



Trident BMC Cruise HVAC & EMT

Go ahead, challenge us!

Who we are

Trident BMC works hard for its strong reputation as one of the leading suppliers of high-quality turnkey services in the Marine and Offshore industry. We are a well established company working with shipyards and ship-owners from all over the world since 1916. Trident BMC adds value from the initial concept to the delivery of services with after-sales support. We are a reputable, well-organized company made up of skilled and passionate professionals with over 25 years of experience in the marine industry.

For ship owners and shipyards seeking integrated solutions, Trident BMC has experience with newbuilds and refurbishment of existing infrastructures, complex turnkey projects and providing custom designs which fulfils all of customers expectations.

Effective solutions, strong work ethic, problem solving and a dedication to quality has made Trident BMC the preferred choice amongst our customers. Trident BMC is well known for consistently providing superior work and a high level of service in everything we do, such as: design, engineer, build, install and maintain integrated solutions for cruise ships and commercial vessels.

Our turnkey scope of services includes: ship inspection, laser scanning, engineering, software, documentation, procurement, logistics, material supply, installation and commissioning process. With every project, our primary goal is to complete the project on time and within budget to fulfil customer satisfaction.



Areas of Activity

Trident BMC has built a strong reputation for our high-quality turnkey services for Marine and Off-shore industry.

- Design & Engineering
- Interior Outfitting
- Environmental Services (EGCS, BWTS, SCR)
- Energy Management & Electrical Services
- HVAC
- Hull & Steel
- Pipeline installation
- Boiler Repairs

Scope of work for turnkey services

- Inspections
- Feasibility studies
- Detailed engineering
- System Integration Cohesive and comprehensive production drawings, technical classification designs, material specification and 3D vessel scanning
- Materials procurement
- Logistics
- Production
- Installation
- Commissioning support



MS Guardian HVAC Installatio



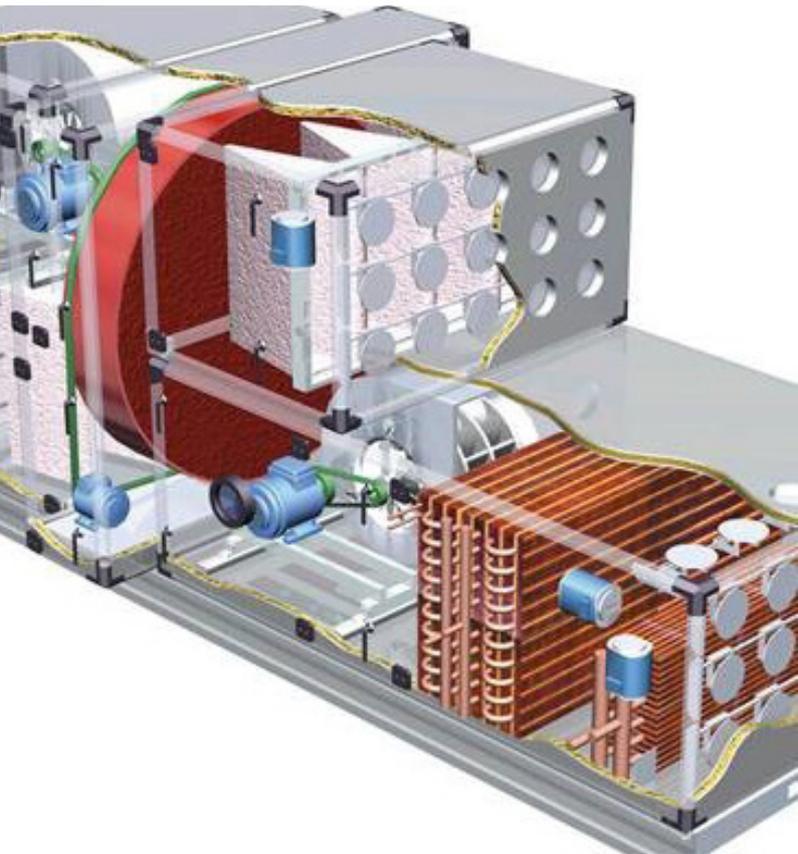
HVAC Engineering



Laser Scanning



Flow-control valve Sac



Energy management

Advances in automation technology enables ship operators to achieve significant energy savings by optimising HVAC and fluid machinery. Trident BMC is an expert in ship optimization with decades of know-how in designing efficient HVAC plant and fluid systems, paired with smart automation and benchmarking systems.

