2.10 LOW IMPLEMENTATION SENSITIVITIES

As discussed in *Considerations for Policy Implementation* throughout Sections 2.1-2.9, there are many uncertainties and challenges around the full implementation of the federal and State policies modeled in the core scenarios. To assess the impacts of these uncertainties on emission outcomes, we explore a set of sensitivities by assuming a less optimistic implementation of several State policies and IRA provisions under Maryland's Climate Pathway.

As shown below (Table 2.1), the Low Implementation scenario includes: delayed achievement of EV sales targets in ACC II and ACT; smaller VMT reductions; less electrification of nonroad fuel usage; fewer commercial buildings meeting the 2040 net-zero goal under BEPS; delayed compliance with zero emissions appliance standards and construction standards; slower deployment of solar and wind power; less waste diversion; no adoption of a cap-and-invest program; and a less optimistic implementation of IRA's clean energy tax credits and EV tax credits.[2] Moreover, it also assumes an overall low implementation of various IRA funds and provisions, which are not only drivers for emissions reductions on their own, but also powerful enabling policies that can help deliver the State's various policy targets. Failing to effectively utilize the IRA could make achieving these targets more costly and result in delays.

Policy	**Target**	**Maryland's Climate Pathway**	**Low Implementation**
ACC II	2030 EV sales target	54%	27%
	100% EV sales target year	2035	2045
ACT	2030 EV sales target	30%-50%	15%-25%
	40-75% EV sales target year	2035	2045
Nonroad fuel use	50% electrification by 2050	Yes	No
Smart growth	Annual average VMT growth from 2020 to 2030	0.6%	1.2%
BEPS	Share of commercial buildings hitting net-zero by 2040	50%	25%
Zero emissions appliance standards and construction standards	Compliance year	2027	2032
Solar & wind	RPS target year	2030	2035

deployment	CES target year	2035	2040
	RGGI target year	2040	2045
Waste management	Additional annual waste diversion	0.4%	0%
Cap-&-invest	Adoption	Yes	No
IRA	PTC ($26/MWh)	7.5% transferability deduction	15% transferability deduction
	ITC (30%)	7.5% transferability deduction	15% transferability deduction
	Clean vehicle credit effective value	$6,673	$3,337

Table 2.1. Summary of representation of low implementation of state and federal policies compared to Maryland's Climate Pathway.

MODELING RESULTS

Overall, the combined effect of low implementation of these policies leads to a gap of 10.2 MMTCO2e with the State's 2031 target. Without the cap-and-invest program alone, the policies in Maryland's Climate Pathway only achieve 56% emissions reductions in 2031, falling 4.8 MMTCO2e short of the State target. Additionally, without a carbon market created by the cap-and-invest program, CDR fails to deploy, and the State falls short of its 2045 net-zero goal. Although emissions still decline, the rate of decrease slows and net emissions in 2045 are 27.0 MMTCO2e in the Low Implementation scenario.

