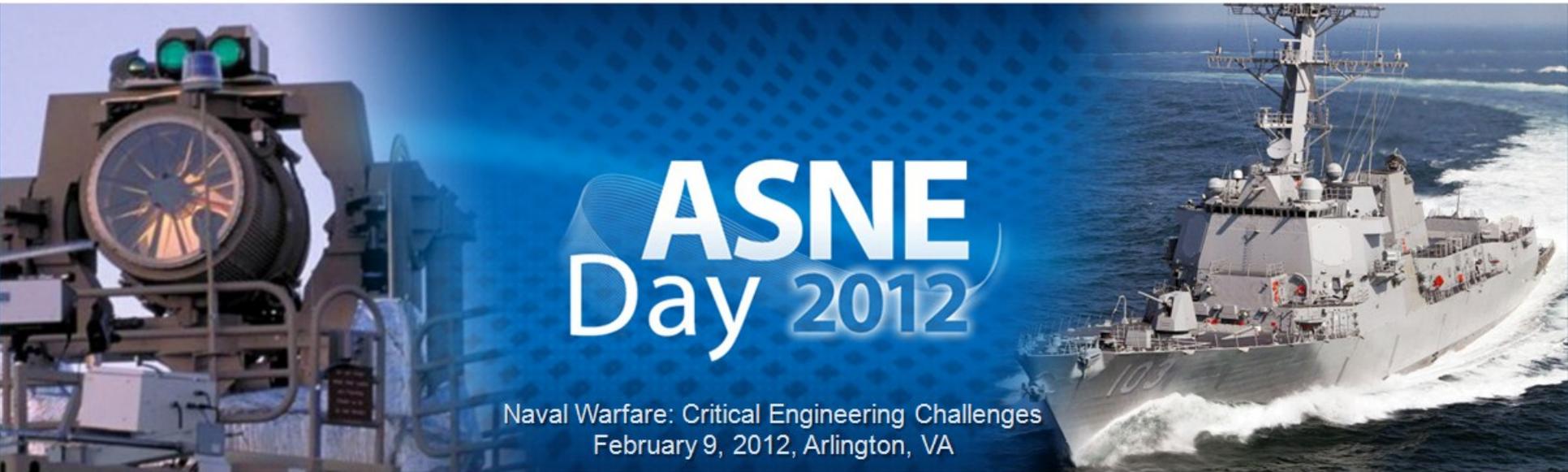


Hull, Mechanical, & Electrical (HM&E) Roadmap: Revolutionizing Naval Warfare and Achieving Energy Security



Naval Warfare: Critical Engineering Challenges
February 9, 2012, Arlington, VA

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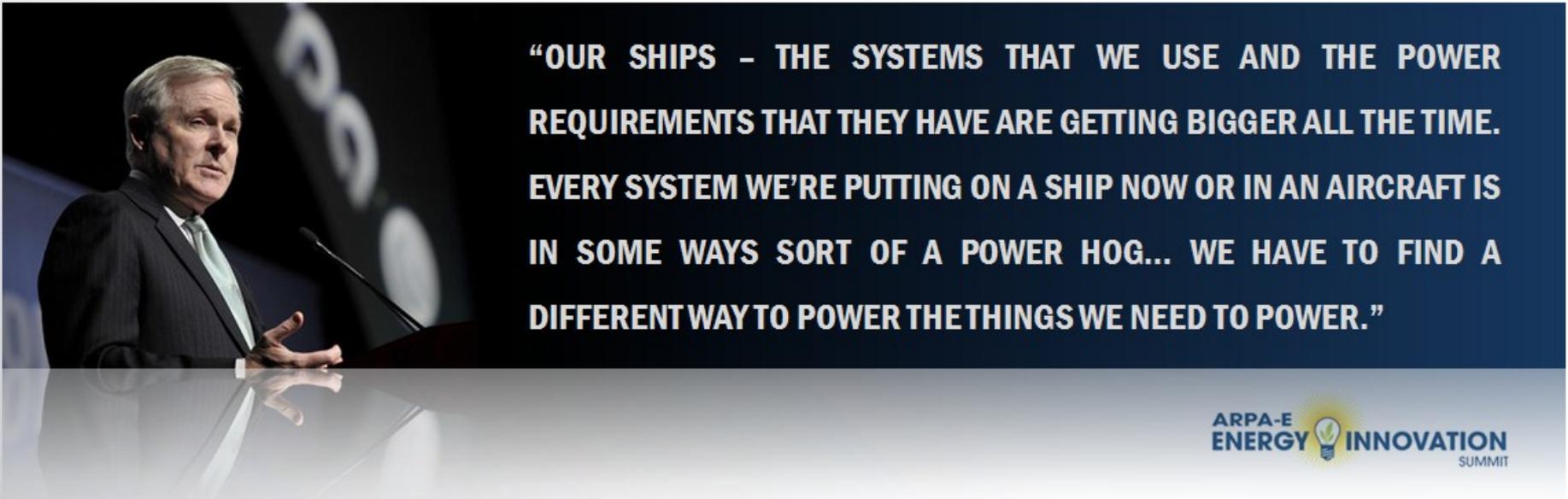
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Honorable Ray Mabus 75th United States Secretary of the Navy

