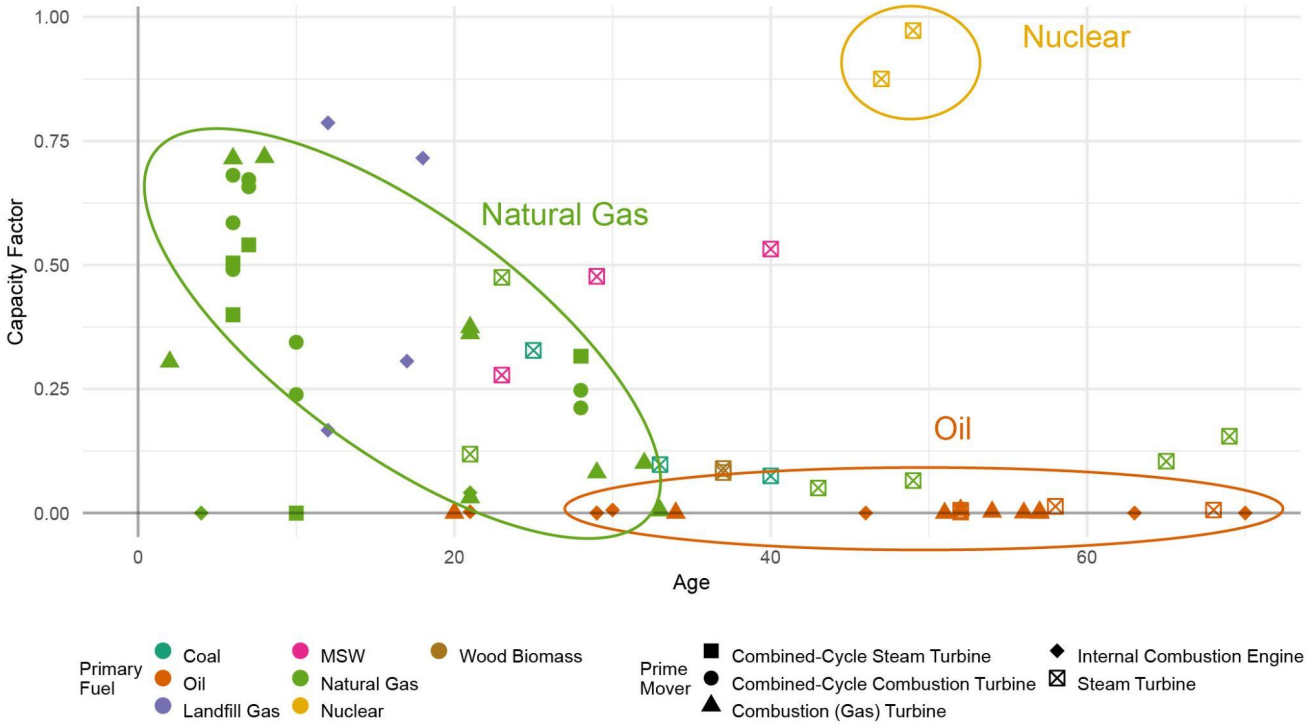
Governor Moore has directed the MEA to establish a framework to achieve 100% clean electricity in Maryland by 2035. This proposed Clean Energy Standard (CES) is still under development, so the specifics of how it will be defined are not yet known. Additional legislative action will likely be needed to implement the standard.

Summary of Maryland Generation

	# of facilities (2023)	MWh generation (2023)	% of state generation (2023)
Coal	2	1,708,970	4.6%
Natural Gas	17	15,336,203	41.0%
Petroleum	14	64,240	0.2%
Fossil Total	**33**	**17,109,413**	**45.8%**
Nuclear Total	**1**	**14,983,751**	**40.1%**
Biomass/Waste/ Landfill	10	634,689	1.7%
Hydro	2	1,849,088	4.9%
Solar*	144	2,324,764	6.2%
Wind	5	481,526	1.3%
Renewable Total	**161**	**5,290,067**	**9.1%**

Data source: EIA (2024), DOE USEER (2023), USEER Supplemental Report (2021)

Thermal generation characteristics vary by fuel type



- Natural gas generators span almost all mover types, with downward trend in capacity factor with age
- Calvert Cliffs nuclear generators have the highest capacity factors
- Many generators using fuel oil have low capacity factors, are older than 40 years, and use combustion and steam turbines

