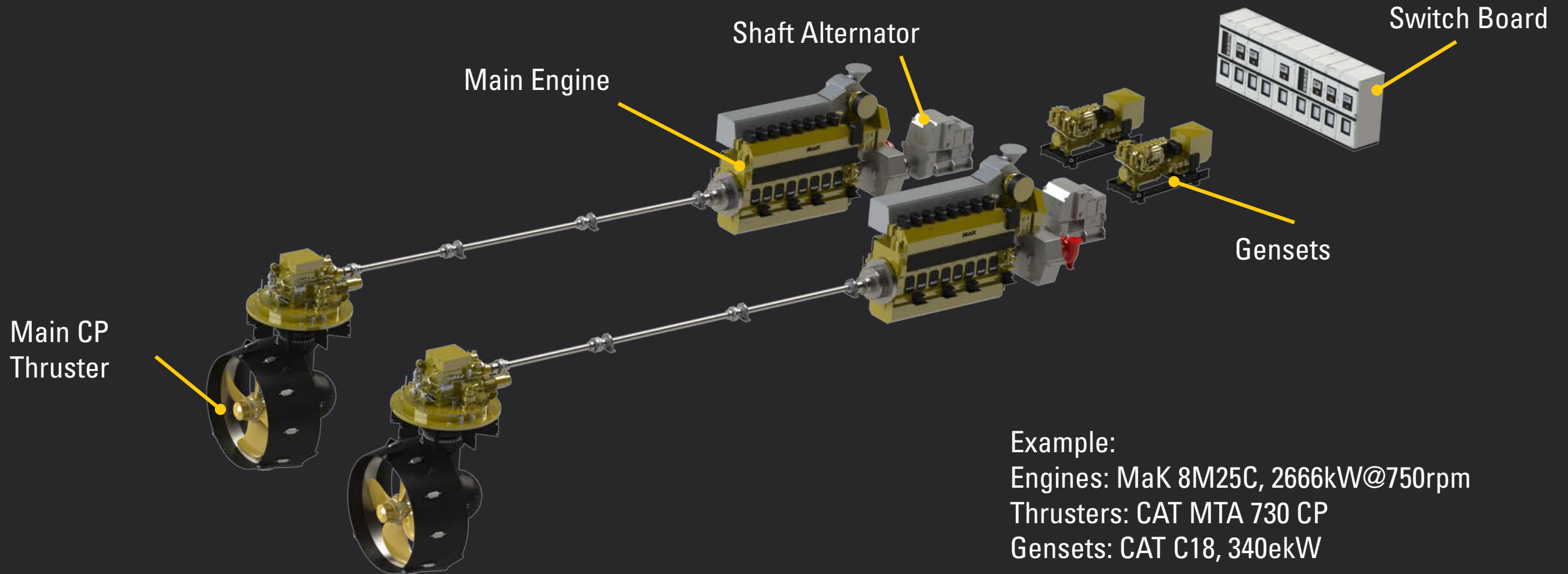


# CAT HYBRID THRUSTER

# TYPICAL AZIMUTH THRUSTER ARRANGEMENT

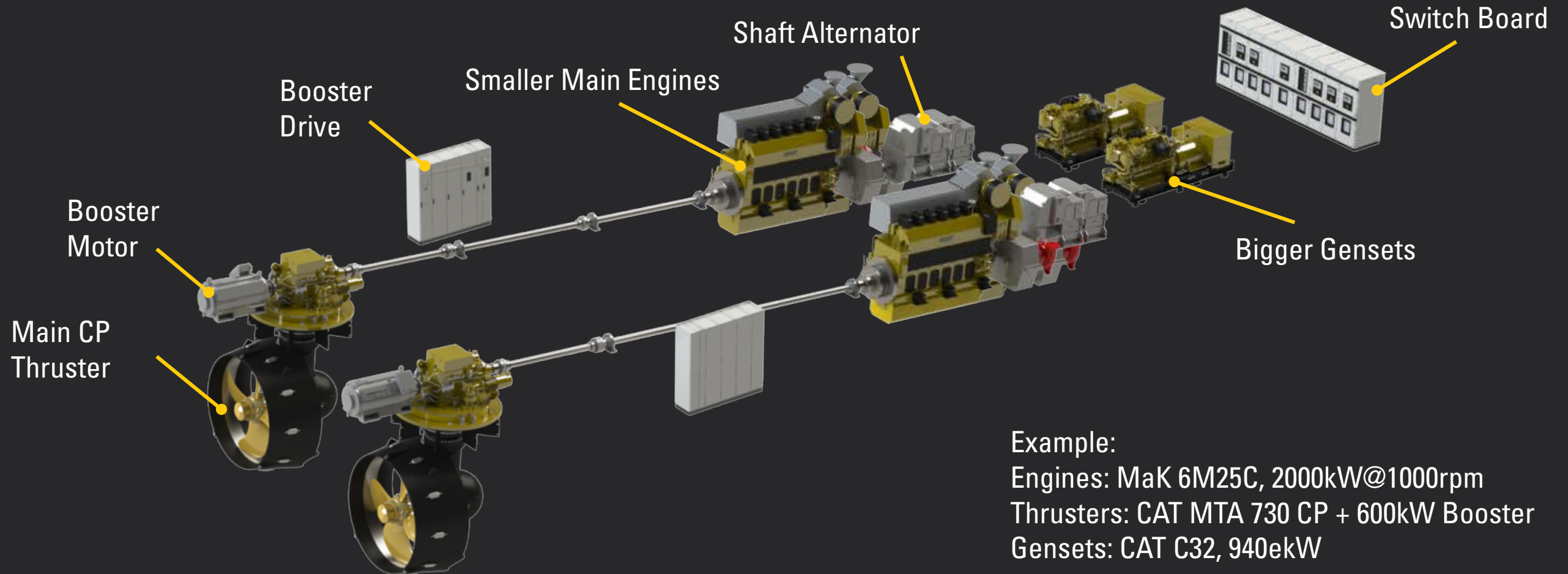
Example: 7000hp Vessel



Example:  
Engines: MaK 8M25C, 2666kW@750rpm  
Thrusters: CAT MTA 730 CP  
Gensets: CAT C18, 340ekW