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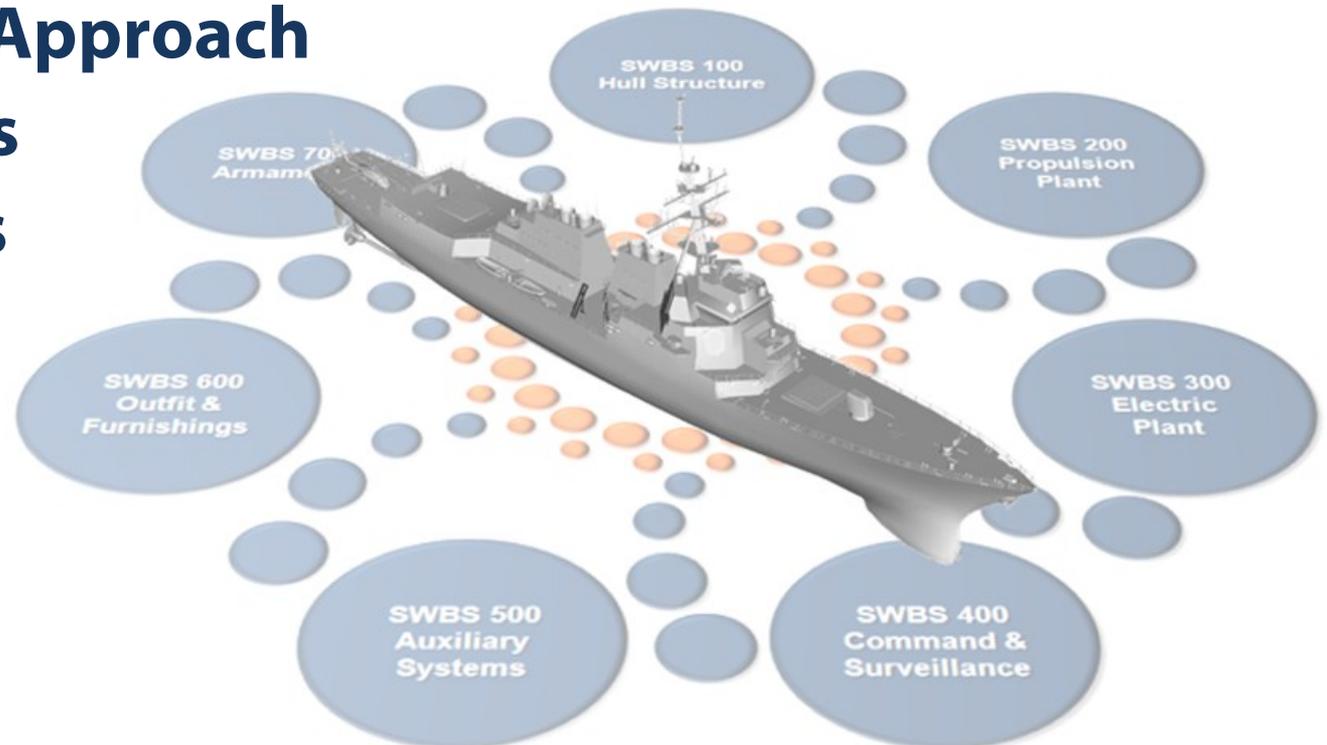


“OUR SHIPS – THE SYSTEMS THAT WE USE AND THE POWER REQUIREMENTS THAT THEY HAVE ARE GETTING BIGGER ALL THE TIME. EVERY SYSTEM WE’RE PUTTING ON A SHIP NOW OR IN AN AIRCRAFT IS IN SOME WAYS SORT OF A POWER HOG... WE HAVE TO FIND A DIFFERENT WAY TO POWER THE THINGS WE NEED TO POWER.”

