VIRGINIA MARINE FUEL-SWITCH ASSESSMENT

Executive Key Takeaways: Economic, Operational, and Environmental Assessment

Policy Context: Virginia is evaluating a proposed legislative requirement that would mandate certain ocean-going commercial vessels to temporarily switch to 0.10% sulfur Low Sulfur Marine Gas Oil (LSMGO) while navigating, anchoring, or conducting port operations within Virginia waters. This policy addresses localized emissions in the environmentally sensitive Chesapeake Bay and Hampton Roads port complex, balancing economic shipping interests with urgent public health and environmental quality objectives.

Targeted Applicability Restricts private compliance burdens

Unlike sweeping technology bans, the proposed requirement regulates fuel use rather than scrubber hardware. Vessels equipped with Exhaust Gas Cleaning Systems (scrubbers) can continue operating on lower-cost High Sulfur Fuel Oil (HSFO) outside state waters, but must temporarily switch to LSMGO within Virginia jurisdiction. Crucially, vessels already operating on compliant low-sulfur fuels (LSMGO, LNG, methanol, or other distillates) will incur zero additional costs. This narrow focus restricts compliance expenditures exclusively to vessels currently realizing fuel-cost savings through continued HSFO use with scrubber compliance.

Incremental Compliance Costs represent less than 1% of regional earnings

Using representative engineering-economic modeling, the report estimates that voyage-level compliance costs are modest relative to total operating earnings. For the principal cargo vessel classes, incremental compliance costs range from approximately $2,000 to $10,000 per voyage. While cruise ships incur higher absolute fuel costs ($13,223 to $19,849 per call) due to heavy electrical hotel loads in port, these represent a minor percentage of their large revenue base**. For a representative fleet, making 200 annual port calls, the cumulative annual compliance cost represents only 0.61% to 0.91% of modeled regional operating earnings (Earnings Before Interest and Taxes - EBIT).**

Vessel Class	Representative Voyage EBIT	EBIT Margin	Compliance Cost Range*	EBIT Impact Range*
Large Container Vessel	$1,000,000	13.4%	$4,398 – $6,597	0.44% – 0.66%
Ultra-Large Container (ULCV)	$2,100,000	13.4%	$6,838 – $10,256	0.33% – 0.49%
Bulk Carrier	$220,000	27.0%	$2,271 – $3,406	1.03% – 1.55%
Petroleum Tanker	$345,000	33.0%	$2,819 – $4,228	0.82% – 1.23%
Roll-on/Roll-off (RoRo)	$550,000	35.0%	$3,158 – $4,738	0.57% – 0.86%
Large Cruise Ship	$2,250,000	26.0%	$13,223 – $19,849	0.59% – 0.88%

**Range assumes a 50% to 65% fuel cost increase from HSFO to LSMGO*

Substantial Localized public health & environmental benefits

The proposed fuel-switch requirement offsets its modest compliance costs by delivering significant public benefits. Transitioning to 0.10% LSMGO yields an estimated 88% reduction in fine particulate matter (PM2.5) emissions and drastically cuts sulfur dioxide (SO2), reducing cardiovascular, respiratory, and neonatal health risks in coastal communities. Furthermore, by eliminating the need for open-loop scrubber operation, the policy eliminates acidic, heavy-metal-laden washwater discharges (including vanadium and nickel) from the Chesapeake Bay. This protects sensitive coastal aquatic food webs, safeguarding Virginia's high-value $1.2 billion commercial seafood industry and thousands of jobs.

Established Operating Procedures require zero vessel retrofits

From an engineering perspective, the transition is highly feasible. Fuel changeover between residual and distillate fuels is a standard, routine operational practice already performed by international vessels entering and leaving Emission Control Areas (ECAs) globally. The procedure requires no engine modifications, no hardware removal, and no capital expenditures. Affected operators would simply adjust onboard fuel management and recordkeeping practices, ensuring compliant low-sulfur distillate is available during transit. Consequently, compliance costs are restricted strictly to temporary fuel price differentials rather than long-term capital investments.