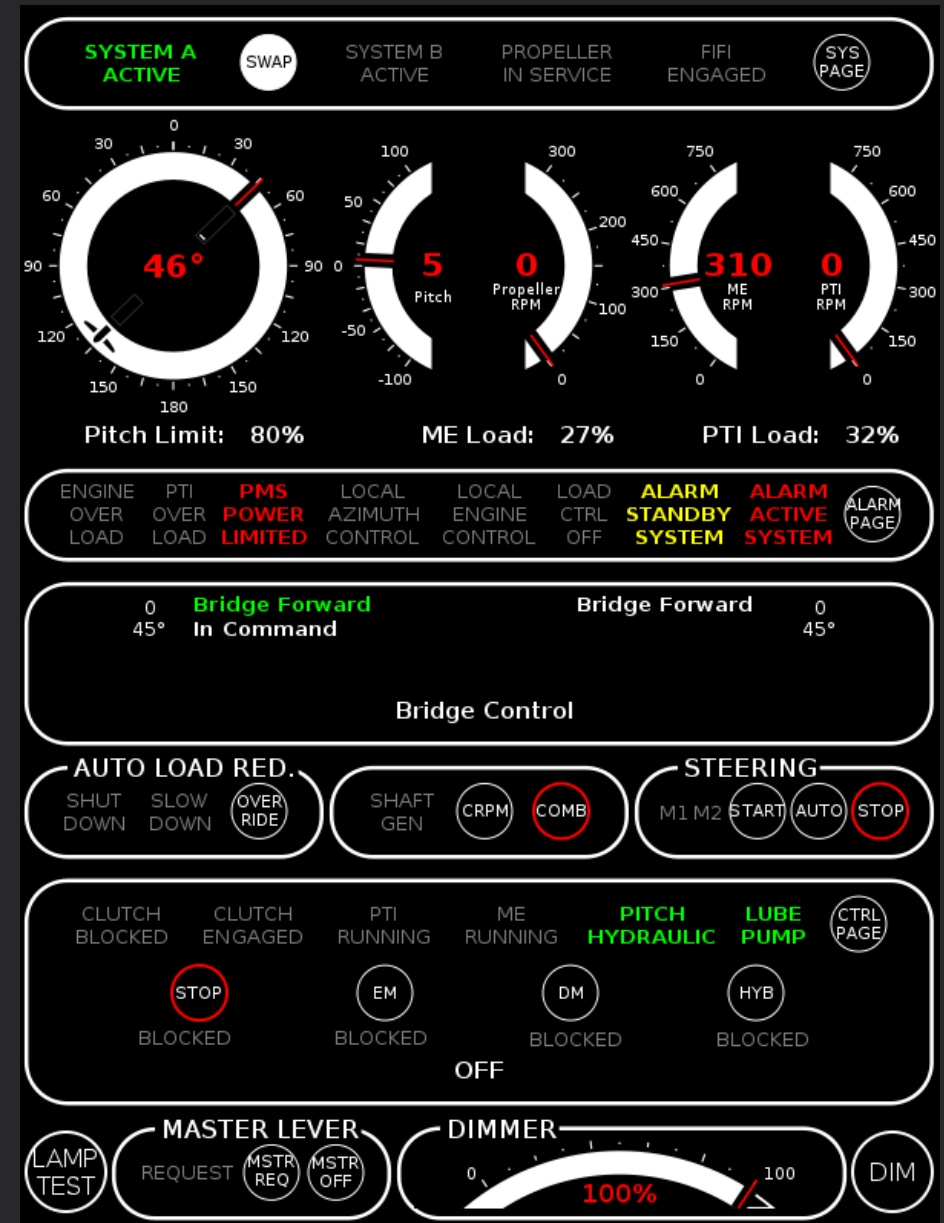
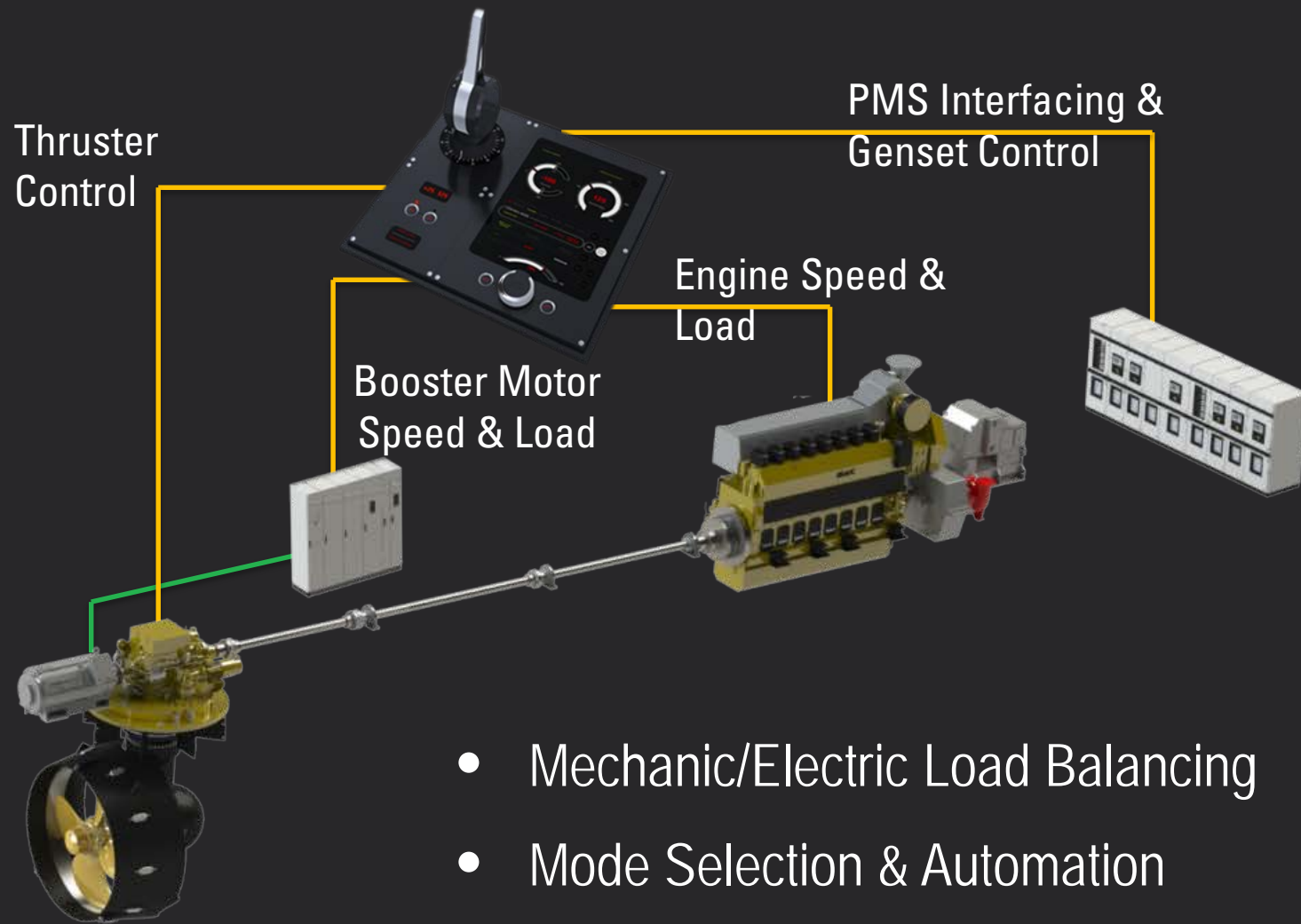
# HYBRID AZIMUTH THRUSTER ARRANGEMENT