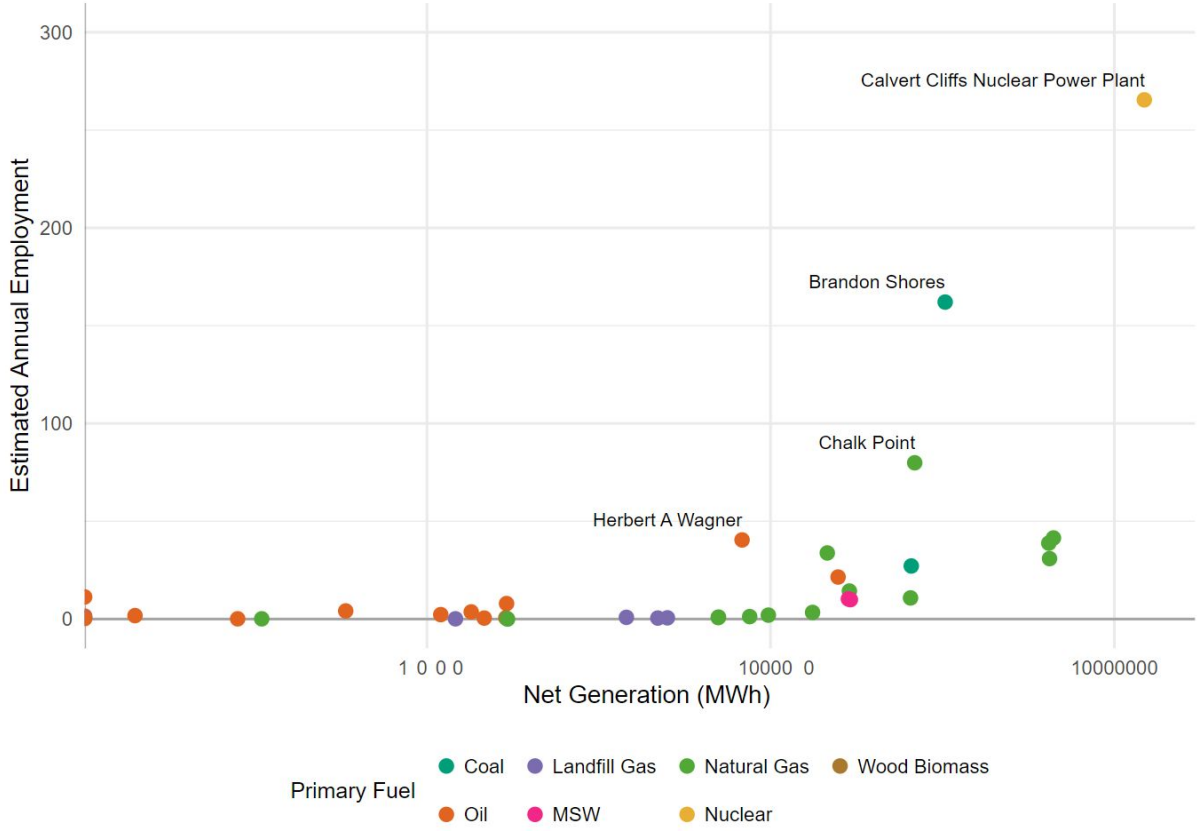
Data source: EIA

Energy Employment in Industry Cross-cuts

	# of jobs (2022)	% of jobs (2022)	Median hourly wage (2019)
Coal	1,599	11.1%	$28.69
Natural Gas	2,086	14.5%	$30.33
Petroleum	107	0.7%	$26.59
Fossil Total	**3,792**	**26.3%**	**-**
Nuclear Total	**1,143**	**7.9%**	**$39.19**
Biomass/Waste/ Landfill	516	3.6%	-
Hydro	502	3.5%	$26.97
Solar*	7,195	49.9%	$24.48
Wind	1,280	8.9%	$25.95
Renewable Total	**9,493**	**65.8%**	**-**

Data source: EIA (2024), DOE USEER (2023), USEER Supplemental Report (2021)

Facilities with highest estimated employment also generate the most electricity



- Facilities that employ >50 people include those with high nameplate capacities, even if they have low capacity factors
- Facilities with medium employment (10-50 employees) include many natural gas and MSW plants
- Facilities with low employment mainly have small capacity factors and small nameplate capacities, many are oil and landfill gas plants
- Newer CC natural gas plants had mid-level employment with high net generation, i.e. >1,000,000 MW

Data source: EIA, PNNL and NREL

Confirmed Facility Retirements

5 facilities with planned retirements:

- 2024: Warrior Run, Morgantown
- 2025: Vienna Operations
- RMR: Brandon Shores & Herbert A. Wagner

Options for Facilities in the Energy Transition

We consider five options for facilities:

1. Reduction in frequency of usage
2. Use of alternate fuels
3. Retrofitting facility with carbon capture and storage
4. Retirement and re-use of facility
5. Retirement without re-use

Potential for additional facility retirements

Additional retirements dependent on if 100% CES is adopted and how it is implemented. Assuming fossil fuel plants are required to stop emissions:

- Baseload/intermediate:
  - Reduce usage over time as clean energy requirements are phased in
  - Adopt CCS to continue operating at high capacity factors
  - Replace with other electricity generation (renewables, SMR)
- Low load (peaker):
  - Transition to alternative fuels to continue using thermal generation equipment
  - Replace with batteries
  - Retirement without re-use

Impacts of Potential Facility Closures

- Direct loss of jobs for facility employees
  - Could be addressed through retraining or relocation
  - Locally targeted interventions will be important in addressing job loss
- Loss of state and local tax revenues
  - Could be addressed through investing in new local industries
  - Locally targeted interventions will be important in addressing loss tax revenue
- Improvement of air quality
  - Better health and environmental outcomes, which could be of significant value

Energy Facilities Case Studies

Reuse of Coal Plants: Warrior Run

Power plants have several options for reuse, including converting fuels, siting battery storage, or building a data center or manufacturing facility. The most significant asset of a plant is its interconnection point.

