

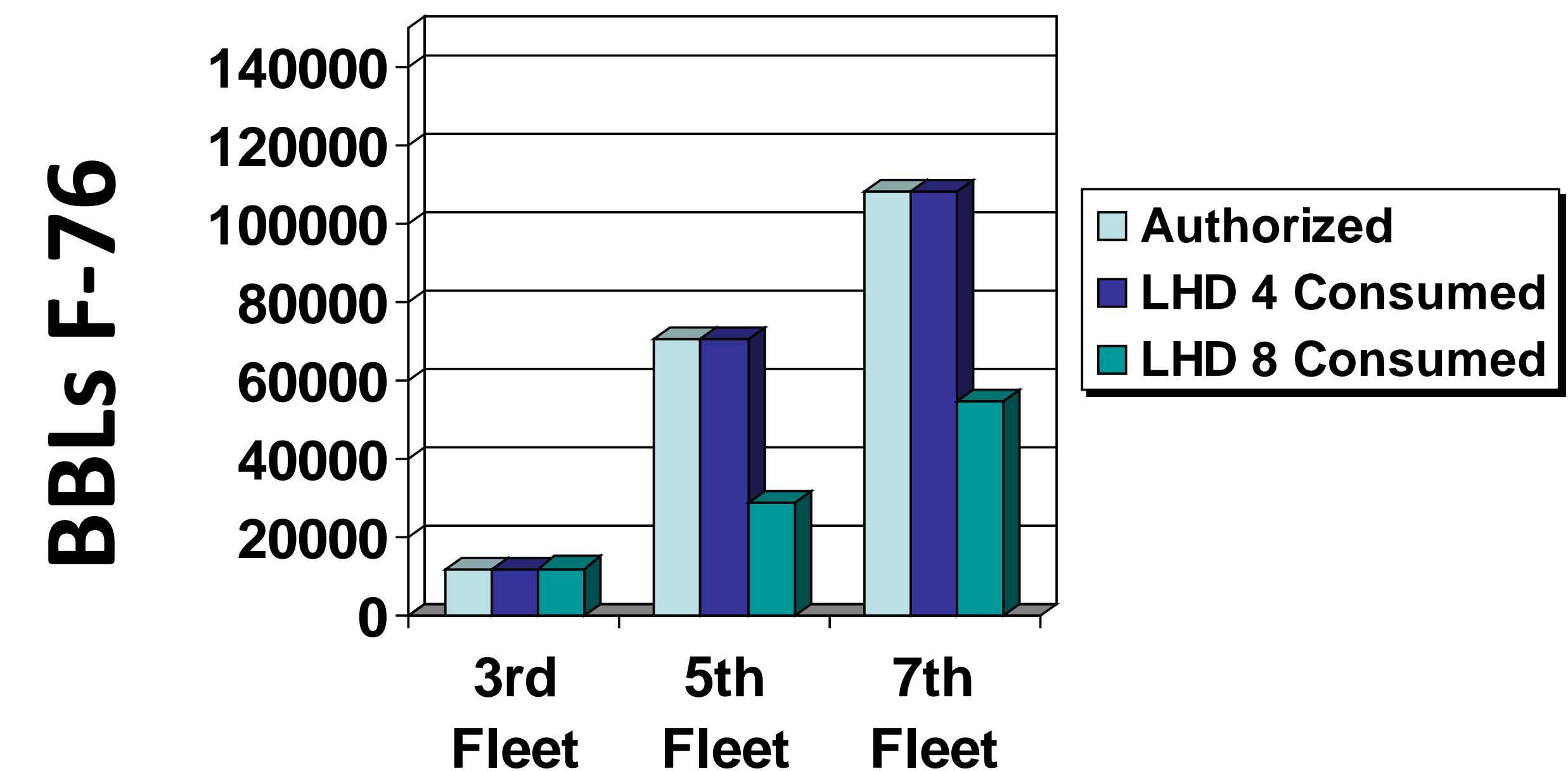
## A COST-BENEFIT ANALYSIS OF CONVERTING WASP CLASS LANDING HELICOPTER DOCK (LHD) STEAM PROPULSION PLANTS TO HYBRID PROPULSION