Example: 7000hp Vessel





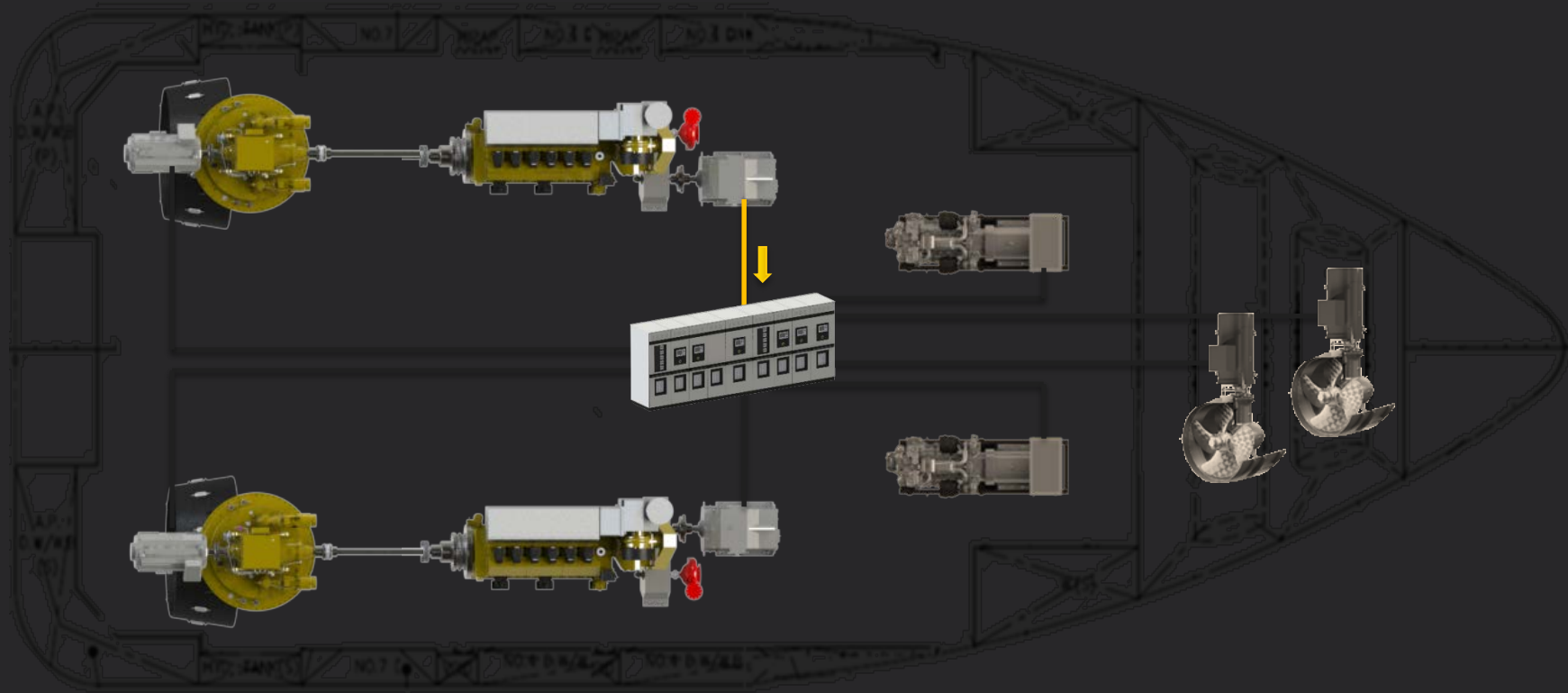
# CAT MPC 800A: CONTROLS



# MODES: TRANSIT CRUISING

Cruising speed in conventional diesel mechanic mode

- Reduced fuel and maintenance cost with smaller main engines



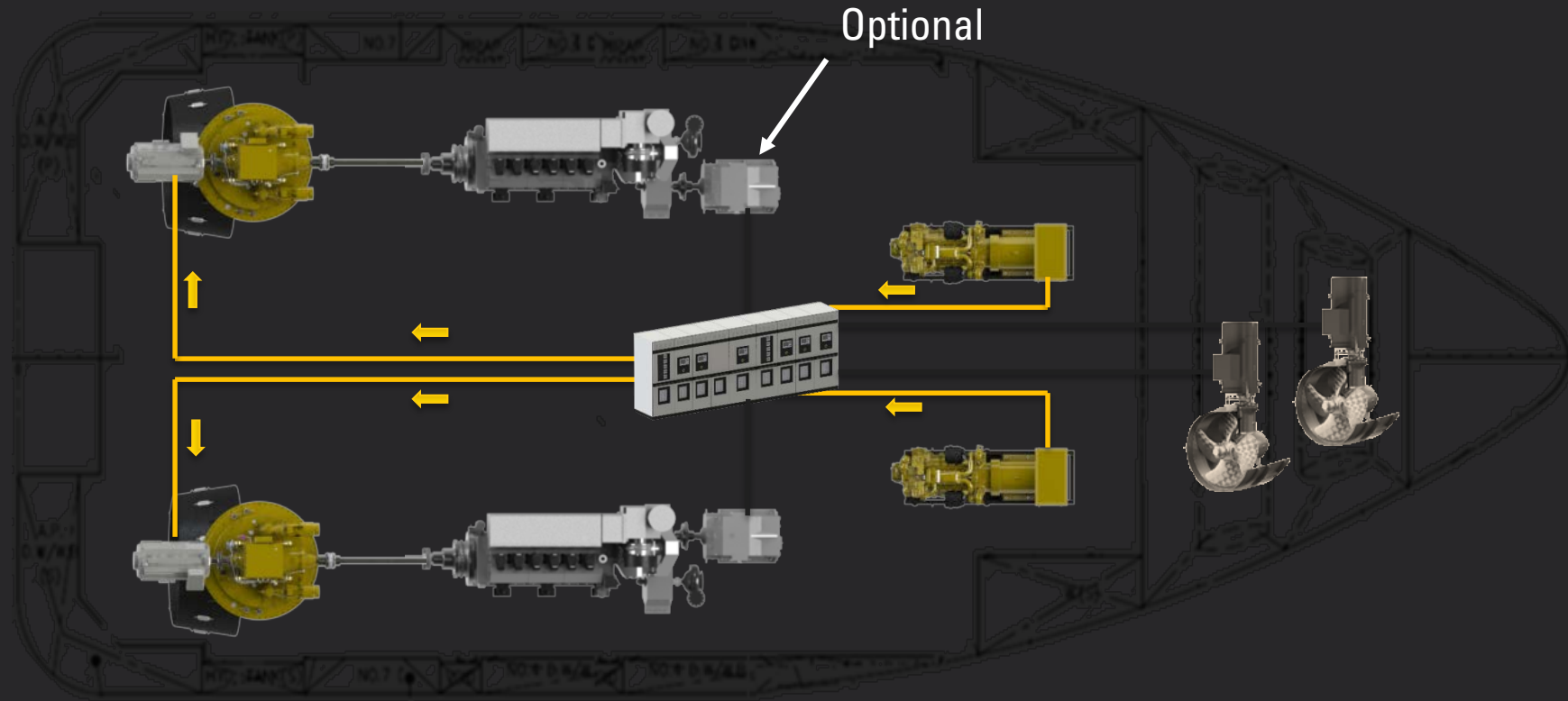
# MODES: TRANSIT ECONOMIC SPEED

Cruising speed in conventional diesel mechanic mode

- Reduced fuel and maintenance cost with smaller main engines

Economic transit with one/two gensets in diesel electric mode

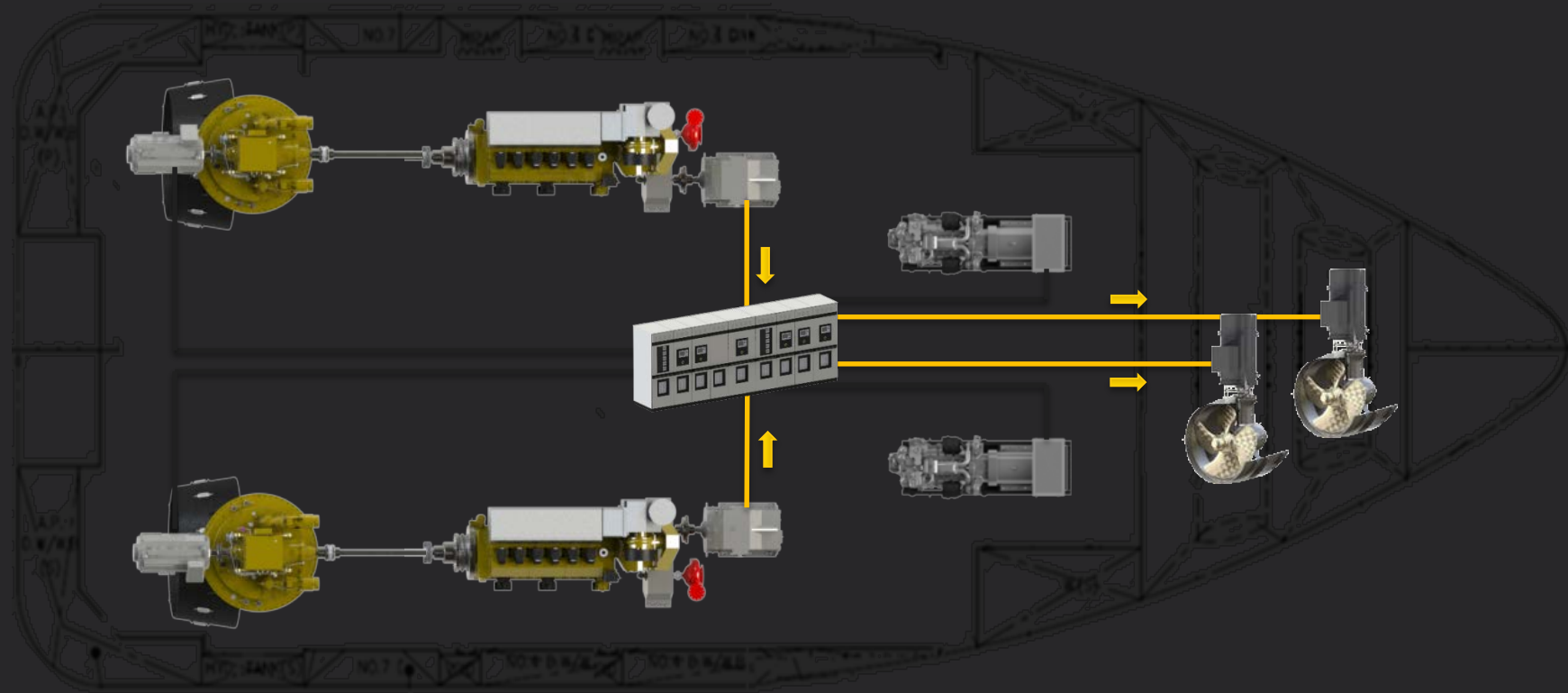
- 10-15% reduced fuel consumption in 7-8kts range
- Optional to run one main engine as a genset