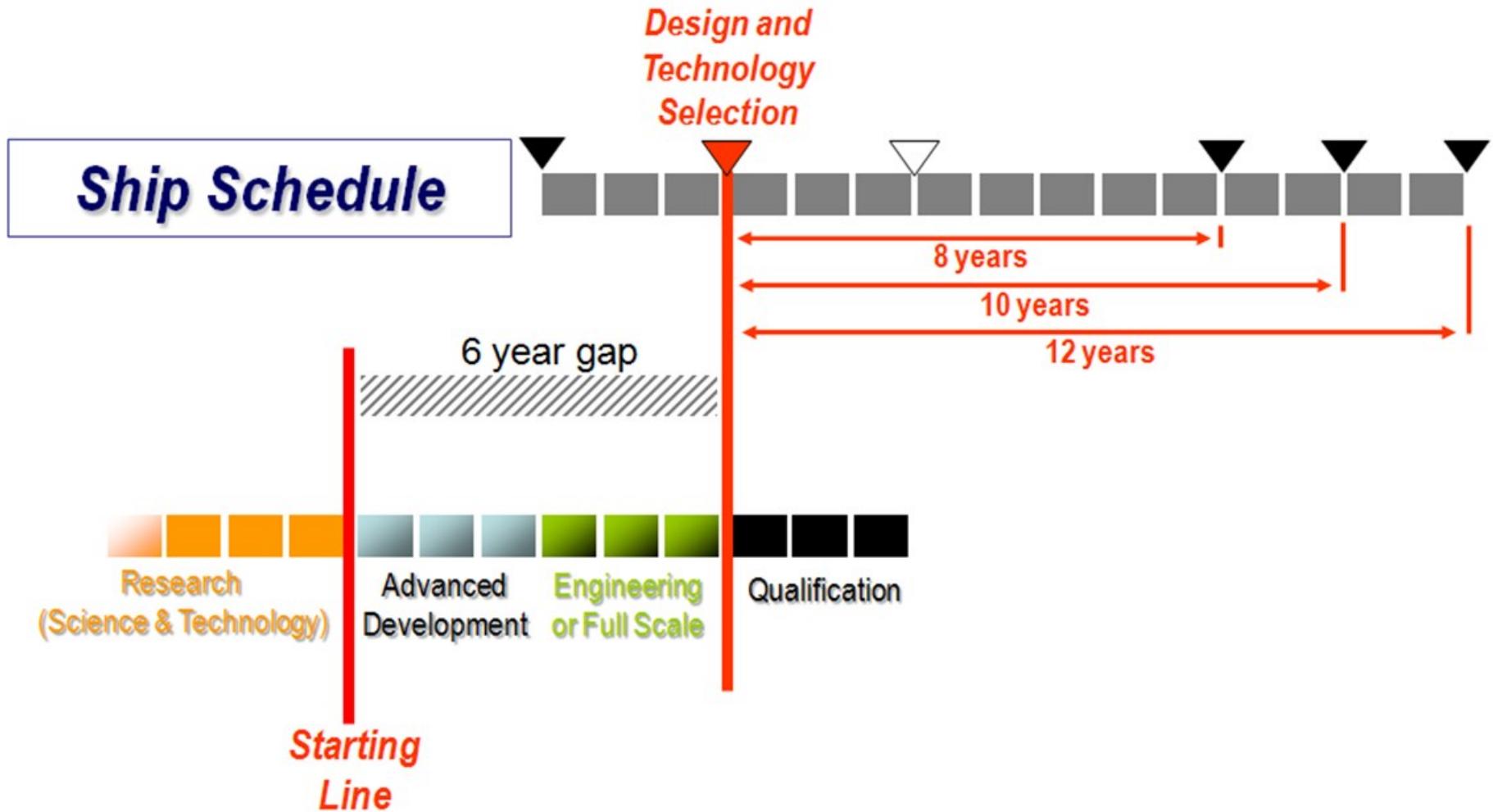
ARPA-E
ENERGY  INNOVATION
SUMMIT

Fundamental Shift Required for In-Service and New Construction Programs

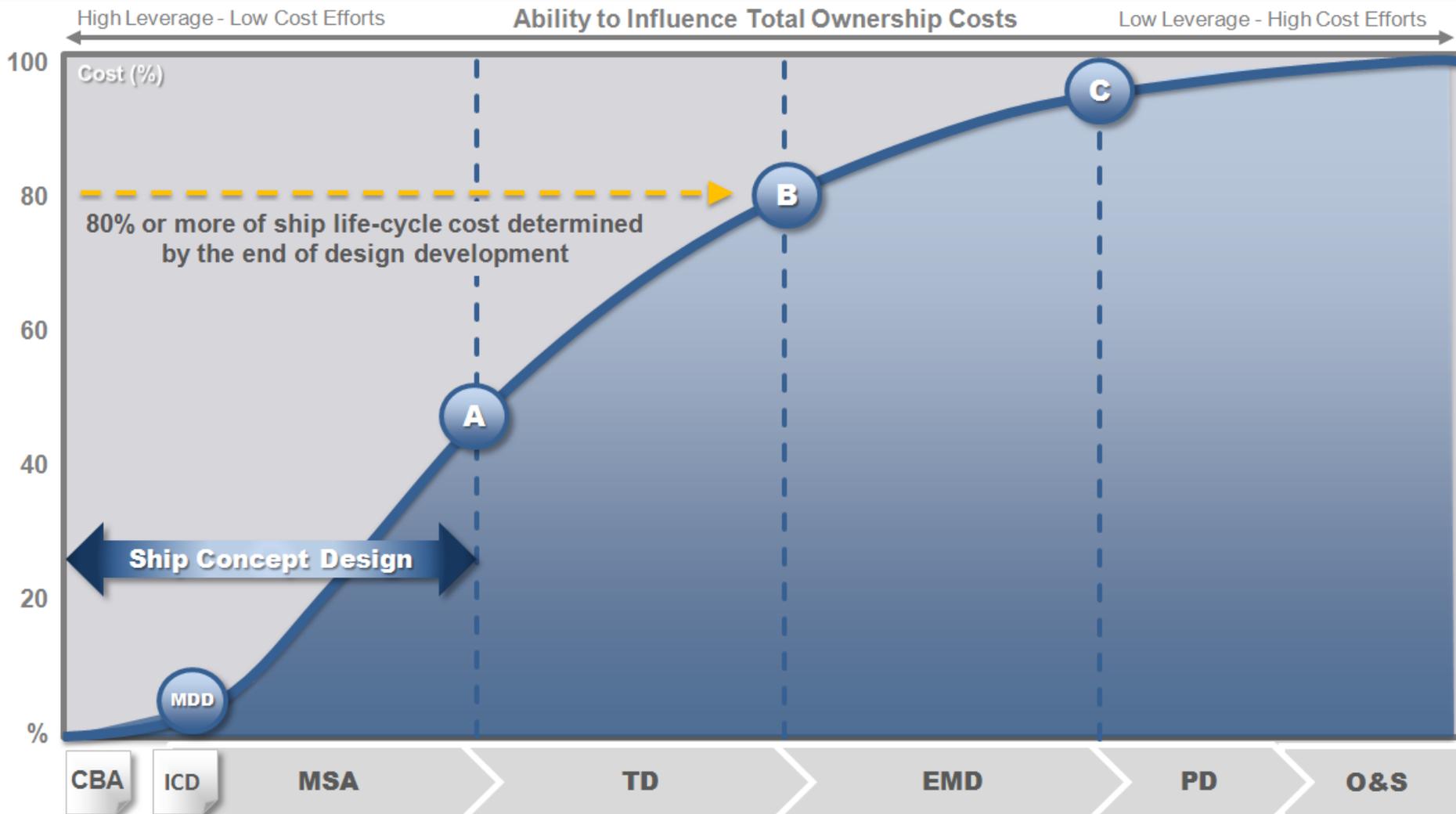
- **Background**
- **Objective**
- **Purpose of Roadmap**
- **Proposed Approach**
- **Challenges**
- **Next Steps**



Background: Notional Timeline



Background: Ability to Influence Total Ownership Costs



Greatest ability to influence with lowest cost impact is during pre-Concept Design

Develop a technology plan that is responsive to future threats & weapons capabilities, shipbuilding plans & schedules, current fleet opportunities, and budgetary realities

Provides sufficient data to inform budget decisions for S&T, R&D, new acquisition/construction, and fleet insertion