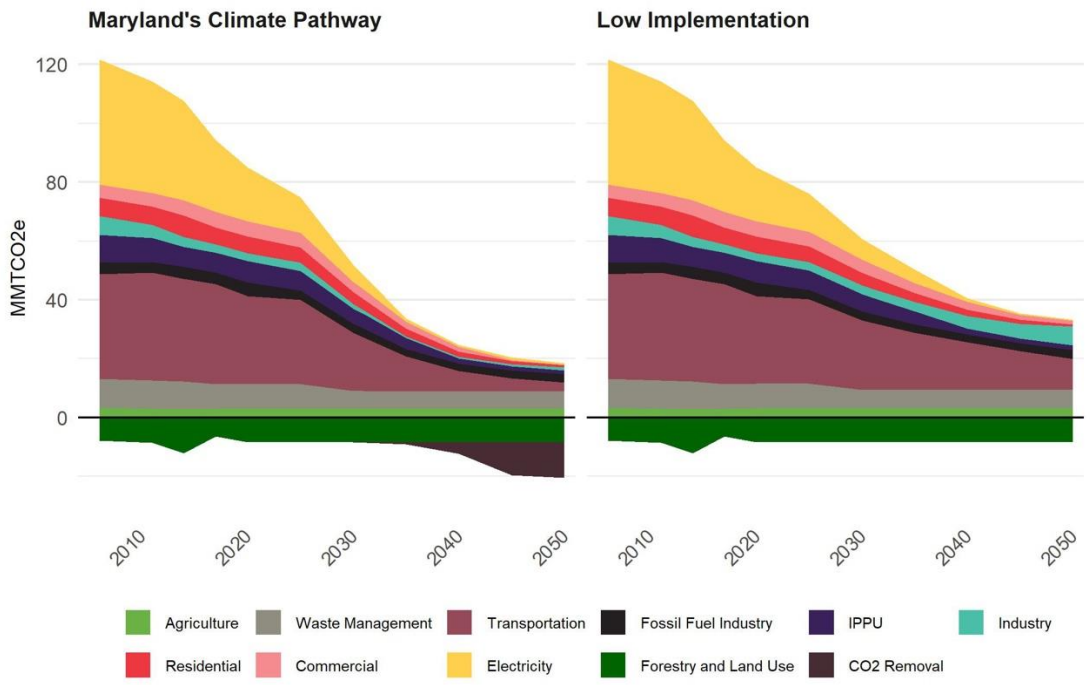

Figure 2.21. Economy-wide GHG emissions by sector in Maryland's Climate Pathway compared to Low Implementation of key policies.

Lower implementation of State and federal policies leads to a notably different electricity generation mix compared to Maryland's Climate Pathway. Delayed achievement of Maryland's clean energy targets in the Low Implementation scenario leads to a smaller build-out of renewables, continued unabated use of natural gas generation through 2040, and lower levels of imported electricity from the PJM grid. These changes are associated with a lower overall level of electricity consumption, so the electricity sector achieves 84% emissions reductions from the 2006 baseline by 2031 (compared to 89% reductions in Maryland's Climate Pathway), but because of lower electrification, emissions in end-use sectors are higher. It is important to note that substantial build-out of renewables is still required in the near-term, even with the delayed achievement of State targets. Therefore, grid stability with high renewables penetration will be a key challenge, even if State targets are not fully met, and addressing this challenge should be a priority for both the State and the wider PJM grid region.

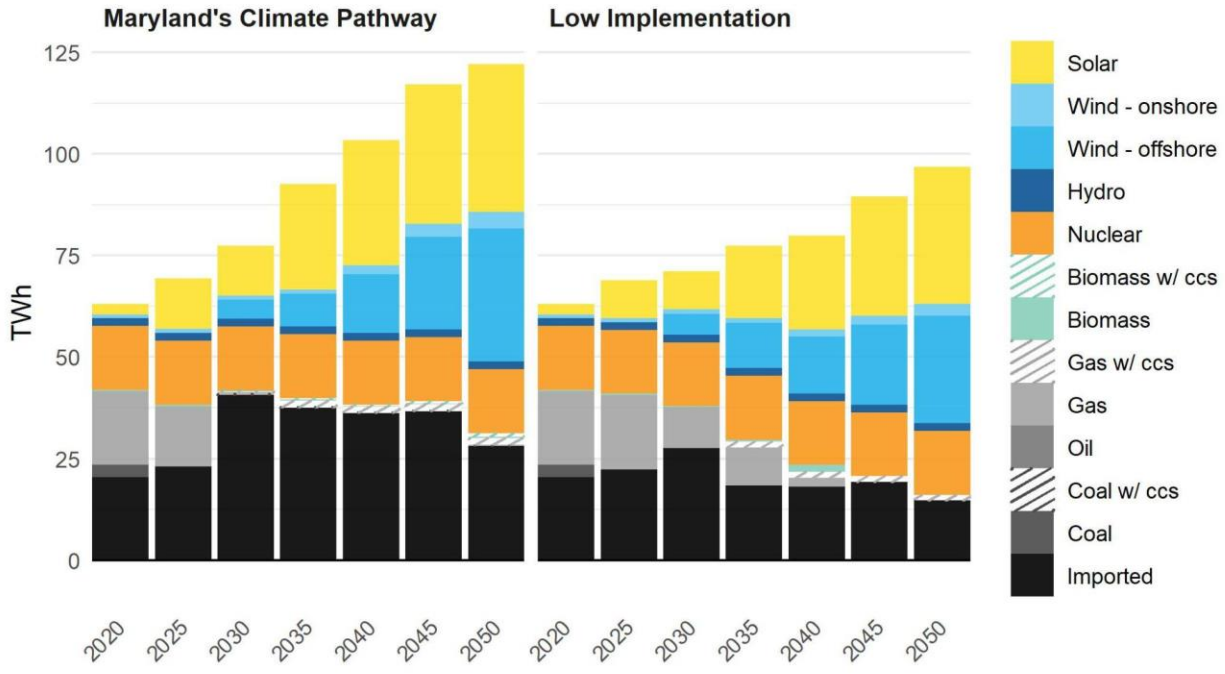

Figure 2.22. Electricity generation in Maryland's Climate Pathway compared to Low Implementation of key state-level policies.

