

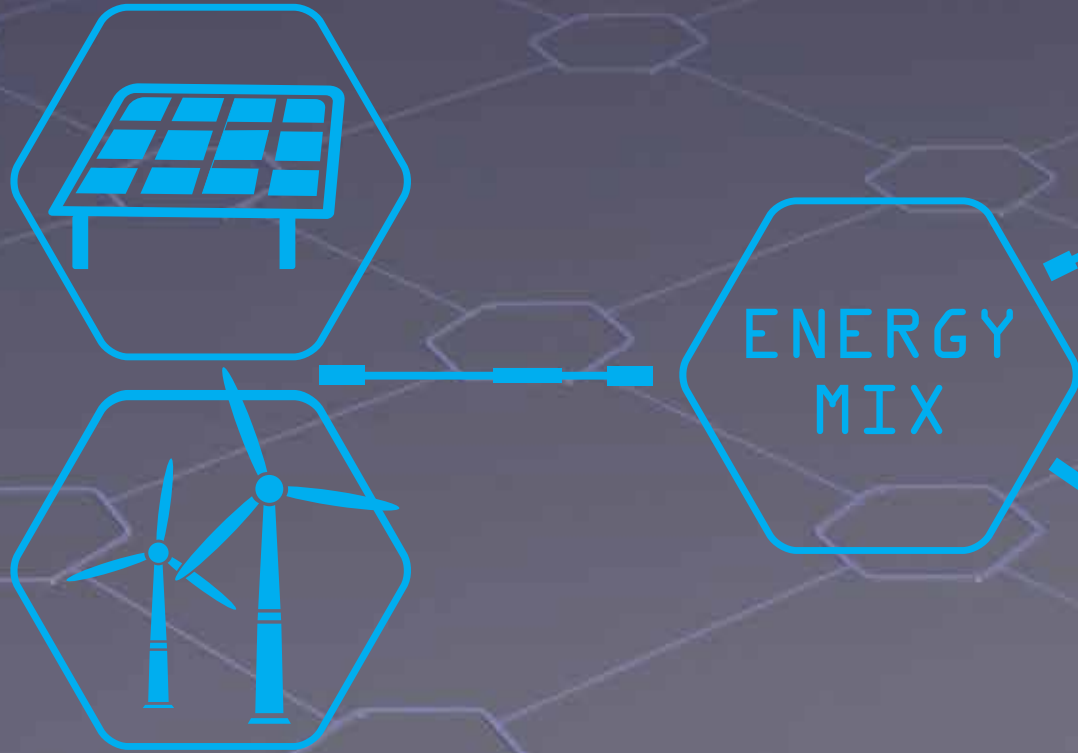
Integrated solutions with renewable power generation

HYBRID POWER



Grounded baseload with renewable integration

HYBRID ENERGY SOLUTIONS



BWSC offer hybrid energy solutions that mix renewables and conventional generation technologies.

We deliver innovative hybrid power solutions that combine the strengths of engine-based solutions and renewable technologies from leading manufacturers. Clean and low-cost power from renewable energy sources can be combined with dispatchable power to obtain a reliable power supply at competitive prices.

Fossil fuel dependency is reduced and future OPEX can be established with greater certainty. With the integration of an energy management system (EMS) the optimisation of the entire system will unlock even further savings.

Our turnkey hybrid power projects range from 10 to 300 MW and are optimised for local energy sources and site conditions. The energy mix for such a setup could include a combination of:

- SOLAR PV
- WIND POWER
- ENERGY STORAGE
- GAS
- DIESEL
- BIOMASS
- WASTE

Stability, security, storage

The hybrid power generation units are designed to secure a stable electrical grid and can include energy storage systems as well. Simulations and EMS are used to optimise the hybrid power system's operation. We offer complete hybrid systems as well as a retrofit of existing generation assets.

We customise and optimise hybrid power projects for specific locations. We can investigate potential sites, solar and wind resources and can perform scenario analysis to advise customers on system configuration.