- Energy management solutions for HVAC and engine rooms on passenger, offshore, naval and merchant ships
- Over 100 installations delivered with a typical pay-back time of two years
- 400 million kWh 80 000 tonnes of fuel and 256000 tonnes CO2 every year



With our

True Demand Technology

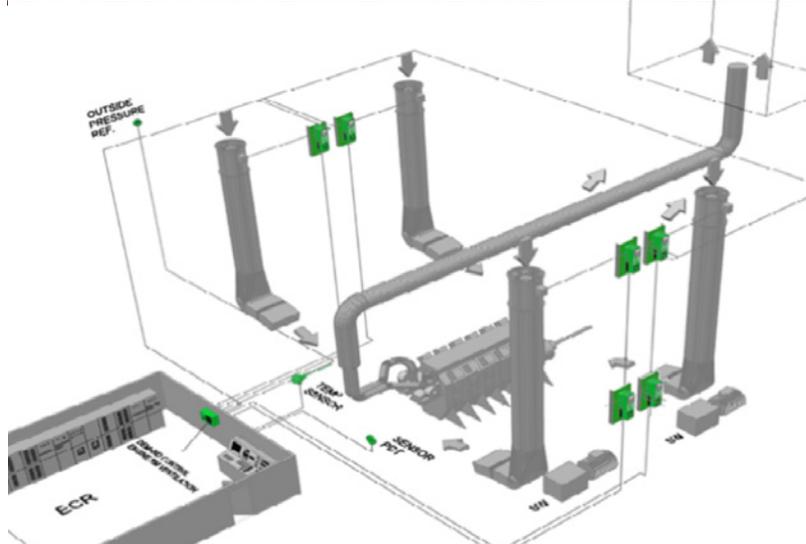
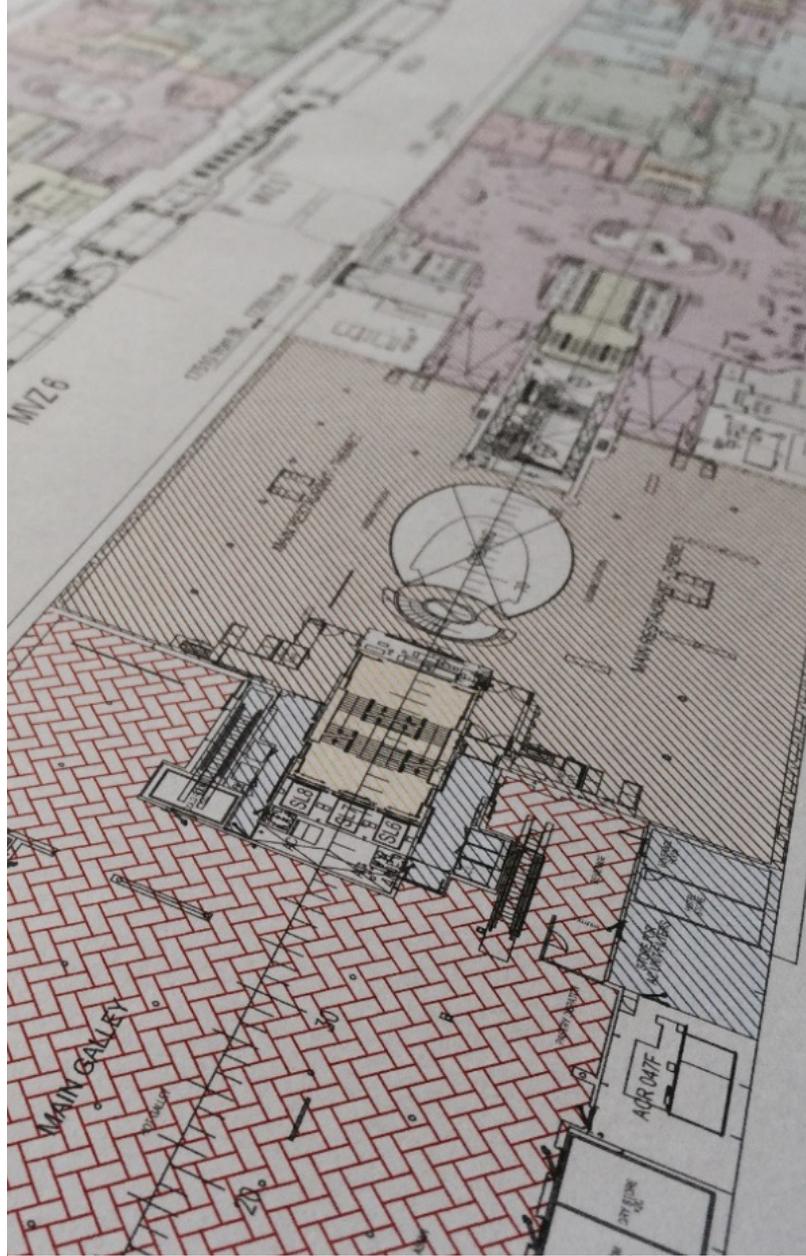
required energy for engine room fresh air is reduced by as much as 50%.