# MODES: DP HIGH

## DP High with main engines and shaft alternators

- Reduced fuel and maintenance cost with smaller main engines



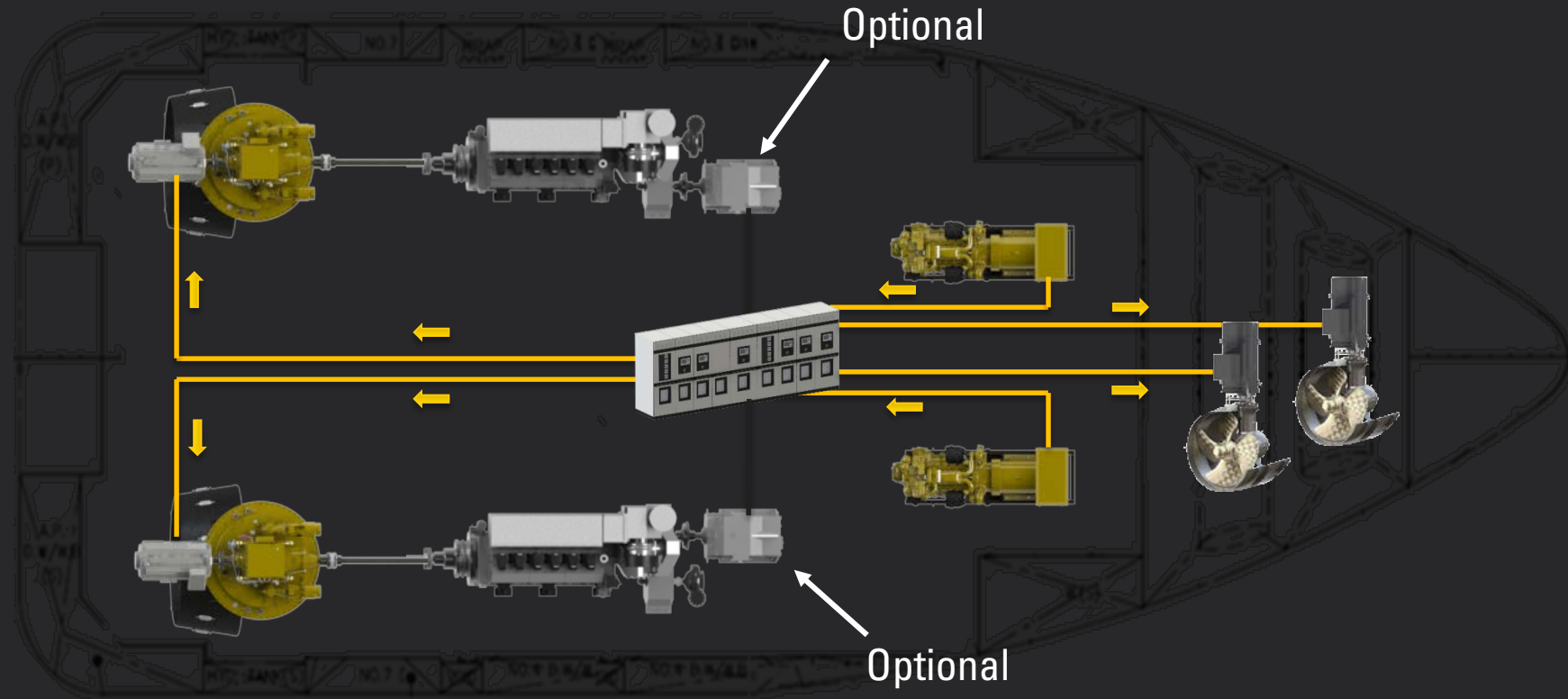
# MODES: DP LOW & STANDBY OPERATION

DP High with main engines and shaft alternators

- Reduced fuel and maintenance cost with smaller main engines

DP Low & Standby in diesel electric mode with main engines

- Main propulsion running in variable speed reducing power and fuel consumption
- Optional to run main engines as gensets