Low Implementation of key policies leads to substantially lower electricity consumption overall, primarily due to reduced electrification in transportation and industry.

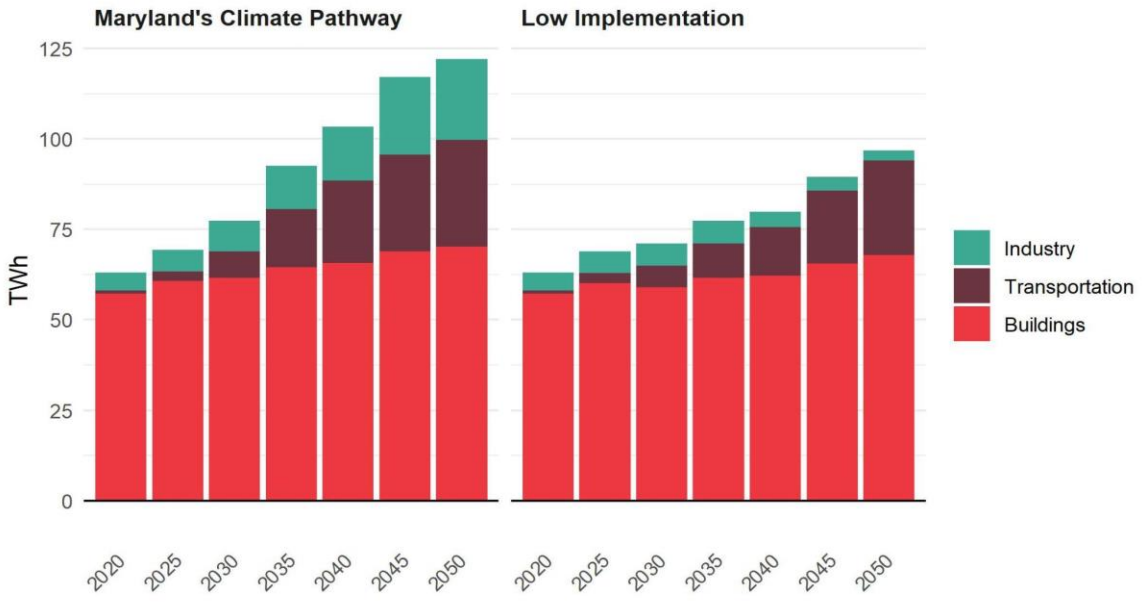

Figure 2.23. Electricity consumption by sector in Maryland's Climate Pathway compared to Low Implementation of key state-level policies.

The transportation sector sees significant changes under lower levels of policy implementation, achieving only 36% emissions reductions from 2006 levels by 2031, compared to 49% in Maryland's Climate Pathway. Potential sources of uncertainties that may affect transportation sector outcomes and achievement of targets include purchasing of internal combustion vehicles from states outside of Maryland; large-scale supply chain constraints on EVs or their components; and barriers that reduce access to and uptake of incentives such as the IRA tax credits. These instances are not modeled specifically in the sensitivity analysis presented here.

With Low Implementation of policies, passenger miles in personal vehicles (cars, SUVs, and passenger trucks) increases through 2030, then remain fairly constant through 2050, instead of declining, as seen in Maryland's Climate Pathway. Significant electrification still occurs for these vehicles, but it lags well behind rates seen in Maryland's Climate Pathway due to delayed achievement of state targets.