Energy management for passenger vessels

Environmental legislation and rising operational costs erode cruise & passenger industry's margins. It is increasingly important to control the most energy demanding processes onboard: propulsion, hotel operations and HVAC.

We deliver combined smart energy modifications of the mechanical, electrical and automation equipment with high efficiency components. Our solution is scalable up to a total HVAC plant reconfiguration make-over, and can be implemented on new builds as well as sailing ships. We are an independent integrator and work with all major brands of mechanical, electrical and automation equipment for our energy management projects.

- Our energy and climate performance computer simulation enables us to offer a kWh-savings guarantee
- Benchmarking software makes it easy for crew to monitor and maintain optimised HVAC energy use
- Pre-installation HVAC surveys to identify areas where HVAC plant can be optimised for the best air quality and comfort
- Officers and ship managers can take advantage of our in-house HVAC & energy efficiency training programs



Smooth and efficient project execution

Energy optimisation projects can take place during dry dock or vessel operation. Both scenarios present operational challenges, whether it be short deadlines or maintaining an operational system during the upgrade. With many successful retrofit projects behind us, our customers know that Trident BMC will deliver smooth and efficient project execution. We offer various contract models, including complete turnkey solutions, system design, material supply, installation, supervision and commissioning.

Automate your HVAC system with Trident BMC emt™

Trident BMC Energy Management Technology reduces HVAC energy consumption whilst improving passenger comfort. Our solution combines smart energy modifications of the mechanical, electrical and automation equipment with new key products and high efficiency components.

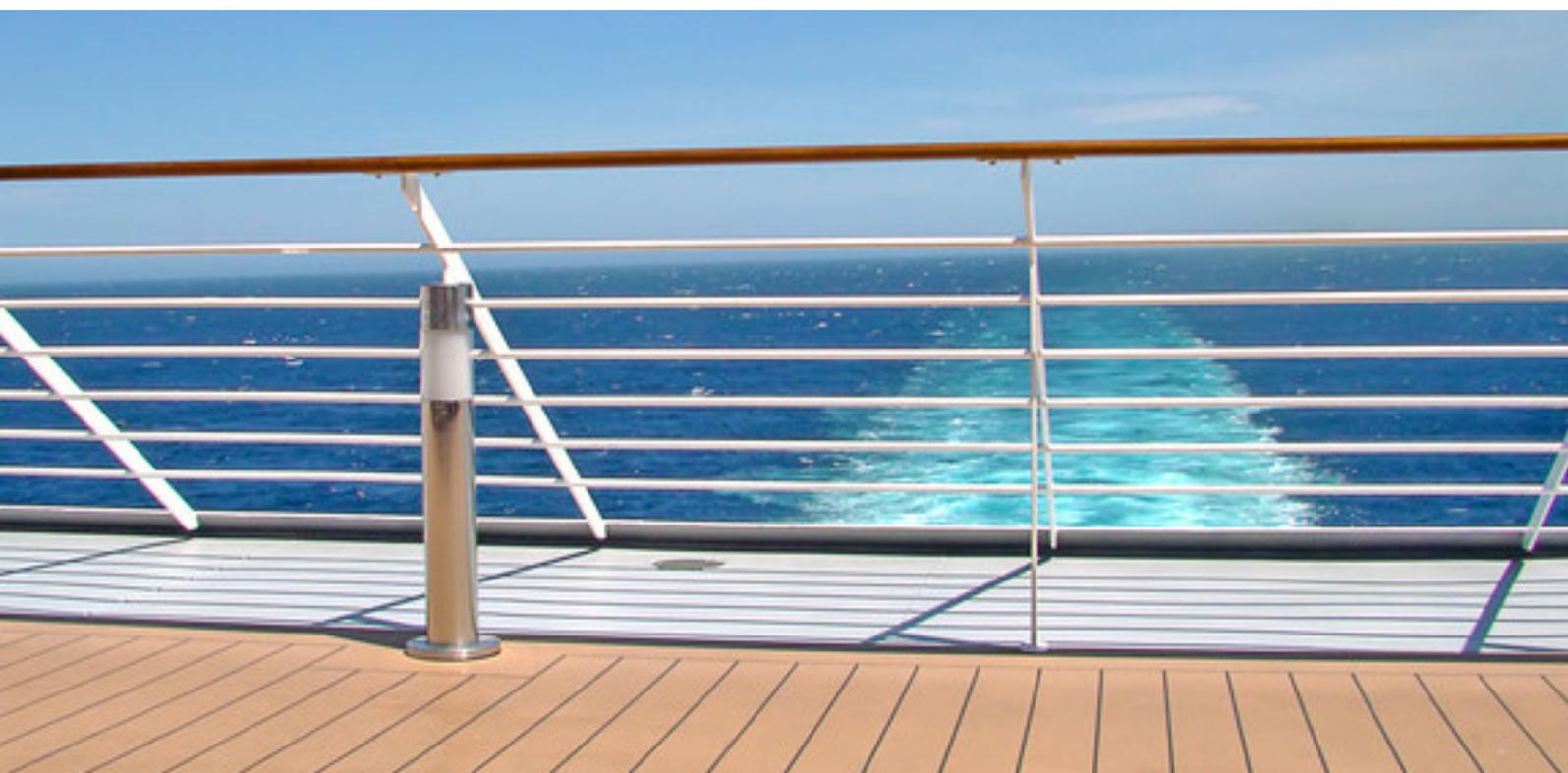
Reclaim energy by upgrading to new generation energy wheels