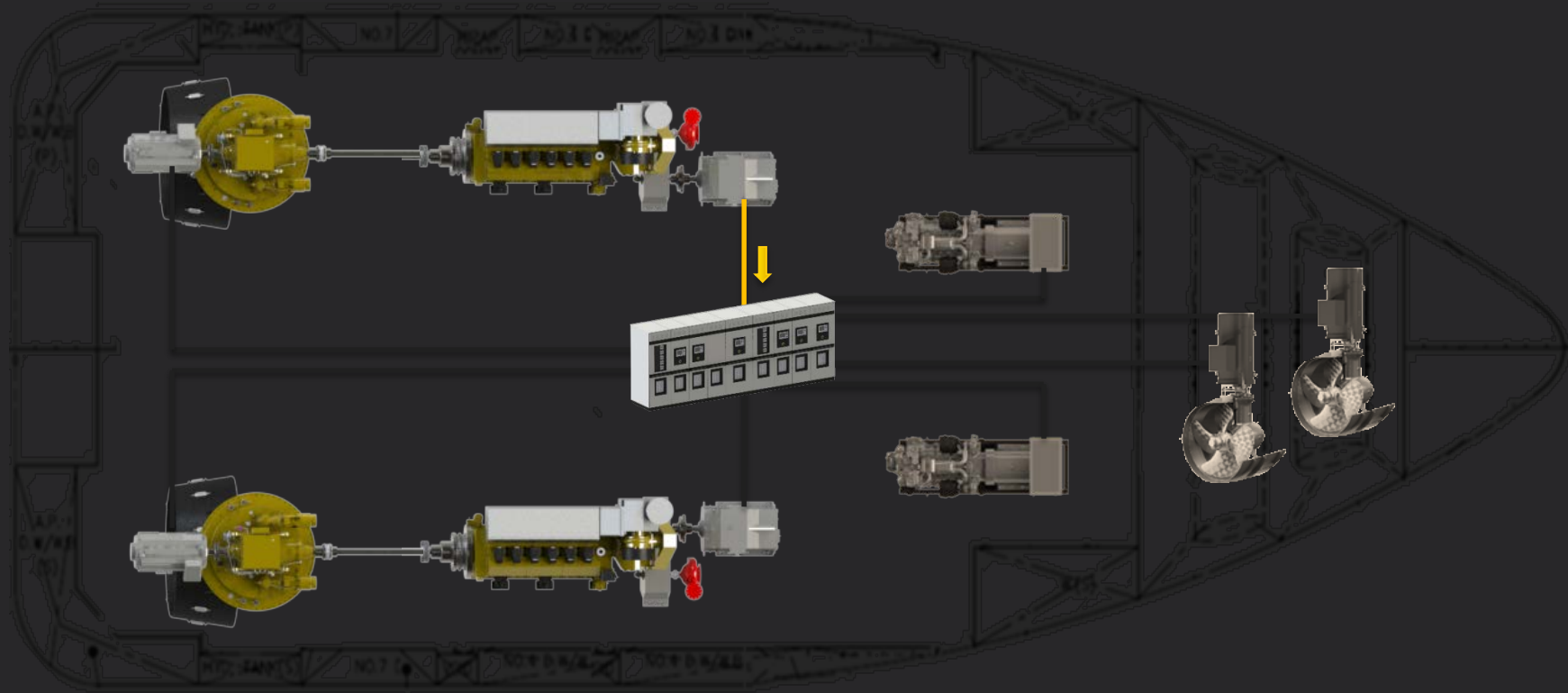




# MODES: TOWING

Diesel mechanic mode

- Using only main engines



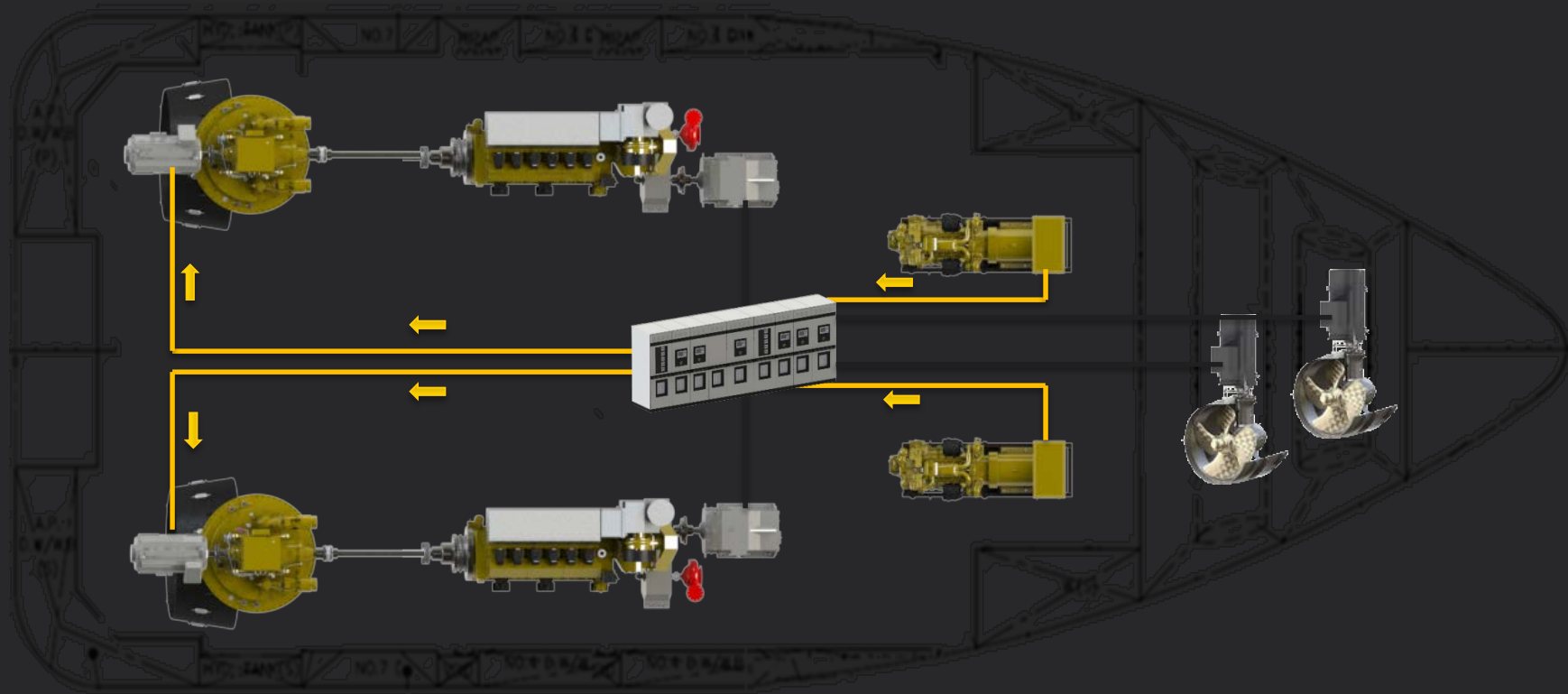
# MODES: TOWING AND ANCHOR HANDLING

Diesel mechanic mode

- Up to 75% power

Hybrid mode with gensets and main engines working together

- Up to 100% power
- Main propulsion running in variable speed reducing power and fuel consumption

