The self-contained power station

POWER BARGES
BWSC’s power barges come equipped with the most fuel efficient engines available on the market. That way, power suppliers can deliver efficient, reliable power using a variety of fuel sources: diesel, natural gas, HFO, or dual fuel. And because we use the best engine technology available, we can promise performance figures and low maintenance costs similar to our land-based power plants.

**Big power, little impact**
Our power barge design places extra emphasis on minimising impact on the environment. By using radiators instead of seawater for cooling, for example, we avoid discharging cooling water which raises local water temperatures and damages plant and animal life. In addition, the power barge is designed with a highly efficient noise enclosure – an important feature for people living and working in the area.

**Ease of construction**
Locating the power plant on the water means power suppliers can sidestep engineering challenges associated with land-based projects, such as how to build heavy concrete foundations.

Soil conditions and land prices are no longer stumbling blocks either.

By using carefully vetted shipyards in different regions, BWSC can reduce the risk of delays and secure high productivity, regional financing incentives, and relatively short lead times.

**That’s a wrap**
Some companies can deliver generators. Or an LNG storage and re-gasification system. Or a substation. But at BWSC, we can deliver all of them in a ‘wrapped’ package. So in about 18 months’ time, a BWSC power barge can be hooked up to the grid, providing 60-150 MW of capacity to virtually any coastal community in the world.

Our power barges are also self-contained. Liquid fuel tanks on board contain fuel for 2½ days of operation. Step-up transformers and switch gear are on board ready for connection to a transmission system. We have even allocated space for workshops, tool rooms and storage space, so maintenance staff do not have to go ashore to make parts or fetch equipment.
FLOATING POWER PLANTS

Flexible docking, low risk
Because the barge is designed and constructed to marine classification standards, it can be towed or delivered by heavy lift ship upon completion. Sheltered coastal areas, river estuaries, existing docks or a primitive sheet piled wharf all make suitable locations for mooring. As such, the power barge is not affected by poor infrastructure or soil conditions. The low draft of 3.5 metres means the barge does not have to occupy key commercial space in a harbour. The hull of our power barges is designed so in-water inspection is possible, and dry docking is not necessary every five years.

After a power purchase agreement (PPA) expires, the power barge can be moved to a new location, ensuring a high residual asset value. With little or no stranded costs, a well-designed power barge becomes a low-risk mobile asset that is relatively easy to finance.

Safety first
Inadequate training and poor maintenance are leading causes of accidents at power plants. That’s why BWSC pays extra attention to safety protocols during construction.

When a power plant is taken into service, BWSC develops proper operating procedures and emergency response systems for the new owners. Fire protection is a key safety component as well. In the event of a fire, a BWSC power barge has a variety of active and passive systems in place to protect personnel and limit damage.

60 MW power barge installed in the Port of Colombo, Sri Lanka
Handling of a 100 MW power barge
LAYOUT AND FEATURES

Protected MV cableways, raised walkways and gratings throughout for inspection and maintenance. Pre-established removal routes for major components.

Steel-framed, insulated, power house building, for generating equipment. Incorporates forced air ventilation, overhead crane, and roof-mounted radiators.

Hull coating specified for maximum service life.

Impressed current, cathodic protection system with additional zinc anodes in ballast tanks and sea chests.

Fuel treatment equipment in ventilated, fire-protected, separate compartments and built-in, insulated, fuel tanks.

CO₂ and foam fire fighting system for protecting main machinery space. Seawater and deck-wash systems connected to on-shore systems.
Mooring brackets for wharf and fixed pile-mooring system to limit vessel motions.

Power barge specifications
- Length: 65-90 m
- Width: 39 m
- Depth: 5.4 m
- Draft (operating): 3.6 m
- Height (to top of stacks): 40 m
- Class certificated +A1 Barge class inland waterways. Designed to withstand hurricane winds.

Sound-insulated steel deckhouse, air-conditioned day crew accommodations, control room, MV and LV rooms, office, workshops, tool room and utility spaces.

Flexible connections for all fuel supply and fluids.

Indoor storage capacity for plant consumables and spare parts.


Substation with step-up transformers, dead-end structure and all other HV equipment installed on deckhouse in secure areas complete with protective fence.