Trident BMC offers turnkey energy recovery wheel solutions which not only reclaims predicted energy consumption, but lowers it. Our solution incorporates the new generation of energy recovery wheels. With its new generation high efficiency coating, we can retrieve up to 80% energy.

HVAC energy optimisation

Environmental legislation and fuel costs are two significant challenges for the maritime industry. It is crucial to optimise the efficiency of the most energy demanding processes on board; propulsion, hotel operations, and Heating Ventilation Air Conditioning (HVAC).

- Improve operating efficiency and passenger comfort by upgrading your HVAC system
- Trident BMC Energy Management Technology (emt™) delivers proven savings and reduced environmental impact
- Retrieve up to 80% more HVAC energy with our energy recovery wheel upgrade program



HVAC for newbuilds

When keeping passengers cool on a Caribbean cruise, ventilating the cargo space on a car carrier or protecting environmental integrity on a North Sea oil rig, a reliable and energy efficient HVAC system is crucial for a safe and profitable newbuild.

- Expertise in complex newbuild projects and existing HVAC installations in the offshore & maritime industries
- Engineer-led system design reduces system down-time and lowers operational costs
- In-house electrical & instrumentation capabilities and production
- Worldwide commissioning and aftermarket support

Experience in demanding maritime and offshore markets

Our customers operate in extreme conditions and in highly regulated environments. We are experts in international codes and rules & regulations of all leading classification societies.

The scope of supply includes ventilation equipment with shockproof design and low magnetic signature. We supply filter systems, equipment for compact spaces and high pressure air conditioning systems.

Let Trident BMC take care of all your newbuild ventilation needs

Our experience extends from designing and delivering HVAC systems for living quarters, utility areas and mechanical ventilation to storage areas, engine rooms and hazardous areas.

- Complete design & supply of HVAC systems
- Chilled water and DX refrigeration plants
- Provision refrigeration plants
- Cargo hold ventilation
- Deck and tank ventilation for oil and chemical carriers