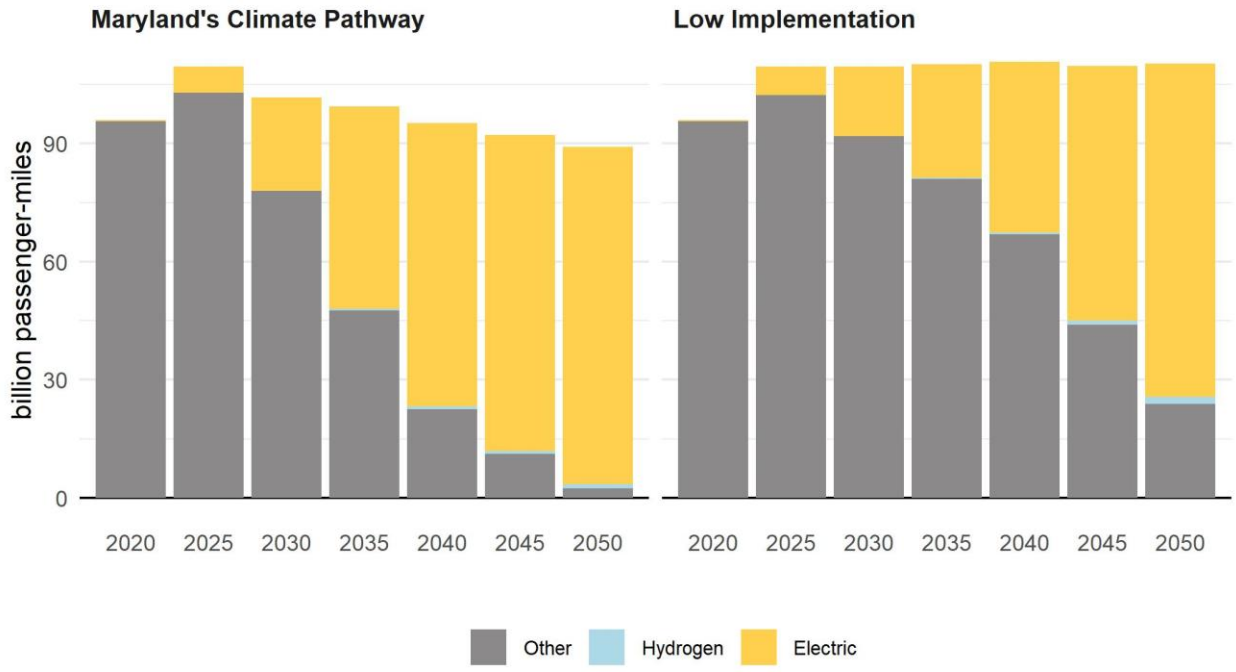

Figure 2.24. Personal vehicle use by fuel type in Maryland's Climate Pathway compared to low implementation of key State-level policies.

Electrification of freight trucks is also substantially different with Low Implementation of policies. In this scenario, there is a much lower adoption of ZEV trucks, which results in larger emissions from the transportation sector.