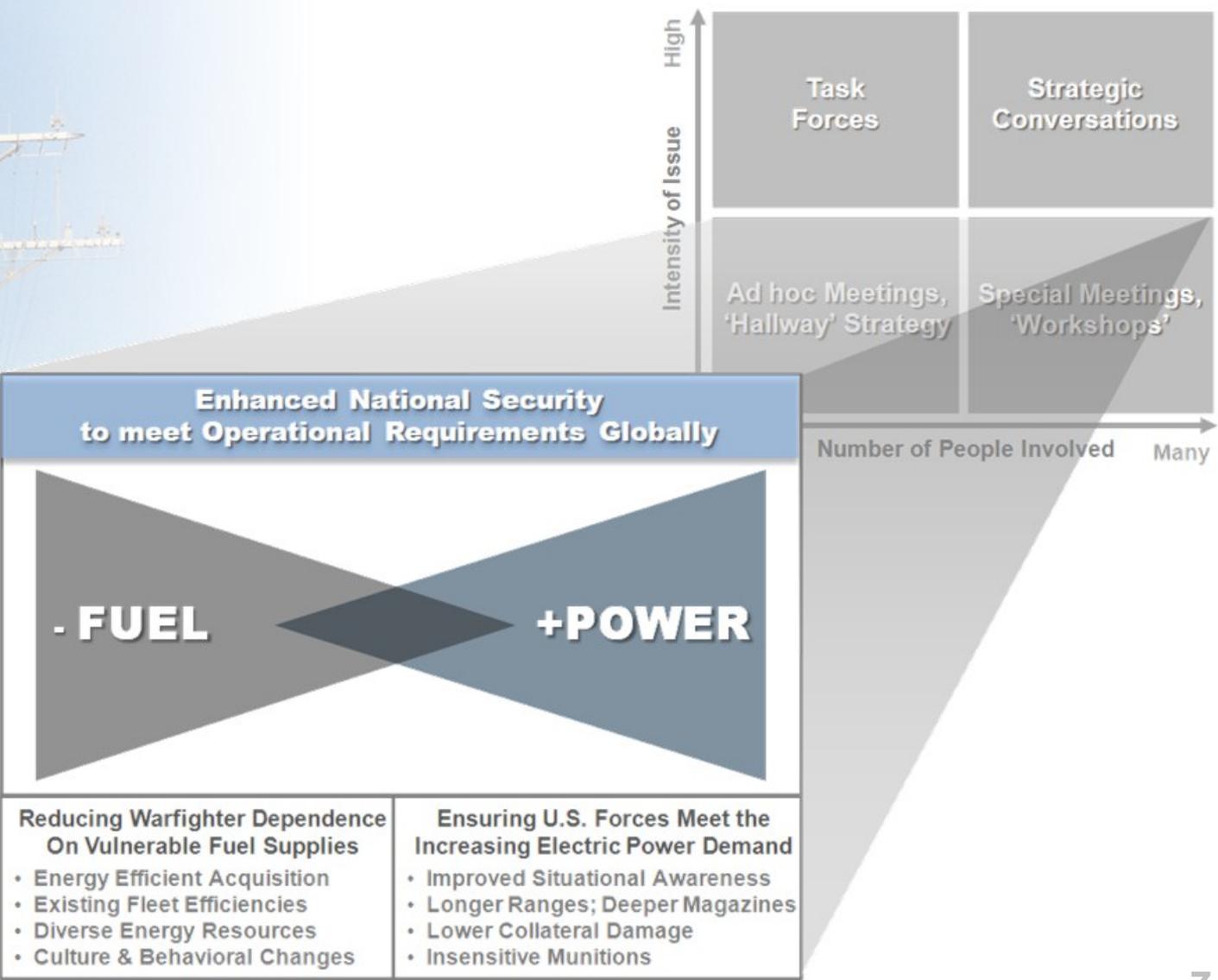
Provides a means of expressing HM&E needs and opportunities to resource sponsors, S&T/R&D organizations, ship/warfare systems program managers, and fleet activities

Resolves competing frameworks (future warfare requirements, life cycle costs, etc.) that foster short-term stovepipe approaches rather than long-term sustainable solutions

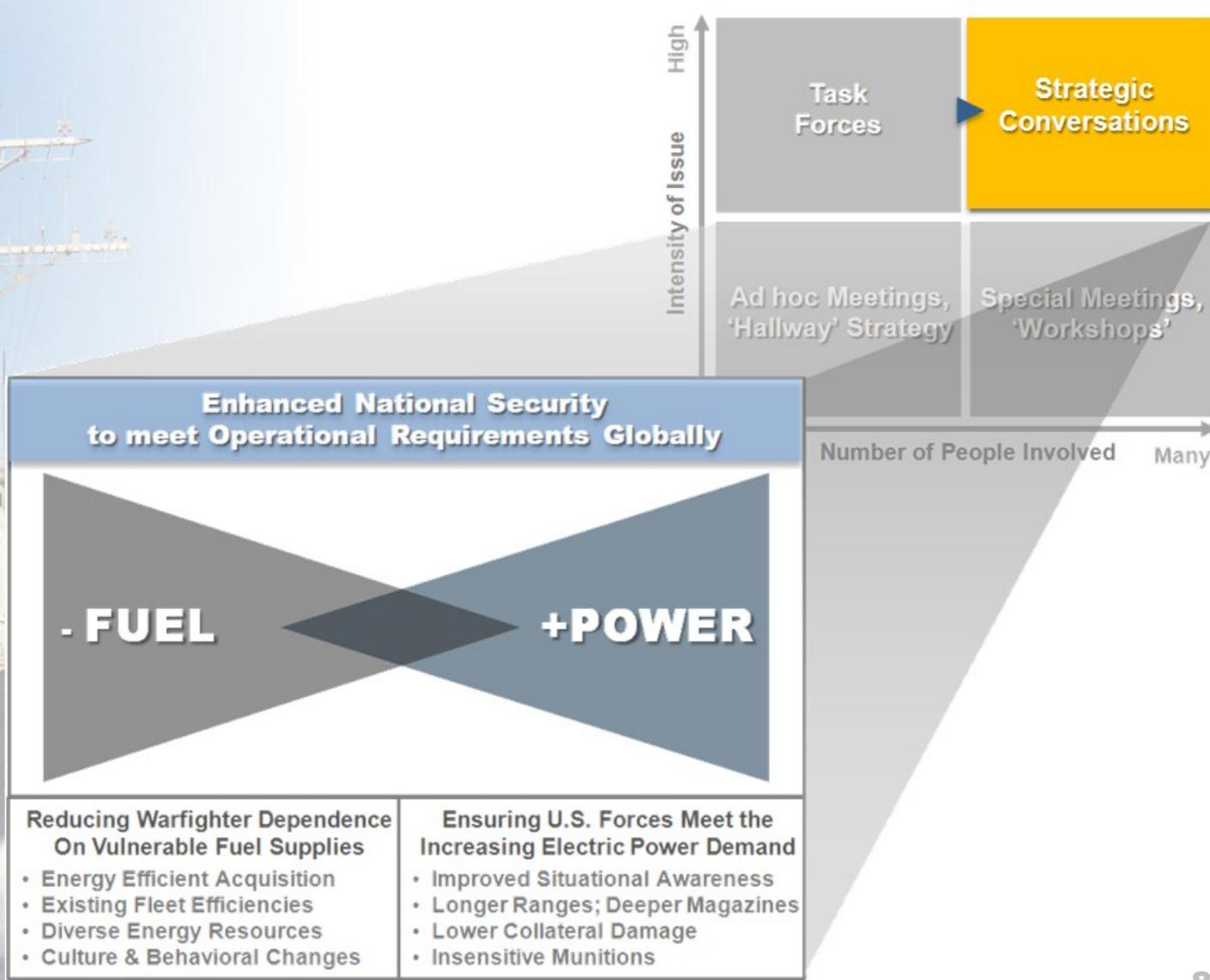
Serves as unifying document between organizations to address future challenges in full alignment

