

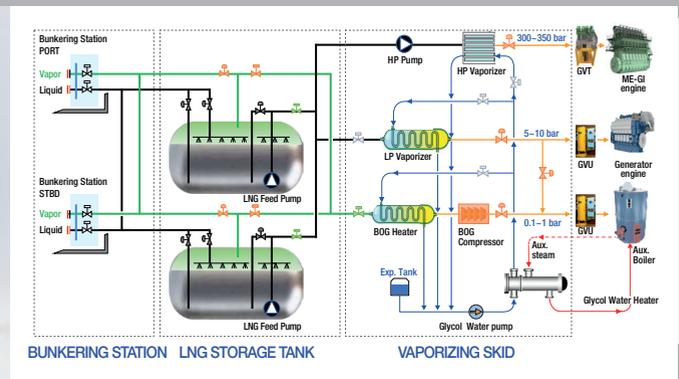
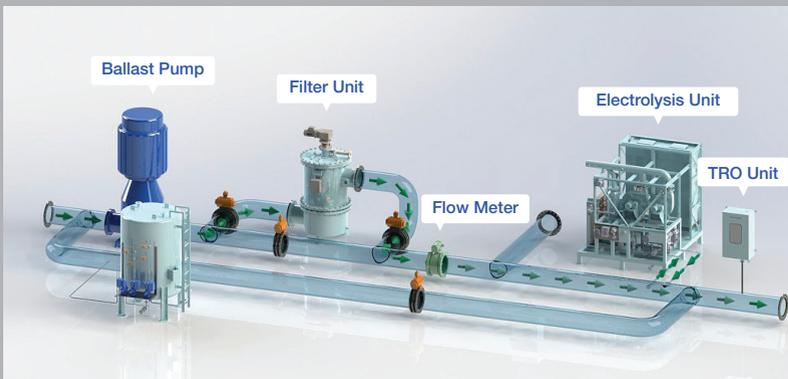


# Energy Storage System

# WHO WE ARE?

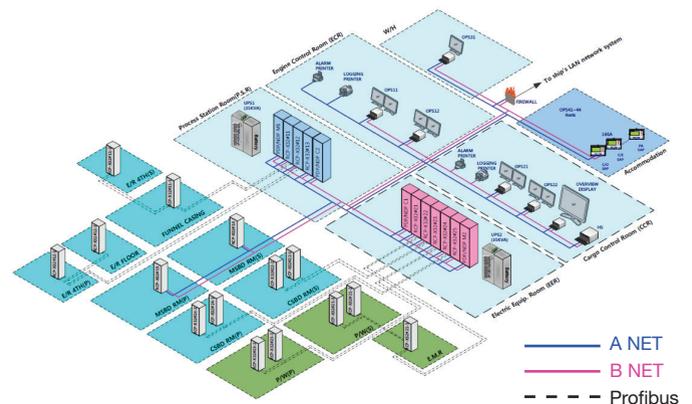
S&SYS

S&SYS has been established as a spin off the Machinery & Electric system team of the Samsung Heavy Industries in 2017 Based on technologies and knowhow accumulated over 25 years in the shipbuilding and marine field, we have developed key equipment such as Ballast water management system(BWMS), ship automation system, switchboard and Fuel gas supply system for LNG/LPG fueled ships to clients all over the world. Drawing on the technological collaboration it has with Samsung Heavy Industries for ESS, S&SYS combines the control system it has accumulated in-house with the technologies and know-how on power solutions to bring you closer to a carbon neutral era through ESS for ships.



## System Integrator for All electric & hybrid ships

S&SYS aims to be a leading company for designing and delivering the best suitable electric system to make ship operable in her best condition. With guaranteed quality performance of own ESS, Switchboard and automation system, we find and procure optimized products for ship's safe, efficient and economical operation under the strong collaboration with partner, which we had made for decades. The future lies in environment-friendly vessels brought to you through sole or combination of next-generation energy sources for vessels and cutting-edge technology, including battery systems, hydrogen fuel cells, solar power and wind power. And at the center of that future is S&SYS.



Now we are ready for the ship's future with ESS. If you ready for the journey with us either, please kindly contact [sales@snsys.net](mailto:sales@snsys.net)

# What is Energy Storage System?

ESS

Energy storage system is the solution that helps to use energy stored in Lithium-ion battery in the most economical and efficient situation. As it became possible to place vast amounts of energy within a small battery, we are now entering an era where ships, too, are powered by ESS.

When it is used for ships, the ESS is charged by using one or multiple charging sources (Diesel generator sets, shaft generator and shore power) and supply the stored energy when ship needs power by using converter.

Pure electric ships, 100% purely powered by the energy of ESS, allow the power of the charged ESS to be used as a main force in the motors that rotate the propellers. and it makes us to achieve ZERO emission goals.

Hybrid electric ships using a part of energy from ESS, since it can use charged energy in ESS when ship reaches peak load, the peak load is shaved by the energy of ESS, then the capacity of diesel generator sets can be decreased. By operating the diesel generator sets at the optimal performance condition with less number of engines and less operation time, it leads to the fuel oil consumption savings(Less CO<sub>2</sub> emission) and less maintenance costs.

Due to regulations to rein in CO<sub>2</sub> emissions and other environmental regulations that continue to be tightened, the installation of ESS on all types of ships is no longer an option but a must.