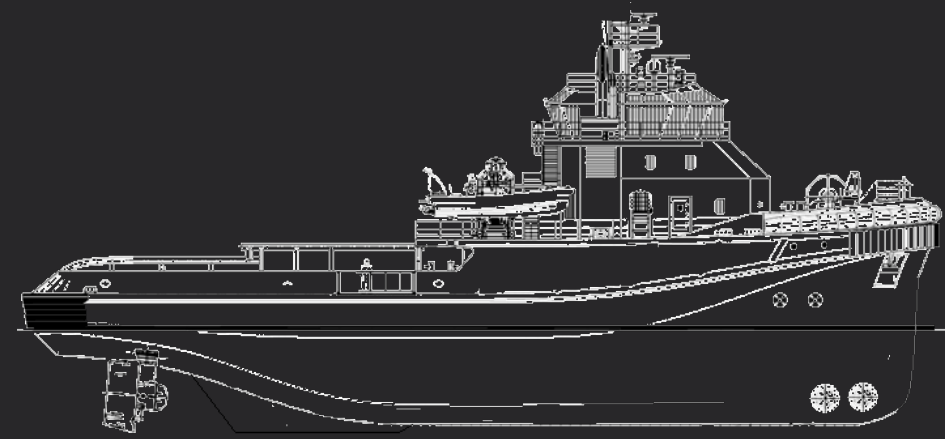




# WHAT DOES ALL THIS MEAN?

TOTAL COST OF OWNERSHIP BENCHMARK

# STANDBY SUPPORT VESSEL



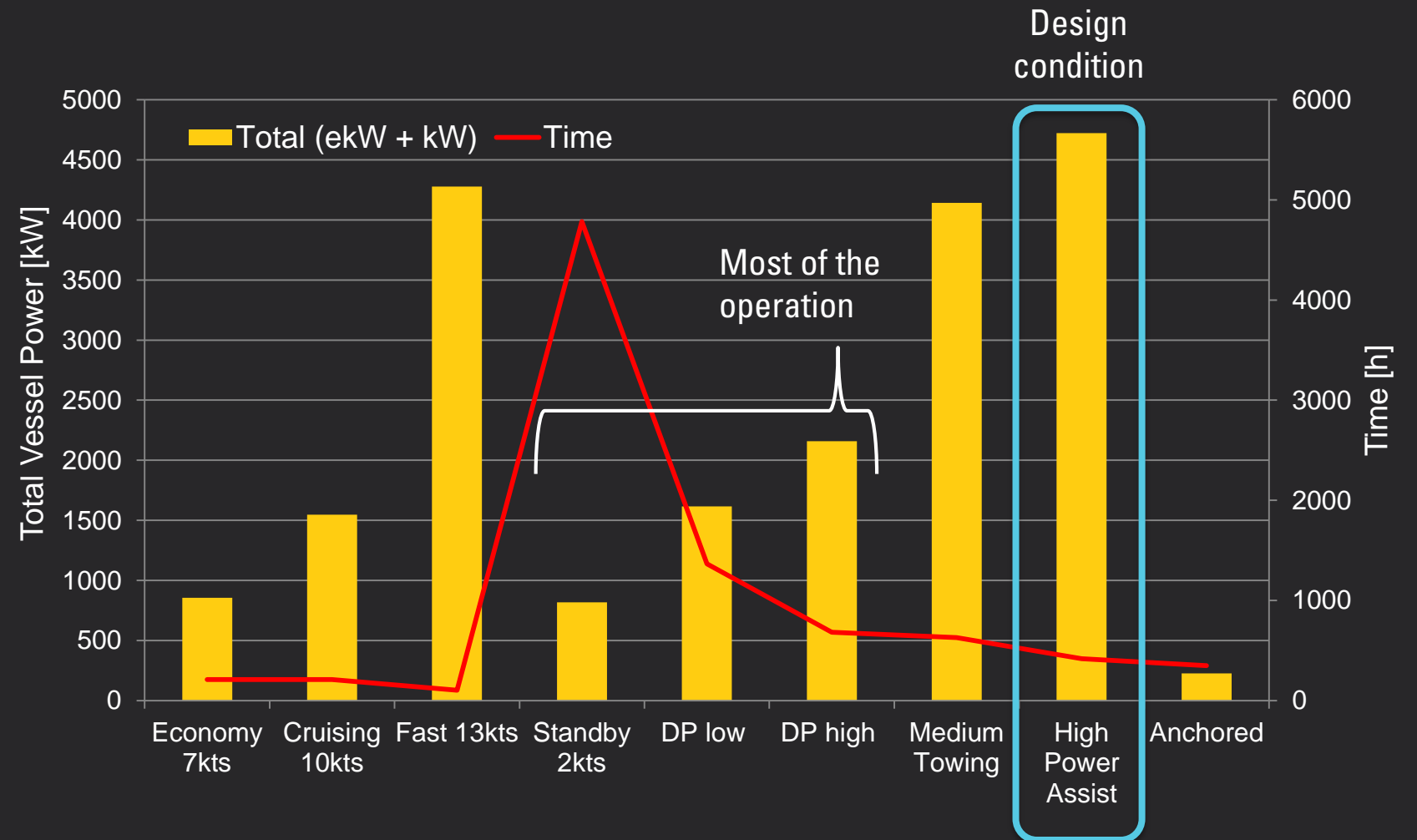
47m - FPSO support operation

85T Bollard pull, 13kts speed

DP 2, FiFi 1

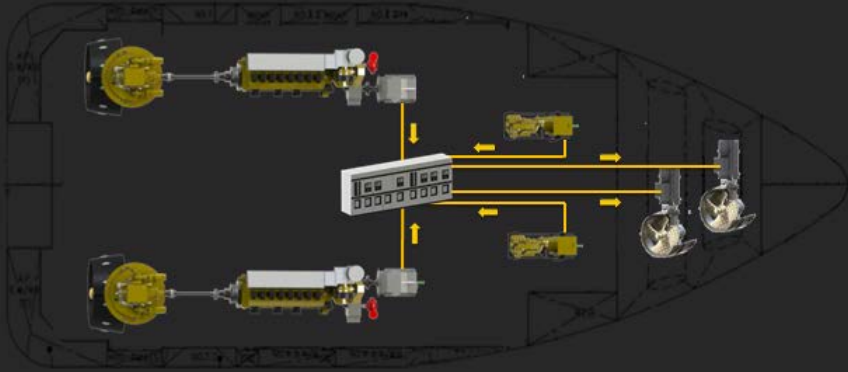
3m CPP Azimuth thrusters