Provides a foundation for Industry and Government agencies to focus their resources

Purpose: Energy As A Strategic Resource

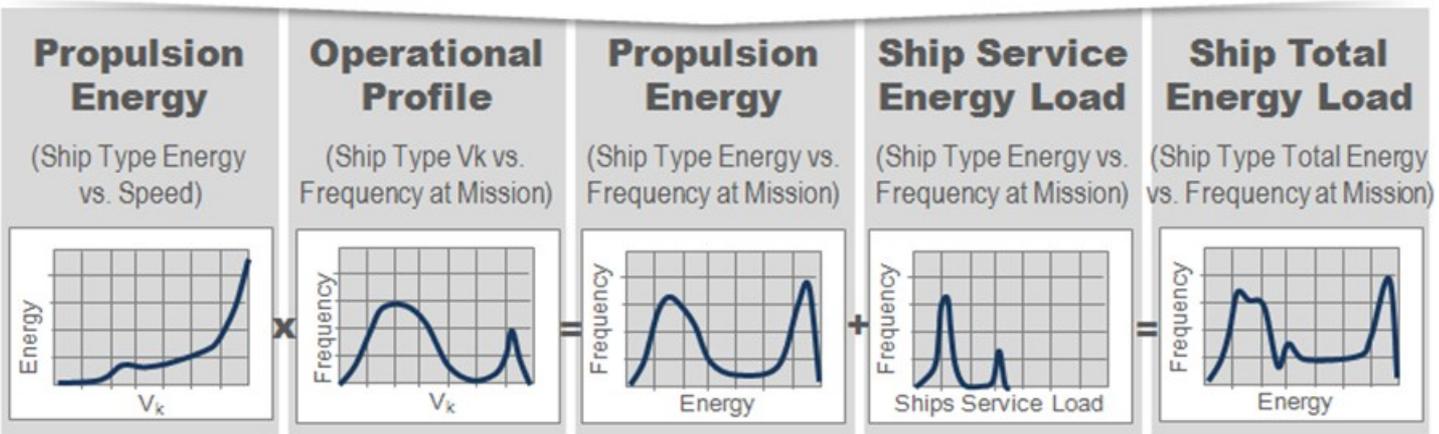


Purpose: Energy As A Strategic Resource



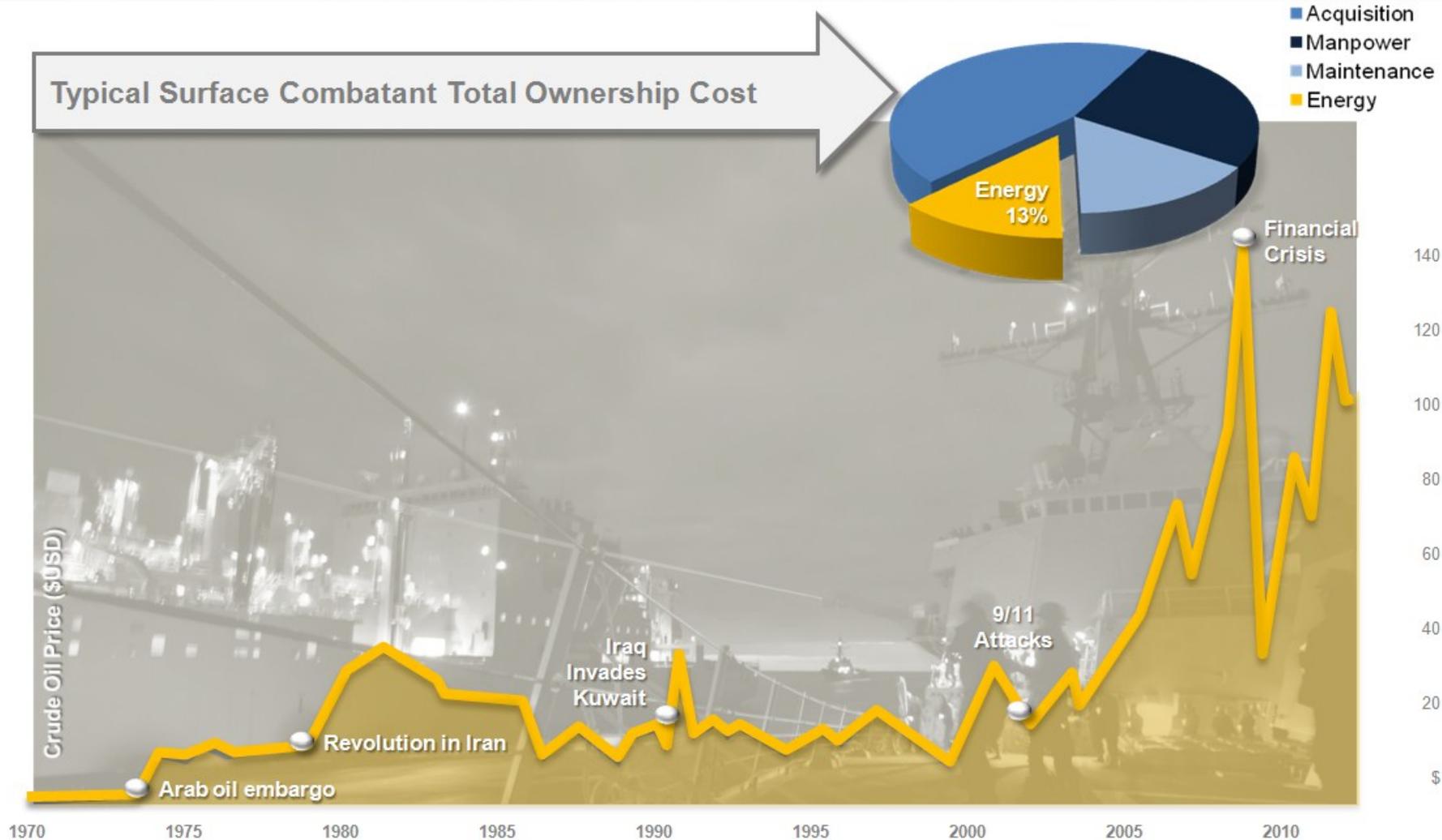