### Problem Statement

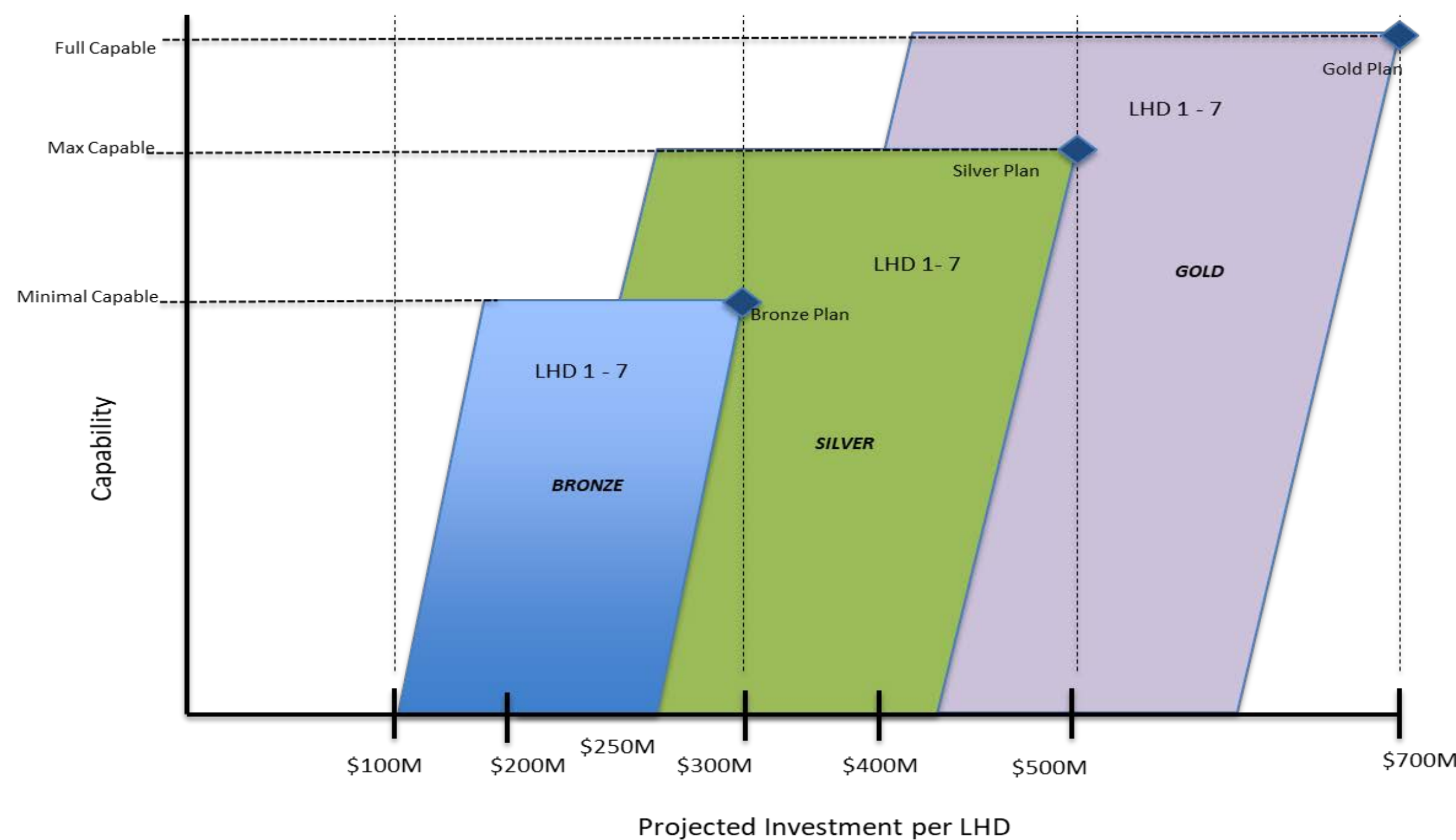
What is the optimal strategic framework to convert existing LHD (hulls 1-7) from a steam propulsion system to a combined diesel-electric and gas propulsion system standard on all follow-on LHD and LHA class ships?

### Area of Research

Examine propulsion plant data including fuel efficiency, manpower savings, equipment readiness, maintenance costs, as well as conversion costs. The hybrid conversion costs will be used to construct a framework that can be utilized to compare against the costs of both maintaining steam propulsion systems onboard for the remainder of the hull lifetime



USS Makin Island (LHD-8) Report on Fuel consumed during maiden deployment (Source: USS Makin Island)



### LHD 1- 7 Top Cost Drivers

SWLIN	Description	MDYS	Rate	Cost	Per Ship Estimate
123	Tanks and Voids	120,184	\$ 825	\$ 99,151,800	\$ 14,164,543
221	Main Propulsion Boilers	120,278	\$ 825	\$ 99,229,350	\$ 14,175,621
631	Interior Preservation	108,484	\$ 825	\$ 89,499,300	\$ 12,785,614
634	Deck Coverings	91,601	\$ 825	\$ 75,570,825	\$ 10,795,832
512	Ventilation System	79,143	\$ 825	\$ 65,292,975	\$ 9,327,568
514	Air Conditioning Plants	68,332	\$ 825	\$ 56,373,900	\$ 8,053,414
255	Main Feed System	60,639	\$ 825	\$ 50,027,175	\$ 7,146,739
110	Underwater Body Hull	58,188	\$ 825	\$ 48,005,100	\$ 6,857,871
311	Ship Service Turbine Generator	48,518	\$ 825	\$ 40,027,350	\$ 5,718,193
584	Mechanically Operated Gates/Ramps	38,335	\$ 825	\$ 31,626,375	\$ 4,518,054
		793,702.00		\$ 654,804,150	\$ 93,543,450

Estimated LHD Hull Lifetime Extension Costs (Source: OPNAV N953 LHD 5 Complex Overhaul (COH) Modernization Plan)