1.8m CPP tunnel thrusters

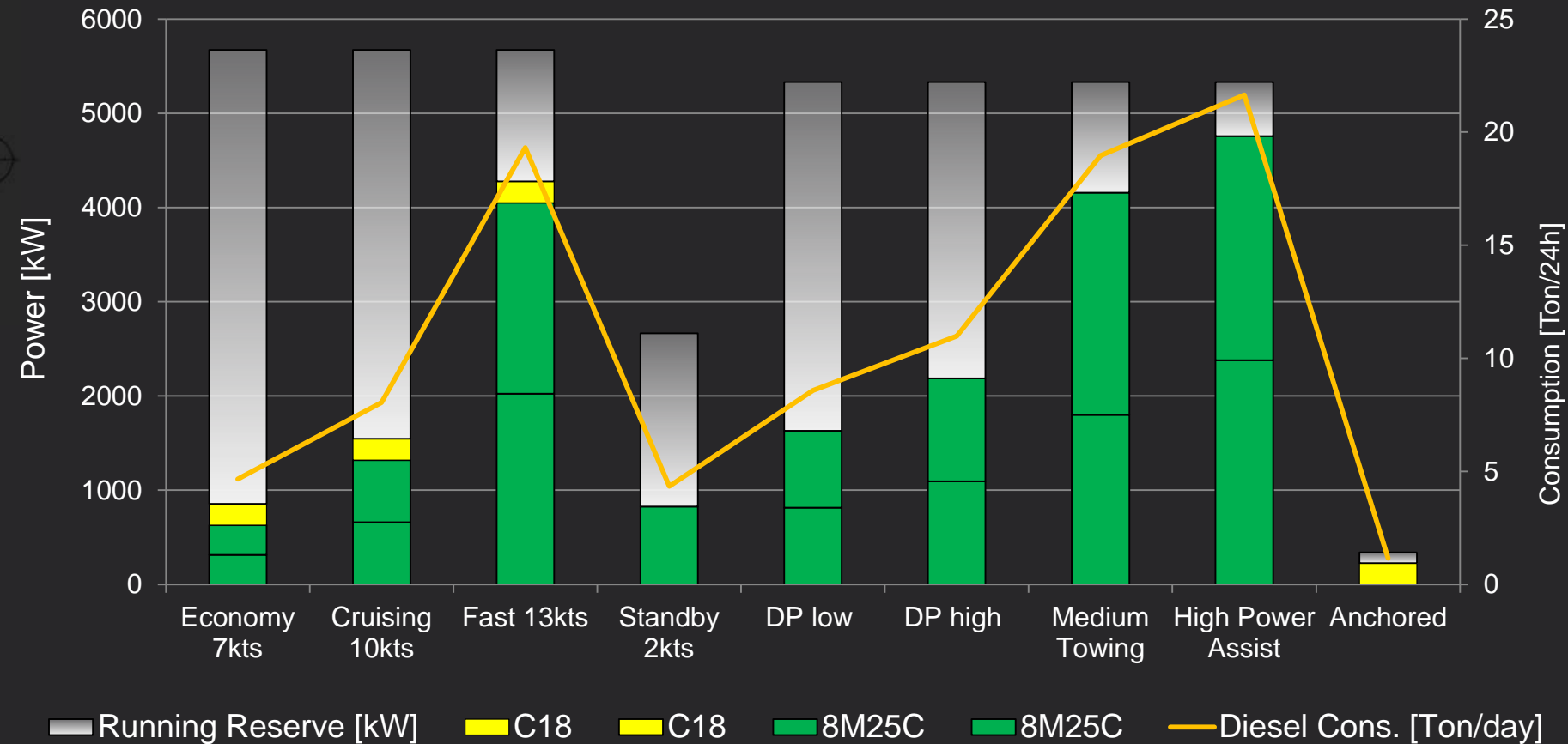




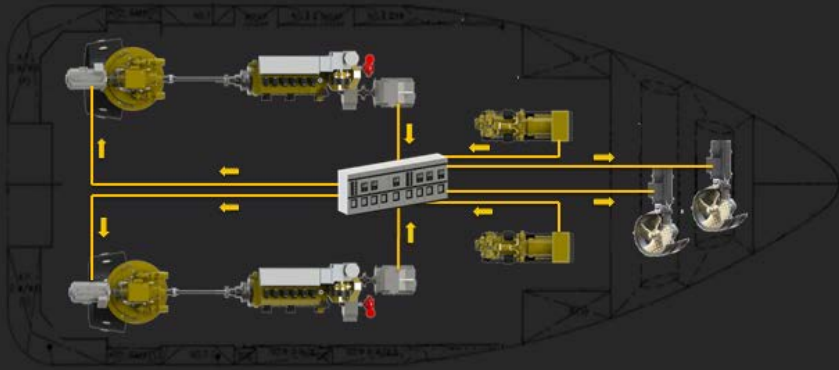
# POWER CHART: DIESEL MECHANIC OPTION



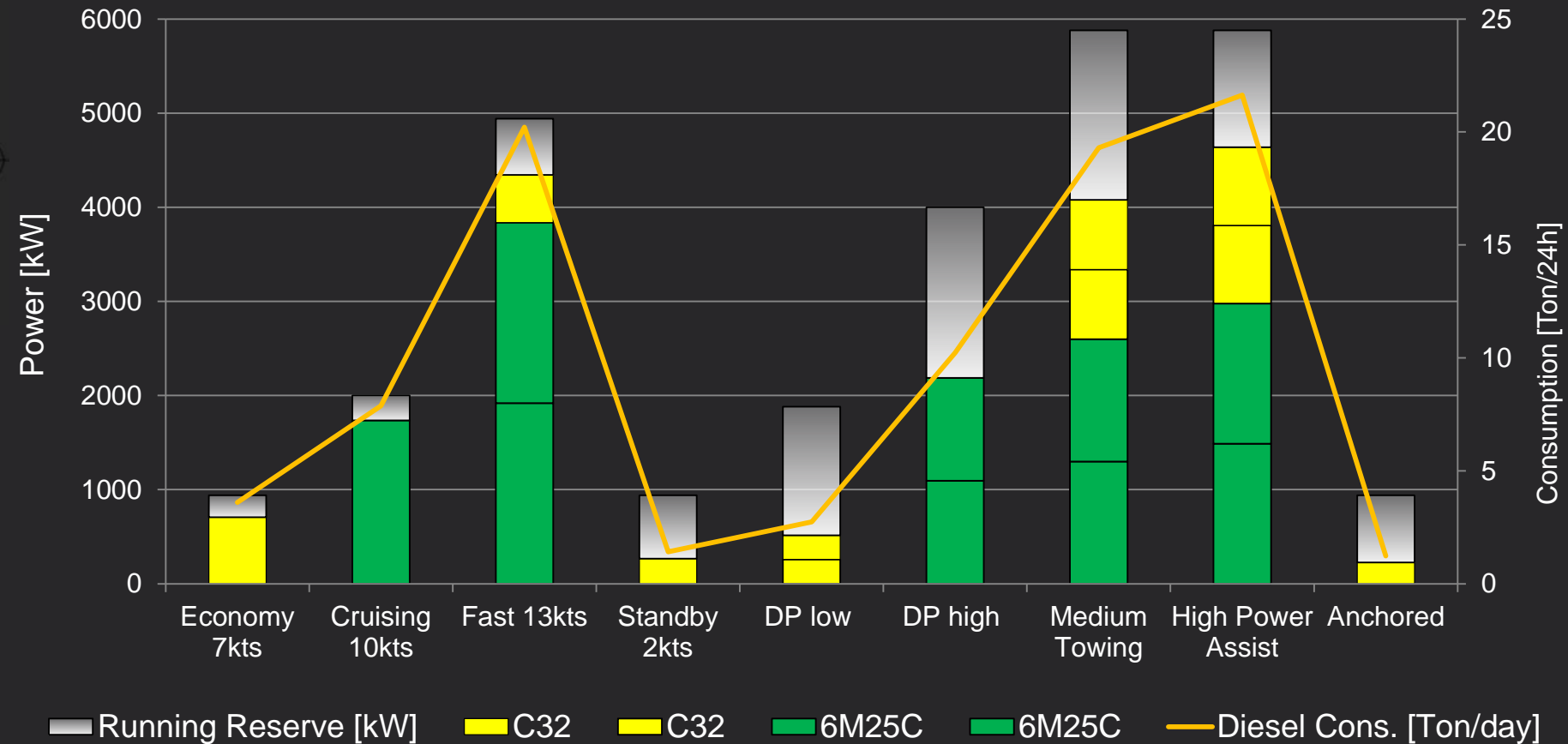
- Both main engines required for all modes except standby
- Low average engine load
- Constant speed CPP operation in most modes