Total Life-Cycle Energy Requirement

Overarching Design Reference Mission

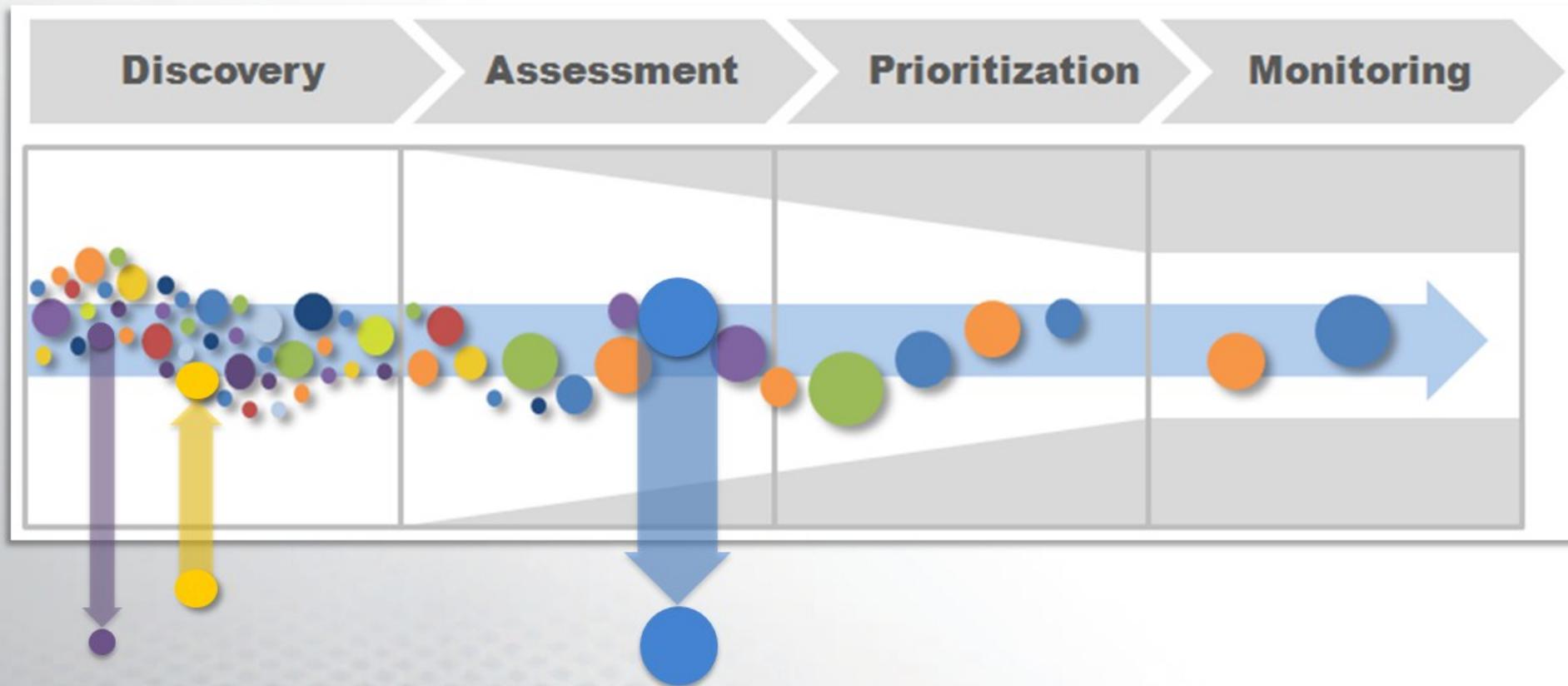


Mission Profile, Operational Tempo, & Expected Service Life

Approach: Identifying the Gap



Approach: Balanced Technology Portfolio