Impact of Grid Reliability Constraints: Brandon Shores & Herbert A. Wagner

Facility retirement decisions must reconcile technical considerations, like maintaining grid reliability, with financial and environmental impacts. Without sufficient preparation, reliability requirements may slow down attainment of state emission reduction goals.

Potential for Stranded Assets: Wildcat Point

Younger plants have a risk of becoming stranded assets as policies change the market or regulatory environment in the near future. Plants should have transition plans in place, and the state must consider how to support and transition fossil fuel plants, employees, and local communities.

Balancing Different Sustainability Goals: Wheelabrator

Plant pathways can be complex decisions, especially when they have implications for many different policy priorities. Waste incineration at Wheelabrator affects GHG emissions, employment, waste diversion, environmental justice and human health.

Framework for Policymakers and Communities

Criteria	Description
Efficiency	The amount of energy input needed to produce a given amount of power. This can either be characterized through an efficiency value or a heat rate.
CO_2 total tons of emissions	The total amount of carbon dioxide emitted by a facility per year. This has significant implications for Maryland's ability to meet its climate goals.
CO_2 output rate	The amount of carbon dioxide emitted by a facility per unit of generation.
Co-pollutant emissions	NOx, SO_2, N_2O, CH_4, PM output rates and total tons of emissions. All of these emissions have important implications for human health.
Dispatchability	How quickly a facility can ramp from being shutdown to operating at full load. This is a critically important service for maintaining reliability, and will become more important with higher penetration of variable renewable resources.
Co-generation	Co-generation is the production of both electricity and heat from a thermal generator. This increases the efficiency of fuel use because the heat would otherwise be wasted.
Alternate job availability	If the facility is in an area heavily dominated by a single industry, it may be more difficult for unemployed workers to find new jobs without relocating.
Unemployment in the immediate area around the facility	It may be harder in areas with high unemployment for workers to find new jobs, particularly jobs with comparable wages and benefits.
Number of direct jobs	The number of people employed at the facility.
Disadvantaged Community	This designation can have many contributing factors - here, we use the definition of disadvantaged communities established by the Council on Environmental Quality (CEQ) in its Climate and Economic Justice Screening Tool.
Water quality	Energy facilities can also use large quantities of water in cooling systems, and can contribute to water pollution.
Tax revenue	The amount of revenue a facility provides to a local community through property taxes. Depending on the facility, this may be a significant source of revenue for the locality.

Policy Recommendations

Achieve Maryland's Climate Goals

Maryland should **rapidly reduce emissions from both imported electricity and in-state generation**, prioritizing phase-out of unabated fossil fuel generation to achieve air quality and health benefits.

Access Federal & State Funding

Maryland should support businesses, communities, and local governments by helping them **leverage IRA programs and tax credits while providing state-level financial and technical assistance** to prioritize impacted communities.

Create a Robust Framework

Maryland should develop a comprehensive framework for facility closures that ensures grid reliability and addresses the broader challenges and opportunities of the energy transition, **considering financial and reliability concerns, as well as social, economic, and environmental impacts**

Promote Stakeholder Engagement

Maryland should design **tailored engagement strategies for each facility closure**, fostering collaboration and ensuring community-centered approaches.

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Thank you!

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Definition of Affected Businesses

1. **Direct Supply**: Businesses that are involved in directly generating, selling, or otherwise supplying energy. This could include extraction, refining, and distribution of fossil fuels, generation of renewable energy, production and distribution of biofuels, or provision of energy from other sources.

2. **Energy Services**: Businesses that provide ancillary services to the energy industry described in the category above. These business activities could include manufacturing energy technologies, installing energy equipment, or other supporting services.

3. **Energy Intensive**: Businesses where value production is heavily dependent on energy inputs. We define these businesses as being above the median energy intensity across all NAICS activities.

Other less affected: All businesses not in the categories above. This may include businesses that will experience more diffuse secondary impacts of the energy transition that may be felt throughout the economy, businesses that use fossil fuels as feedstocks rather than for energy (e.g., production of plastics), or businesses that may be impacted by the effects of climate change such as the insurance or finance industries.

Energy intensity by NAICS sectors