Automate your HVAC system with Trident BMC emt™ technology

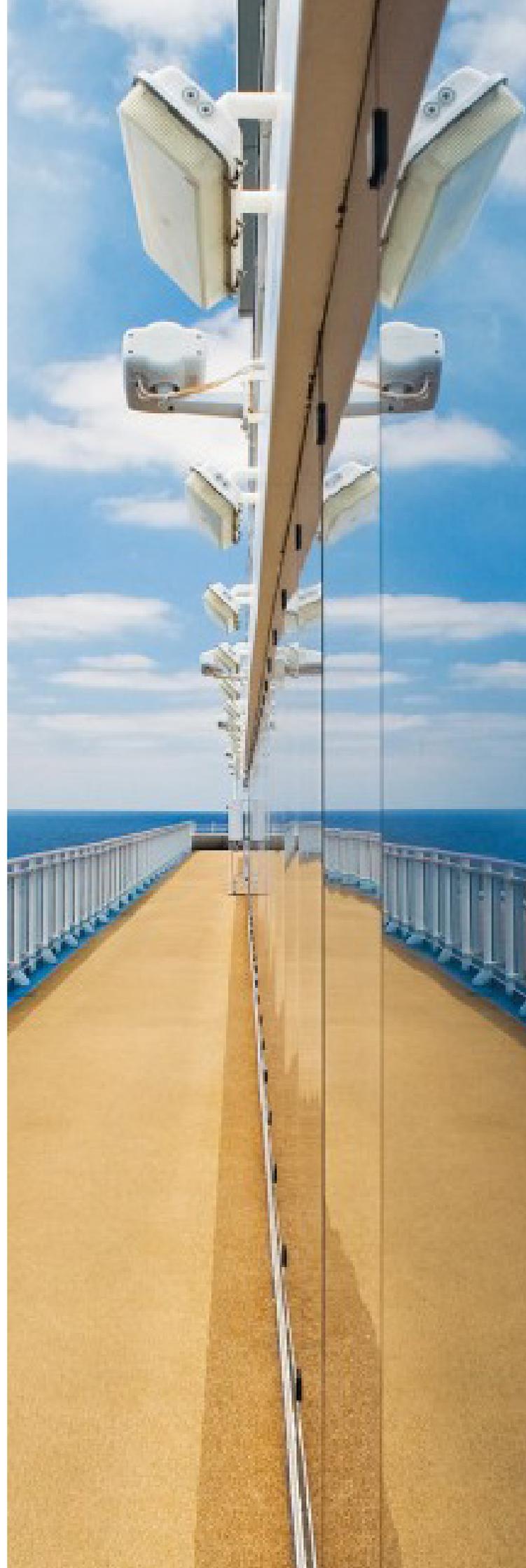
On many vessels, the HVAC system is a major energy consumer. Trident BMC Energy Management Technology reduces HVAC energy consumption whilst improving passenger and crew comfort.

Our award winning technology combines smart energy modifications of the mechanical, electrical and automation equipment with new key products and high efficiency components.

Engineer led system design reduces operational costs

By investing in engineering at the design stage, we deliver a functional, reliable and easy to maintain HVAC system. We provide engineering expertise in the following fields:

- Feasibility studies
- Heat & air volume calculations
- Fire and gas systems
- Automation for HVAC
- Pressurization, sound and vibration



Holistic health solutions

Trident's experience from HVAC system goes back to 1937 and we do HVAC solutions for Merchant, Navy, Ferries, Cruise ships and to a full Hospital ship.

With experience of delivering the HVAC for Mercy ship's new hospital vessel, Trident BMC have a customized toolbox of solution which we call Holistic Health Solutions, securing the air quality onboard cruise and ferry's.

The focus is to have a well-balanced HVAC plant, proper filtration, and UV systems installed where required." Reporting and keeping track of changes and status of the HVAC system is essential; therefore, we have upgraded our HVAC Surveyor App. to include such functionality for our Holistic Health Solutions.

Trident BMC has developed tailored HEPA frame conversion kits for integration in marine air handling units as well as tailored UV conversion kits as part of its Holistic health solutions portfolio.

Energy efficiency is still an important focus and our solutions address the demands and requirement for filtration, UV, air balance and at the same time focus on energy efficiency.

Applying new solutions to the HVAC system creates several challenges why this needs to be evaluated by HVAC experts prior to implementations



Frame with pre-filter and HEPA filters

Reclaim energy...