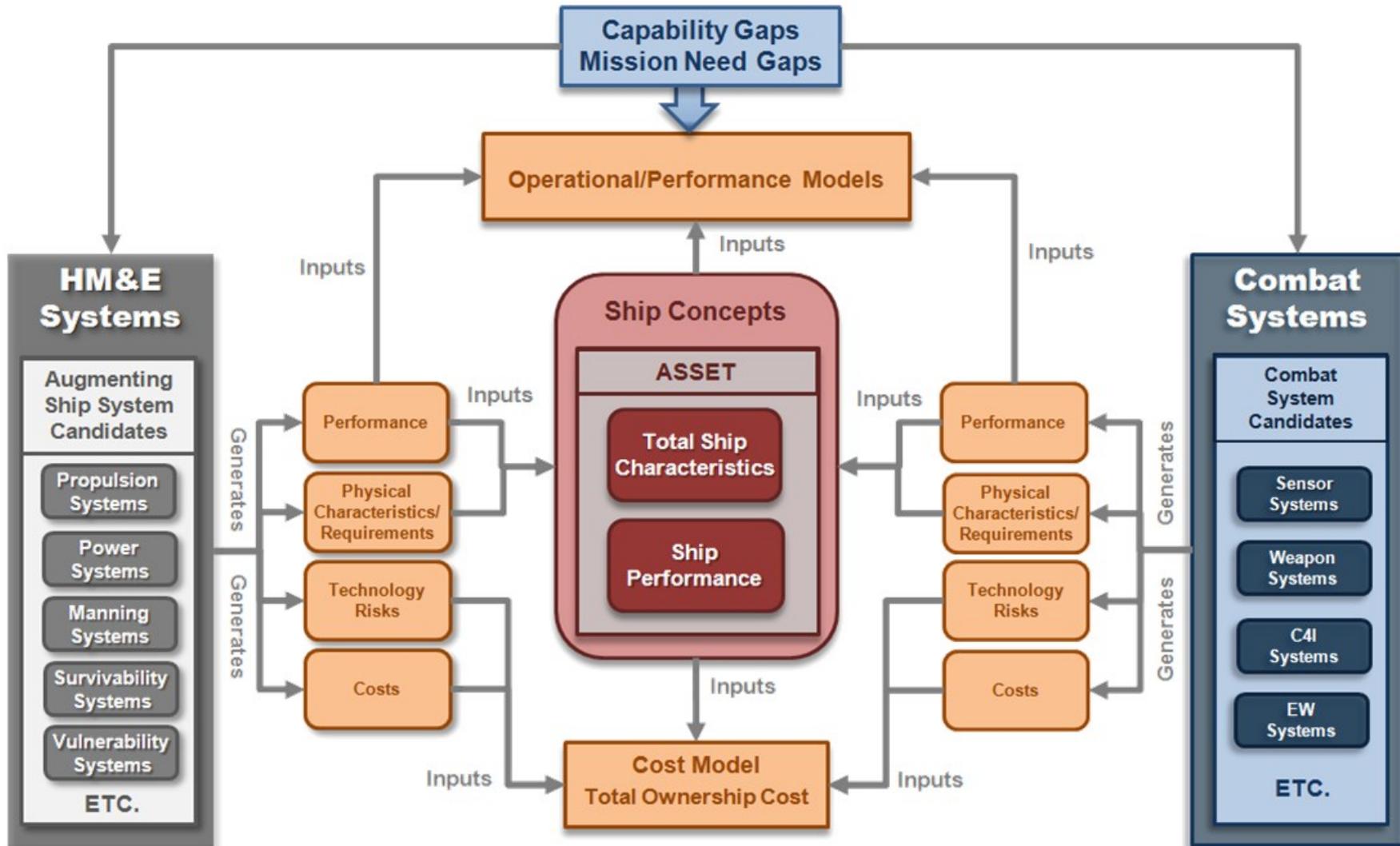


Maritime Energy Portfolio Process

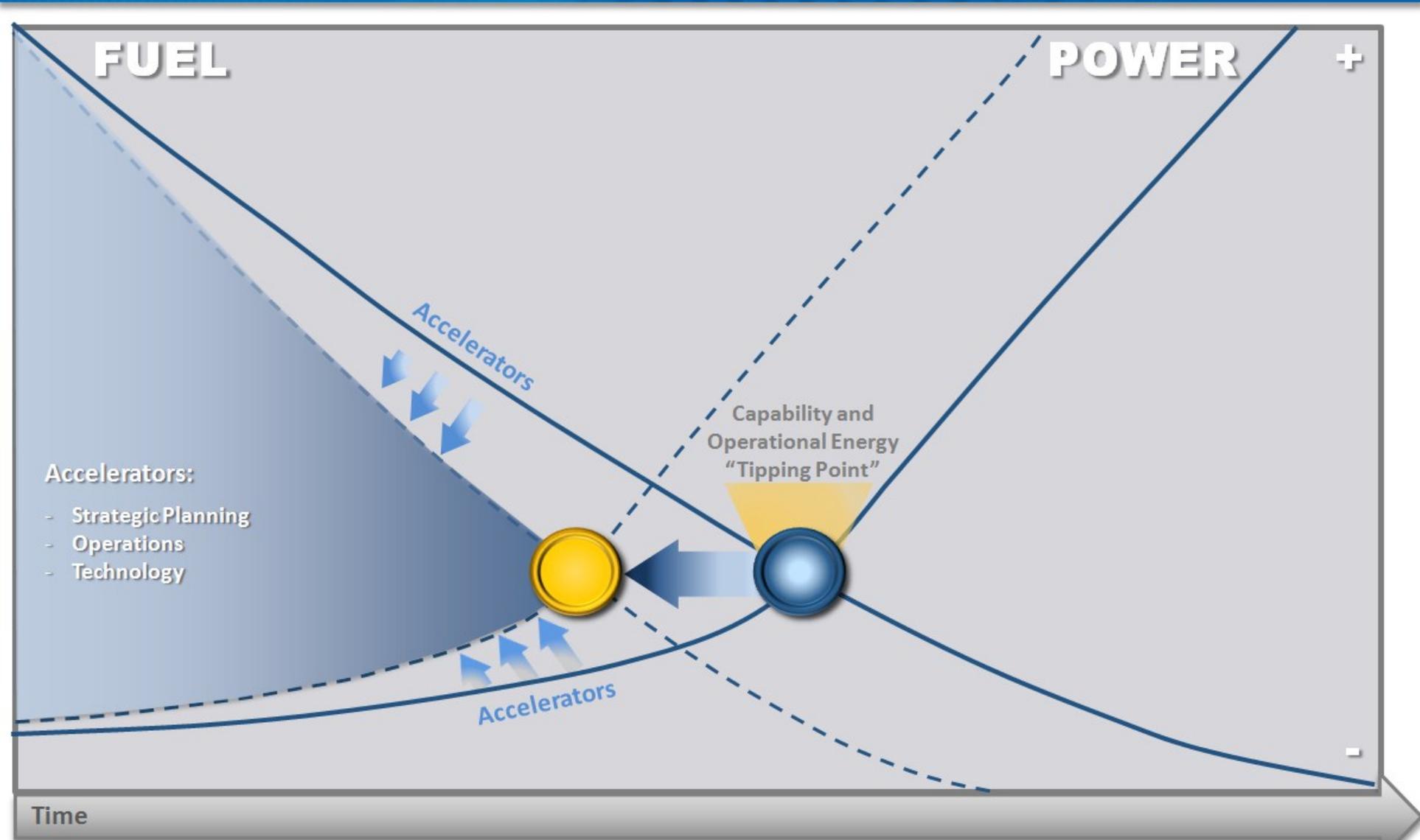
Define a portfolio of concept alternatives that fulfill current and future mission and capability gaps, meet the needs, requirements, and acquisition cost goals