We deliver complete turnkey solutions for the hybrid power and energy management system and utilise the synergies in the integrated design and construction of the system. We also offer post-construction services that provide the benefits from economies of scale.



Solution case

ON-GRID HYBRID POWER

BWSC's hybrid power solution is an attractive alternative to separated renewable and conventional electrification of power grids. Grid connected hybrid power solutions utilise synergies during the whole lifecycle of the power system.

In on-grid hybrid solutions, power generation based on biomass and waste can provide a stable baseload throughout the day. Solar PV and wind provides variable power generation to the system and reciprocating engines generate power to balance the supply and demand of power in the system. Reciprocating gas or diesel engines operate efficiently even though the load pattern varies due to their excellent dynamic characteristics and large flexibility.

If the grid is in the need of an energy management system (EMS), BWSC can upgrade the entire system to optimise performance and run the entire hybrid solution in the most economically viable manner, unlocking OPEX savings. BWSC can include all components in a turnkey contract.



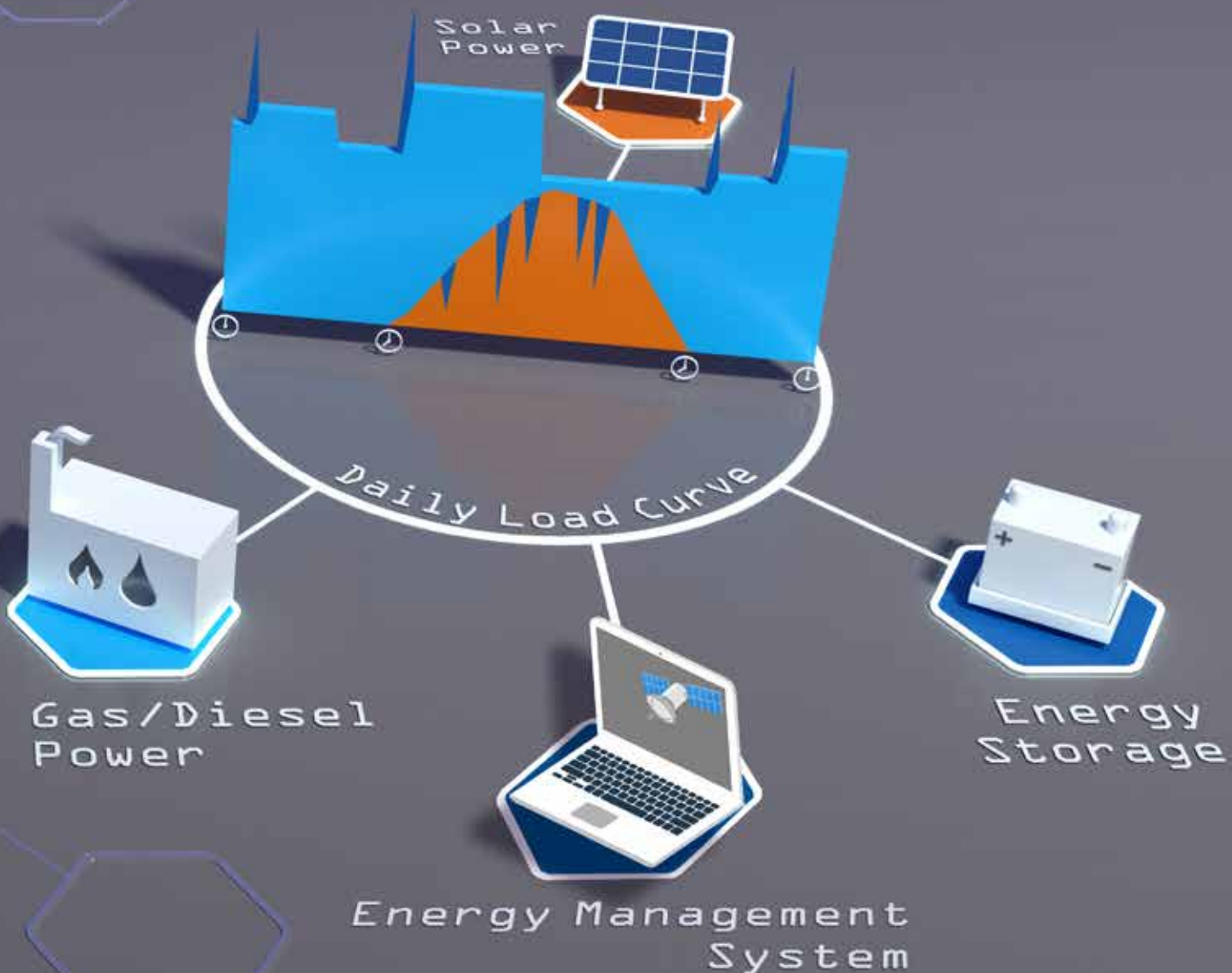
Solution case

OFF-GRID HYBRID POWER

BWSC's hybrid power solutions for off grid applications is an attractive alternative to conventional power solutions.

In off-grid hybrid solutions, generation from solar PV serves as cost efficient fuel saver for the reciprocating engines. The reciprocating diesel or gas engines generate power to balance the supply and demand of power in the system. In cases where short term demand peaks are frequent, energy storage systems can shave the peaks in the demand and provide power regulation support to the reciprocating engines. Introduction of energy storage systems in some cases substitute investments in engine capacity.