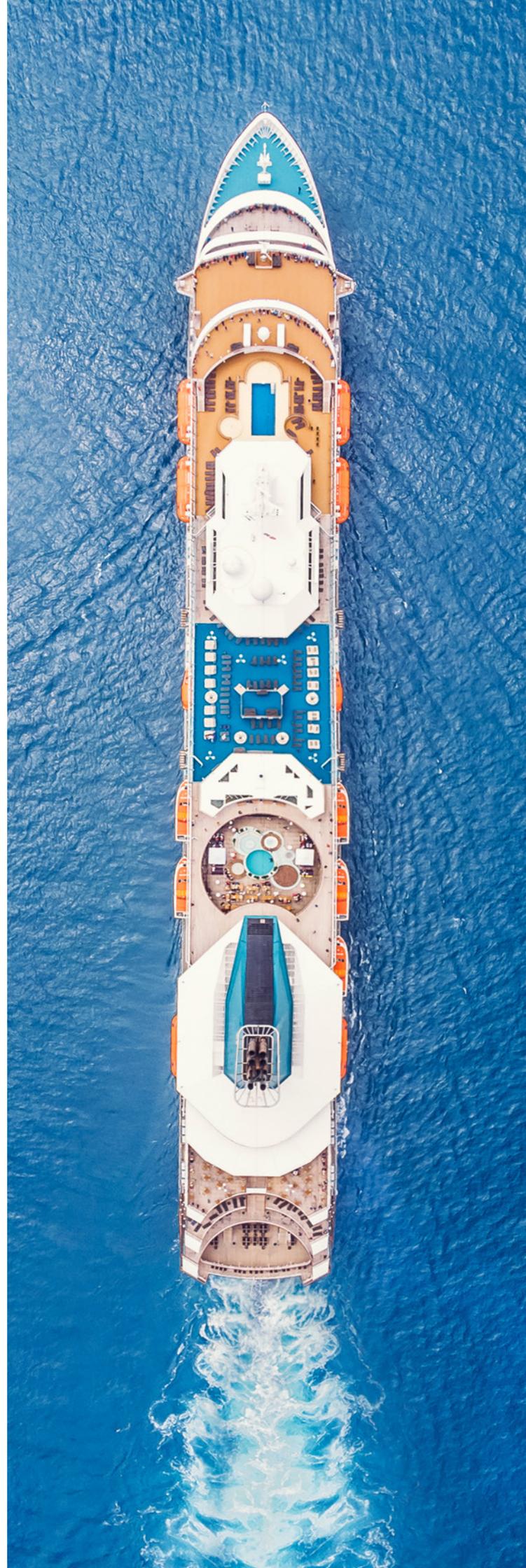
...by upgrading to new generation energy wheels

On average, the HVAC plant is responsible for 1/3 of a cruise ship's total energy consumption. Most air handling units onboard are therefore equipped with energy recovery wheels, which efficiently retrieve the energy from the ship's exhaust air. Over time the wheels get worn and the efficiency degrades significantly. This results in increased energy consumption and, in worst case, the designed climate cannot be maintained onboard the ship.

Background:

Some of the energy recovery wheels onboard were original whilst others had been changed over the years. In common for the energy recovery wheels, besides that they were worn and some of them were not working at all, was that they had the previous generation of coating. As a result, the average energy recovery capacity was reduced to 60%.

By converting energy recovery wheels to wheels with the new generation of coating, the energy recovery efficiency increased to 80%. This translates into an annual saving of USD 250 000 as well as an improved indoor climate and fewer passenger claims. The pay-back time including installation cost would be approximately one year. The total energy recovery from the energy recovery wheels would be USD 750 000 per year at optimal operation and maintenance.



How much energy & money can you save?

Trident BMC has successfully helped several clients change to the new generation energy wheels on their vessels. Below is an example of savings can be achieved during certain circumstances:

Vessel type	Cruise ship sailing in the Carribean, age 15 years
Number of energy recovery wheels in the HVAC plant:	50
Average air flow at full speed from each air handling unit:	4 cu m per second
Reduction of air flow due to other energy conservation activities on board:	60%

How can Trident BMC help?

Trident BMC offers a turn-key energy recoverywheel solution which not only reclaims once predicted energy consumption, but lowers it. Our solution incorporates the new generation of energy recovery wheels. With its new type of high efficiency coating, it can retrieve up to 80% energy.

Trident BMC guarantees and take fullresponsibility for the complete solution:

- One point of contact
- Survey of the existing installed equipment
- Delivery of correct equipment based on survey
- Installation and commissioning of equipment

The result is a highly energy efficient HVAC plant, reduced fuel costs and improved indoor climate for passengers.

Spare parts & service

Trident BMC provides repairs and performance surveys on all types of electrical installations and equipment. We also source and install spare parts, even for obsolete components where the original part is no longer readily available.