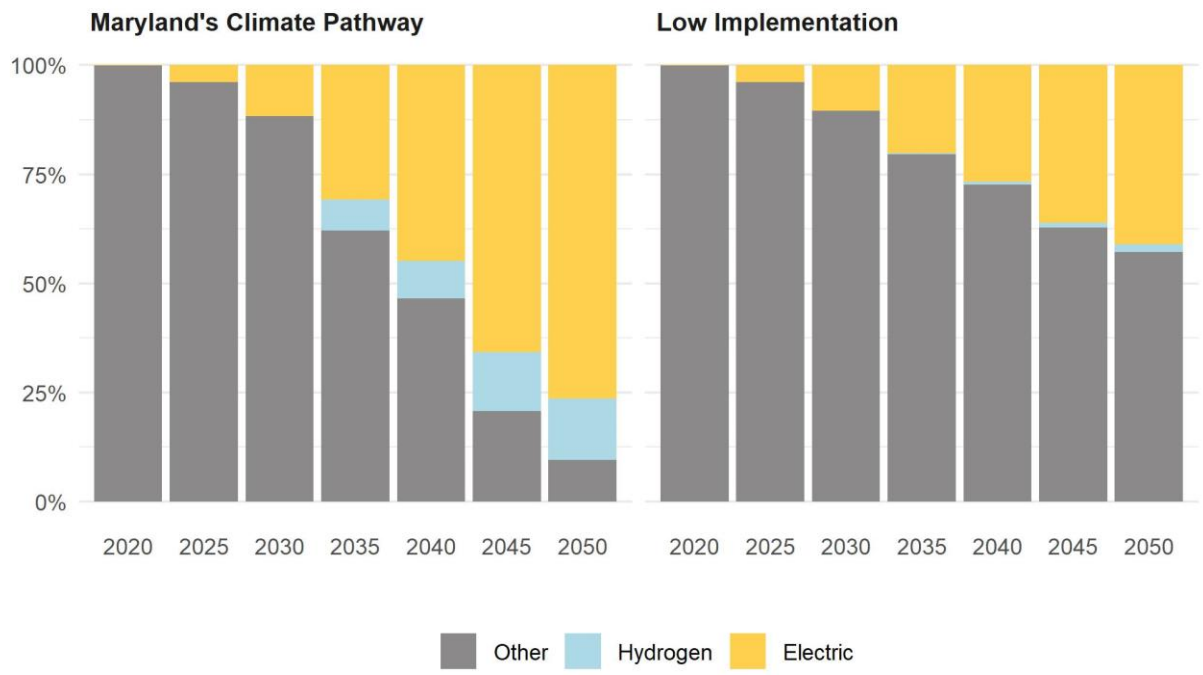

Figure 2.25. Freight trucking by fuel type in Maryland's Climate Pathway compared to Low Implementation of key policies.

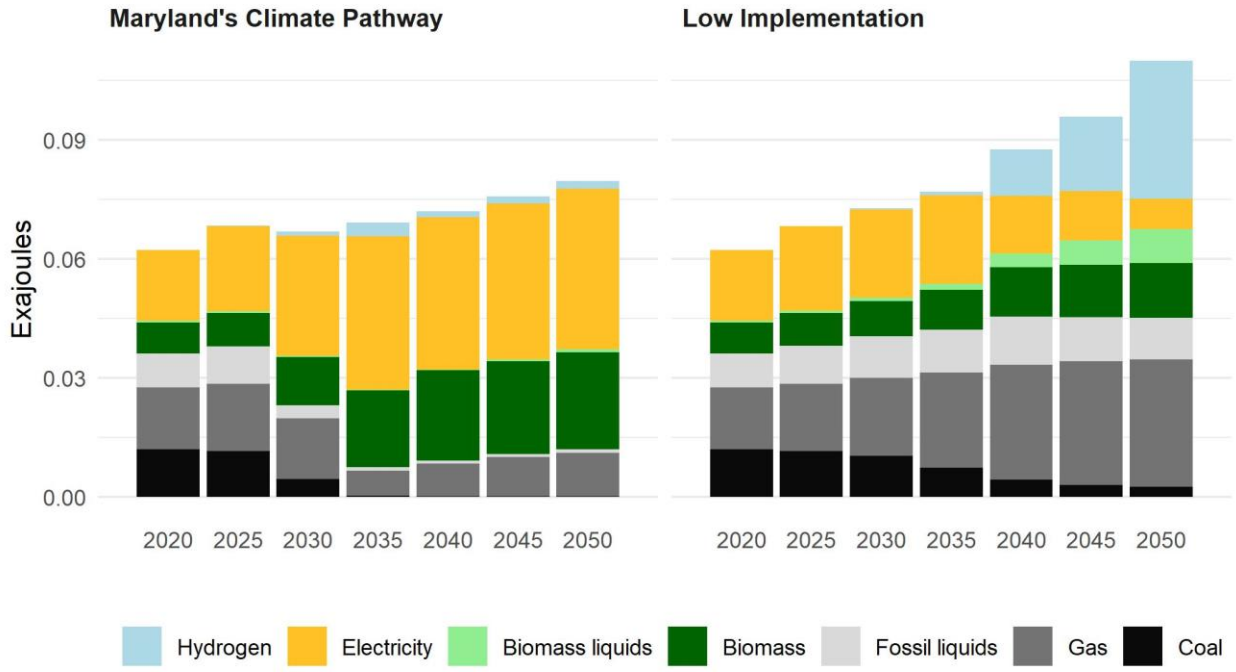

Figure 2.26. Industrial energy use by fuel type in Maryland's Climate Pathway compared to Low Implementation of key policies.

Without the cap-and-invest program there is less incentive for the industrial sector to shift to lower carbon fuels and energy technologies, and consumption of natural gas and fossil liquid fuels continues throughout the modeled period. This highlights the need to adopt policy measures to incentivize a shift to lower carbon options in the industrial sector in order to meet Maryland's emission goals.

Overall, the set of sensitivities with Low Implementation of State and federal policies leads to an emissions gap of 10.2 MMTCO2e in 2031. Closing this gap requires additional State actions and strategies to ensure Maryland's effective utilization of the IRA. Funds from the IRA, if applied correctly, can make it significantly easier to implement State policies.