As part of the off-grid hybrid system, BWSC will install an energy management system (EMS), optimising performance in the most economically viable manner, unlocking OPEX savings. This can be included in the turnkey contract.



Your global energy partner

BWSC

Access to reliable, low-cost energy is essential to achieve sustainable economic growth and the opportunity to develop business and society. Utilities, independent power producers (IPPs) and power-generating industrial companies are increasingly dependent on their ability to maximise the efficiency of their assets, and they need business partners who understand the core of their business.

Burmeister & Wain Scandinavian Contractor A/S (BWSC) is a world-leading turnkey contractor and operator for medium and large diesel engine-based and gas-based power systems. Further, BWSC has vast experience in biomass technologies, and our expertise ranges from all aspects of plant design to rehabilitation, operation, maintenance, service and financing. BWSC has recently entered new markets for waste-to-energy and hybrid power by teaming up with leading energy solution companies.

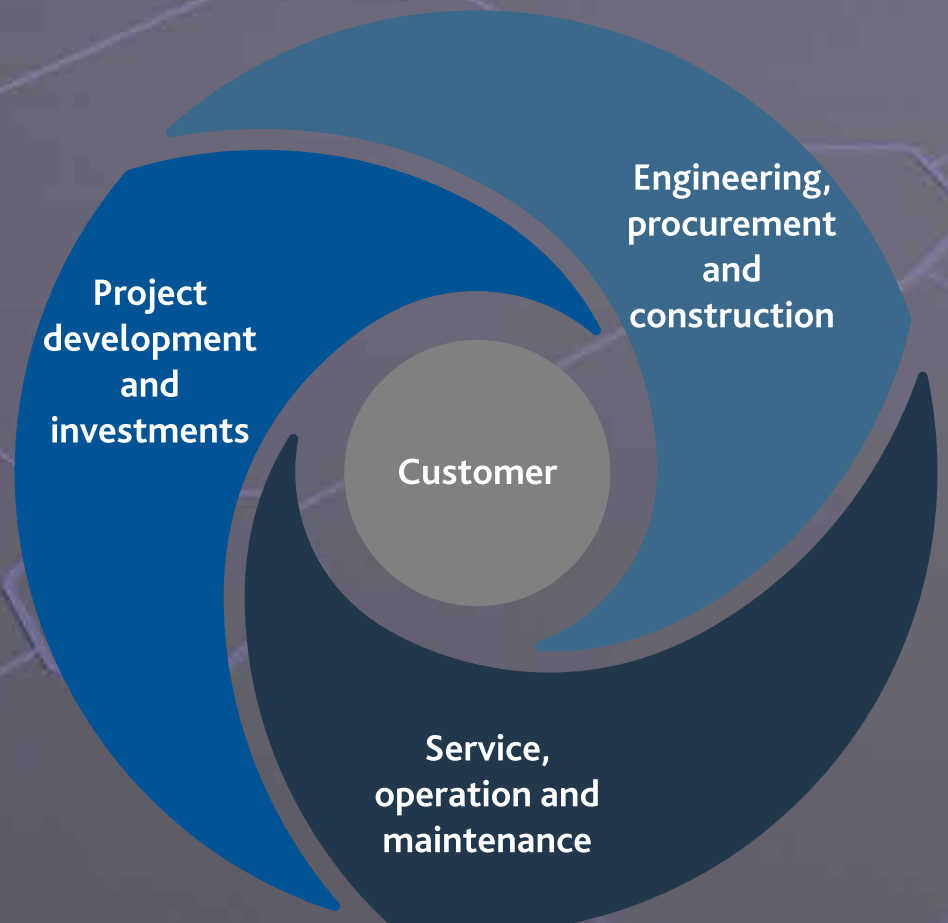
BWSC takes a leading role in the development of IPP companies. This comprises the establishment of all commercial and legal agreements, including power and fuel purchase contracts, and the financing, insurance and land lease arrangements, etc. In addition to the initial role of developer, BWSC undertakes the supply and construction of the complete plant on a turnkey basis and provides operation and maintenance (O&M) services for the lifecycle of the plant.