- Maritime and offshore electrical and automation system upgrades, service and repair
- Flying squads and spares hubs support our customers globally
- Multi-brand electrical spares from parts centres in Sweden, Poland and Florida

Service, maintenance & repair

We support our customers to keep their ships running & compliant, wherever they may be operating;

- Fault finding, repairs and spare parts for any kind of Switchgears, Automation, communication and power distribution plants.
- Thermographic analysis of switchgears and distribution boards.
- Repair and check of medium and low voltage equipment.
- 3D scanning
- Performance check and evaluation.
- Regular mandatory test on generator breakers.
- Preventive technical inspections.

Custom build switchboard solutions

From our spares hubs in Sweden and Poland, we support our customers and our technicians worldwide with multi-brand electrical spare parts. Our comprehensive range of electrical equipment includes:

- Cables and electrical installation material
- Breakers for switchboards and distribution fuses
- Instrumentation and sensors
- Spare parts

Flying squads

Our flying squads are comprised of multi competence engineers and electricians working globally with both repairs, installations and commissioning in accordance with your requirements.

Technical services

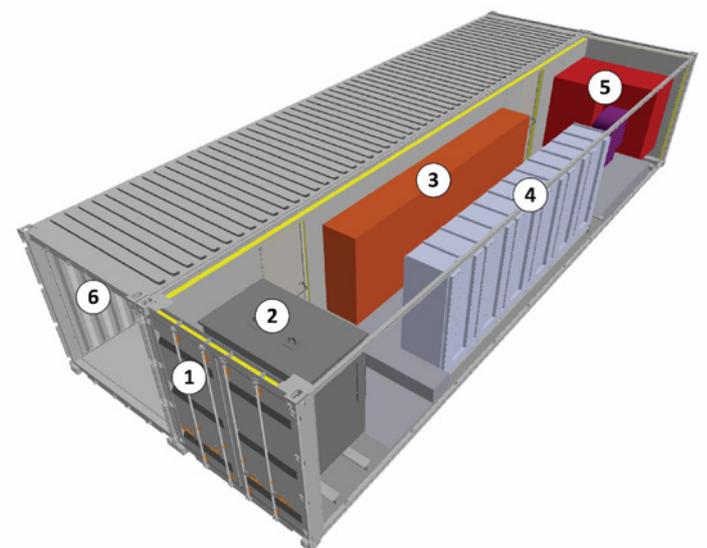
We undertake consultancy or supervision assignments as the owner's or yard's representatives. Independent of makers and subcontractors, we supervise and conduct everything from small upgrades to large conversion projects.

Containerised Battery Energy Storage Systems (BESS)

With Trident BMCs well proven battery energy storage system (BESS) we optimise your power generation plant and improve safety. We make a comprehensive feasibility study to optimise the solution to fit your operation profile. We work in close cooperation with your operation team the class and authorities to make sure we cover all aspects. Understanding the ships operation profile is a key to achieve maximum operation efficiency of the installed equipment, what we call "true Demand operation" an intelligent computerised solution that automatically adopt to achieve optimal and safe operation.



- Peak shaving
- Spinning reserve
- UPS, No more blackouts
- Boost operation
- Improved waste energy recovery
- Emission control



Layout

- CBESS Container
- Transformer
- Switchboard with filters and converters
- Battery racks
- Cooling & ventilation



Shore Connection

Efficient way to reduce air pollution in ports and its surroundings, as it allows ships to connect themselves to a shore source of energy and shut down their engines, thus cutting their contaminant emissions.

- reductions in vessel engine emissions in the port area
- elimination of noise and vibrations
- facilitating maintenance and repairs on machinery while not in operation
- reduced OPEX (maintenance, fuel) due to lower running hours of GenSet(s)
- financial savings, as onshore electricity supply shall be more cost-effective than bunker fuel use



Layout

- Hatch in coming cable
- Intake box,
- HVSC panel incoming
- Outgoing to transformer
- Crane remote control

OUR LOCATIONS



BMC USA | 3580 SW 20th Street | Pembroke Park | FL 33023 | USA

BMC POLAND | ul. Marynarki Polskiej 163 | 80-868 Gdańsk | Poland

BMC SWEDEN | Lindholmsallén 10 | 417 55 Gothenburg | Sweden

Phone USA: +1 786 220 2082 | **Phone Europe (PL):** +48 607 031 635 | **Phone Europe (SE):** +46 31 762 32 00 | **Phone Asia:** +86 21 5461 0258





TRIDENT BMC
Trident Maritime Systems

www.TridentBMC.com
BMC@tridentllc.com