Workshop/tool room for onboard maintenance and repairs.
DESIGN AND TECHNICAL SCOPE

Technical features
BWSC barges are designed around modular installations of engines, generators and auxiliary equipment. The barge structure can be lengthened or shortened depending on the number of generators required for output.

Power barges can deliver output between 60 and 150 MWe at either 50 or 60 hz at normal HV exporting voltages. A range of fuels can be used: HFO, diesel, dual fuel or natural gas.

Mechanical scope
Large-bore, four-stroke, medium-speed, turbocharged diesel engines supplied by major manufacturers can be selected.

The number of engines depends on the output needed, but typically 4 to 8 engines are ordered. The following features are available:

- lube oil systems, including coolers, pumps and separators for lube oil bypass cleaning
- low-noise, roof-mounted, variable speed radiator-cooling systems or, alternatively, raw water cooling with central plate type coolers
- fuel treatment and handling systems for natural gas or HFO and diesel fuel oil
- combustion intake air filter and silencer systems
- grouped exhaust gas stacks including silencers and waste heat recovery boilers for fuel heating
- forced air inlet fans with silencers for machinery spaces
- building exhaust vents with silencers
- compressed air systems
- black start diesel generator set
- water treatment system

Electrical scope
- synchronous AC generators, brushless, air-cooled and flexibly coupled to the engines
- 13.8/15 kV switchgear with feeders and coupling panels
- 2 x HV step-up transformers, 2 x station auxiliary transformers and LV distribution and lighting system
- DC system with dedicated battery room
- computer-based monitoring, O&M diagnostic system
- HV dead-end structure
- barge-neutral earthing system

Shore site options
Wharf to barge concrete ramp(s) and articulated access bridge with all pipes, flexible sections and respective supports for connection to clients’ systems for:

- potable water inlet
- grey water outlet
- sewer outlet
- natural gas, HFO, LFO and lube oil supply

Larger buildings for workshop and office facilities, tank farms and switchyards can be included in the EPC scope.
Global deployment
Power barge hulls can be constructed in one location and moved to another location for specialist equipment outfitting, testing and commissioning. Upon completion, the barge will be heavy-lift shipped to the final site. In this way, a high quality, tested working facility can be delivered virtually anywhere in the world.

Whether the floating power plant is EPC-purpose-built to satisfy specific power purchase agreement (PPA) conditions or developed as a lease facility for temporary or emergency situations, BWSC’s technical and commercial expertise ensures a bankable PPA, a high-value mobile asset and reliable power at short notice.

Development and commercial support
BWSC is an experienced developer of both boiler and engine-based power projects. Our hands-on approach from the early development stage to financial close has made BWSC a leading independent power producer (IPP), developer and investor in Europe, Africa, Latin America and Asia.

BWSC supports customers and partners from concept to implementation and long-term operation. Our services include:

- origination and evaluation of IPP opportunities
- setting up joint development partnerships
- full project development to financial close
- management of tender processes
- negotiation of main IPP contracts including PPA, fuel supply contracts and leases
- capital-raising from equity investors, pension funds and lenders including export credit agencies
- project finance structures
- active ownership and asset management
- medium and long-term facility lease complete with O&M

Service and support is our business
BWSC offers fixed-price, guaranteed O&M agreements that mitigate risks and ensure reliable performance at fixed cost.

At short notice, we can mobilise our specialist troubleshooting staff and secure the required spare parts to minimise down time. Our O&M and support agreements are flexible and tailored to suit your requirements and the specific power installation.

BWSC is qualified according to ISO 9001.
FACTS ABOUT BWSC

- World-leading turnkey EPC contractor and service provider for diesel, natural gas and renewable baseload power plants for electricity generation and thermal energy production
- More than 180 power plants designed and supplied in 54 countries
- Two decades of experience in operation and maintenance of power plants
- A comprehensive range of power plant support services, from spare parts to complete rehabilitation
- Training programmes for all aspects of power plant operation and maintenance
- Extensive experience in financing and development of power plant projects
- Headquartered in Denmark and supplemented by an international sales and support network
- 700 employees based at our main office and power plants around the world
- 100% subsidiary of Mitsui E&S Holdings Co. Ltd., Japan
- Certified according to ISO 9001, ISO 14001 and OHSAS 18001
- Long-standing AAA rating, 2017 revenues: EURm 387