# POWER CHART: CAT HYBRID

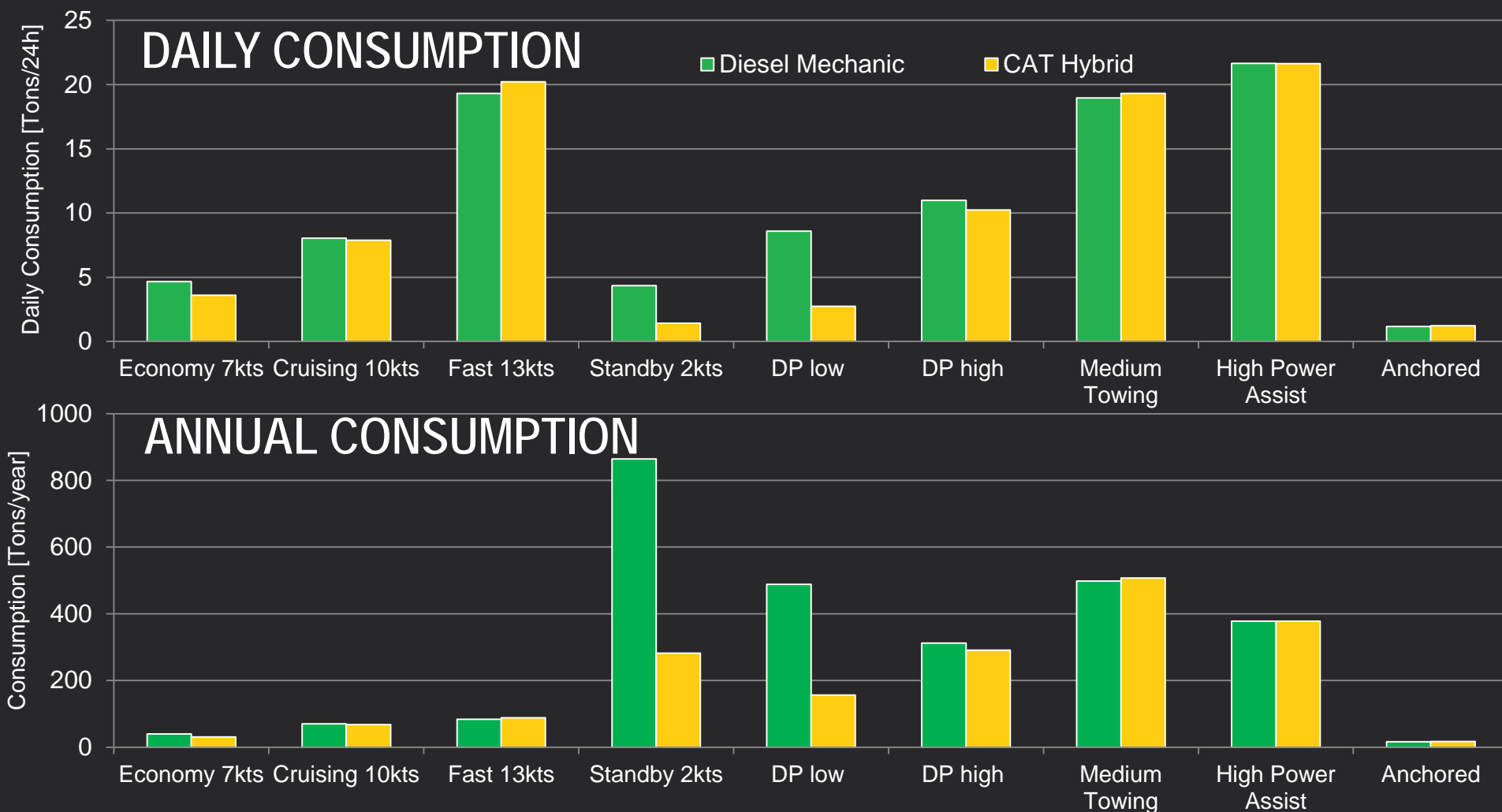


- High engine load
- Variable speed CPP operation in all modes



# FUEL BURN COMPARISON

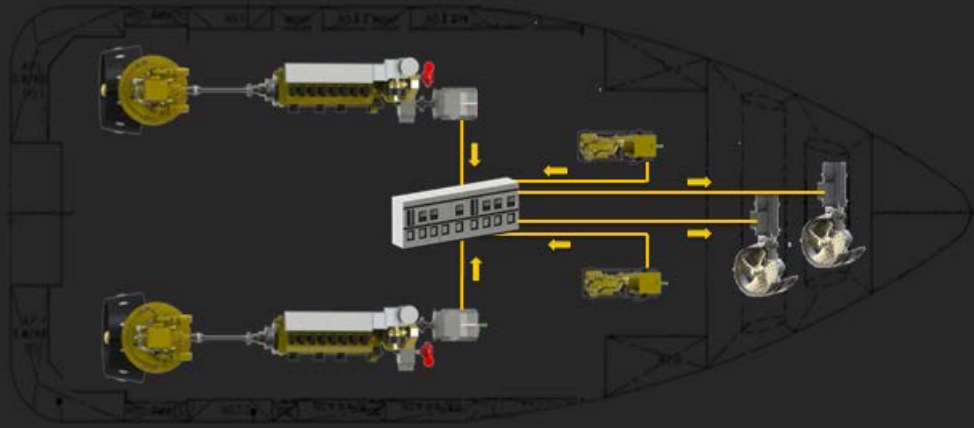
- Conventional Diesel mechanic performs well on high power modes
- Hybrid solution outperforms diesel mechanic on all partial load conditions



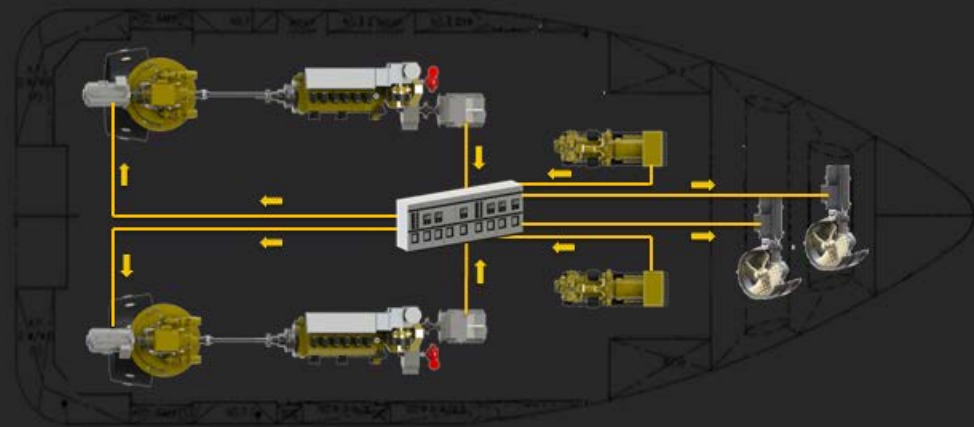
# IN SUMMARY



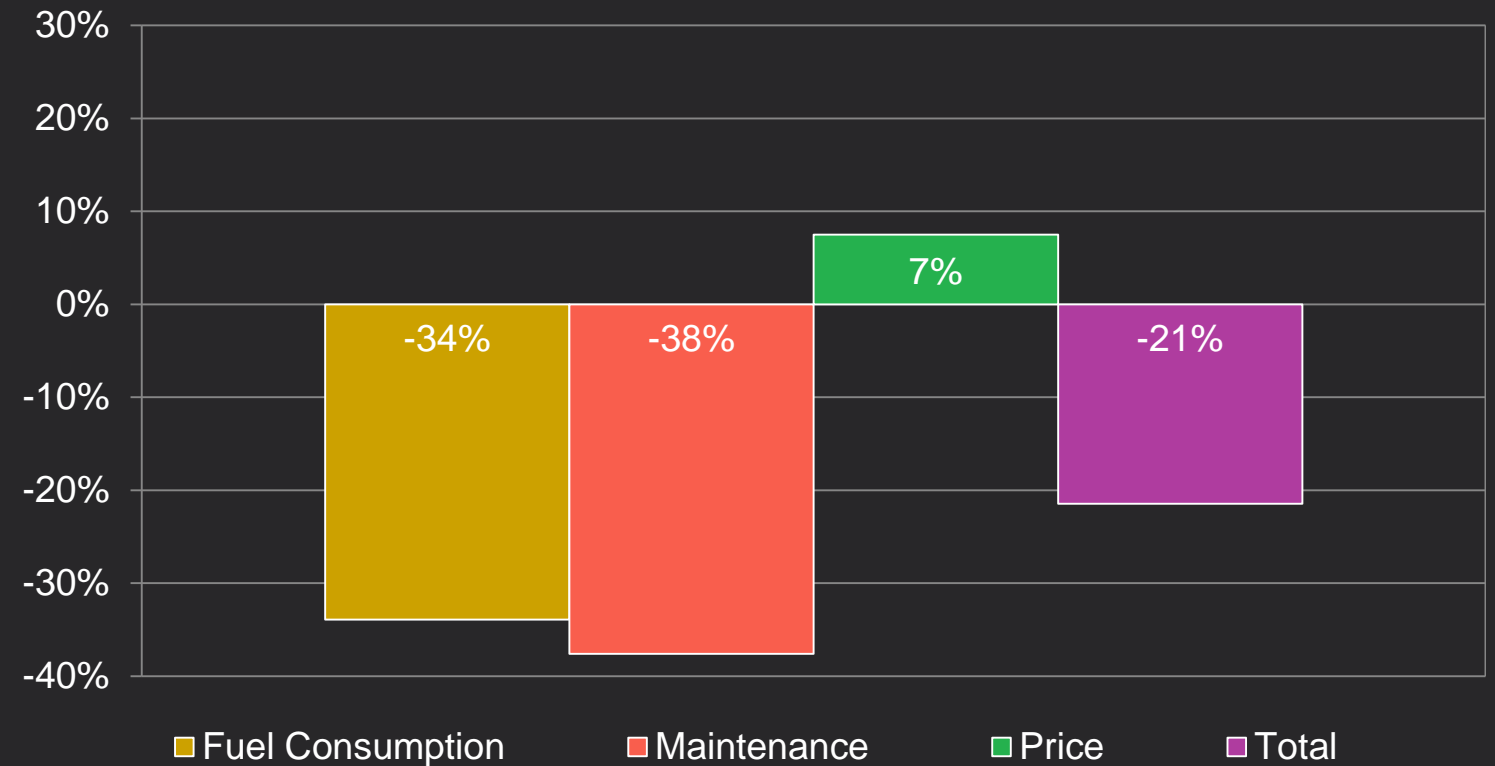
# SUMMARY: TOTAL COST OF OWNERSHIP



Conventional Diesel Mechanic



CAT Hybrid Thrusters



OPEX over 10 Years Operation

# CAT HYBRID THRUSTERS

Designed for all your important operating conditions



Fuel costs



Maintenance costs



Initial investment



Total Cost of Ownership

# TALK TO US

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