BWSC has supplied more than 180 power plants to 54 countries, with a total generating capacity in excess of 4,100 MW. In addition to turnkey power plants, BWSC's product range includes transmission lines, distribution systems, generation services, training, spare parts and power plant rehabilitation.

BWSC has its origin in the stationary engine division of Burmeister & Wain (B&W), which has built and installed diesel engines since 1904. BWSC was established in 1980 as a separate specialist company with the aim to develop their known technologies into high-efficient power plants. Since, the company has evolved into a full turnkey contractor and developer of power plant projects all over the world. In 1990, BWSC was acquired by, Mitsui E&S Holdings Co., Ltd., Japan.

Main activities

BWSC assist customers worldwide throughout the entire or specific phases of a power plant's life cycle.





Project development and investments

PDI

BWSC takes an active role in establishing the commercial, financial and legal arrangements needed to develop, construct and operate an IPP plant.

Key areas:

- Project agreements – concession, power purchase, fuel supply
- EPC and O&M agreements
- Project/corporate structuring and financing
- Credit agreements and collateral security documents
- Equipment and technology selections
- Permitting, authorisations, licenses
- Environmental and social impact issues
- Insurance
- Tax structuring
- Risk mitigation



Engineering, procurement and construction

EPC

As a turnkey contractor, BWSC takes responsibility for:

- Plant design and engineering
- Project management
- Procurement of equipment and materials
- Testing and commissioning
- Construction schedule and guaranteed completion date
- Performance guarantees for
 - Production
 - Heat rate
 - Emissions
 - Lube oil consumption

Advantages for customers:

- Tailor-made and optimised technical solutions
- Secure aligned interest with investors
- Supervision of complex technical tasks
- Management of project interfaces
- Compensation for late completion
- Mitigation of technology risks



Post-construction services

BWSC takes responsibility for:

- Plant management, operation and maintenance
- Sourcing and delivery of spare parts
- Sourcing and delivery of consumables
- Health and safety as highest priority
- Performance guarantees for
 - Production
 - Heat rate
 - Emissions
 - Lube oil consumption

Advantages for IPP stakeholders:

- Competitive OPEX
- Predictable lifetime costs
- Mitigation of operating risks
- Continuous optimisation of the plant
- Sustained asset value through best practice operation and maintenance
- Maximum return on investment (ROI)

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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
- 750 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, 2018 revenues: EURm 290.



Burmeister & Wain Scandinavian Contractor A/S