Establish traceable linkages and direct relationships between mission effectiveness/performance associated with individual ship concepts, technology risks, acquisition cost, and total ownership cost

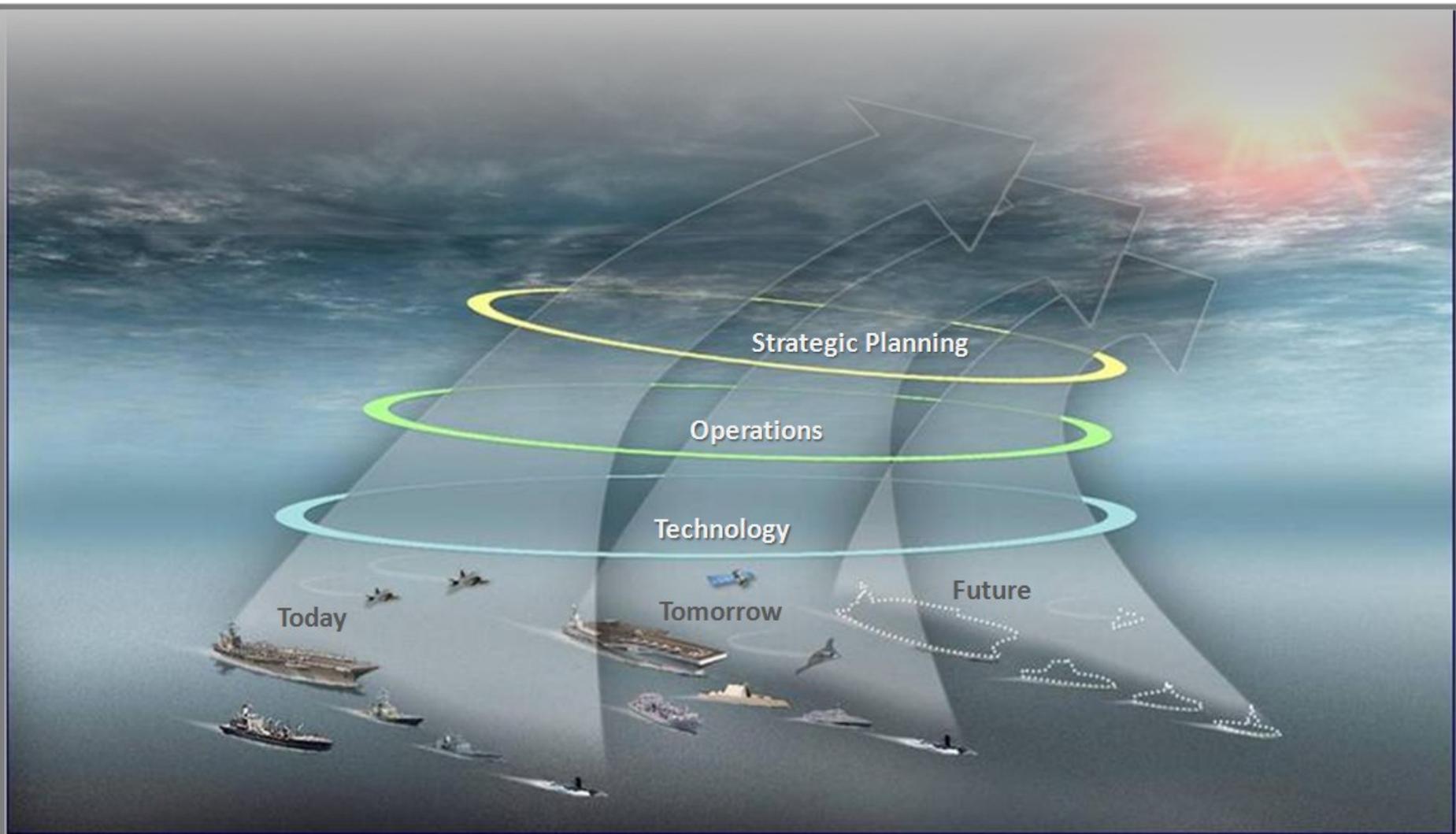
HM&E Roadmap Approach: Capability Based Concept Development



Approach: Accelerating the Transformation



Approach: Moving Toward an Energy Secure Fleet



Time

HM&E Roadmap... what it means

- Communicating the Vision from top to bottom
- Integrating S&T focus with shipbuilding plans
- Identifying gaps and focus areas
- Identifying areas of synergy for common investment
- Linkages to program needs and milestones
- Leverage enterprise-wide partnerships
- Sharing knowledge across teams