## Why apply the ESS to Ship?



Reduced generators capacity



Reduced fuel consumption for generator



Reduced generator running hours & maintenance



Prevented black-out and improved grid stability



Reduced black smoke for sudden load



## Possible applications

We are ready to propose the Best optimized solution for ESS.

### LNG carrier

Power supply to heavy consumer (especially, cargo operation)

### Drillship

Drilling load sharing, Back-up for dynamic positioning

### Retrofits for Existing ships

Ships are in shortage of power after SOx Scrubber & BWMS installation

### Merchant ship

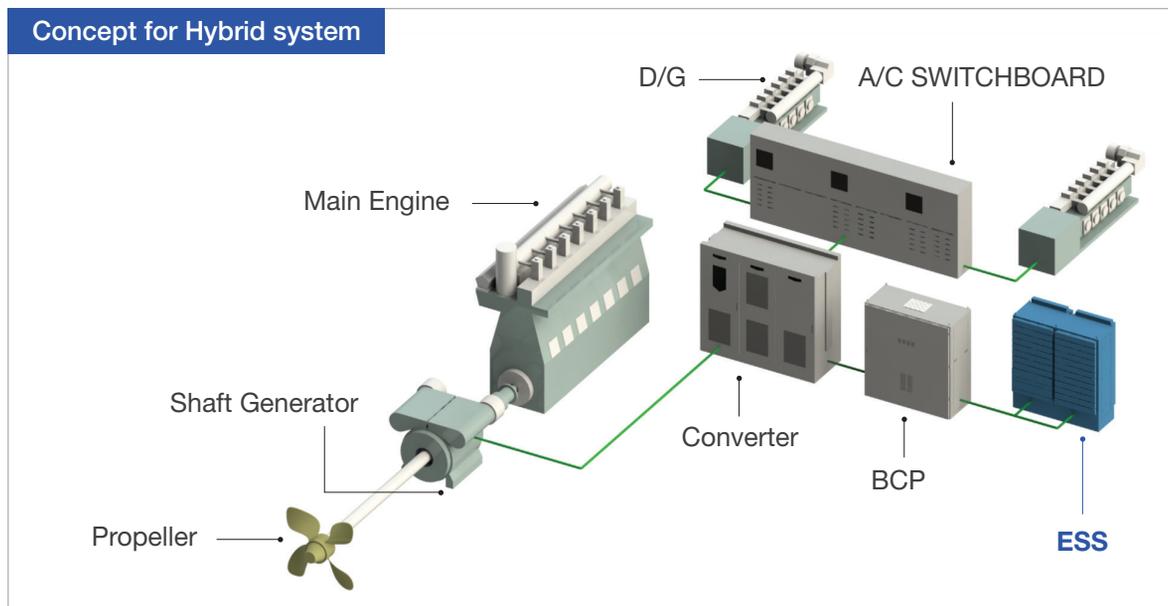
Power supply to temporary load (ex. thruster, refrigerated container)

### Cruise, Ferry, Tug & Small ships

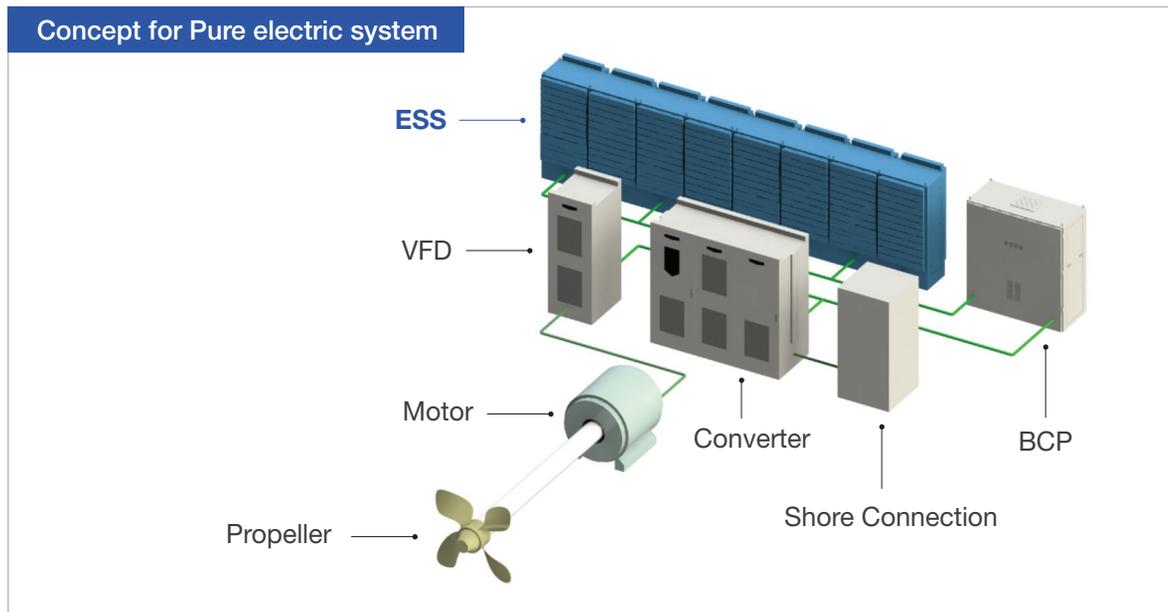
Main propulsion power supply for pure electric ships  
Auxiliary power supply for Hybrid ships

## System configuration (Example)

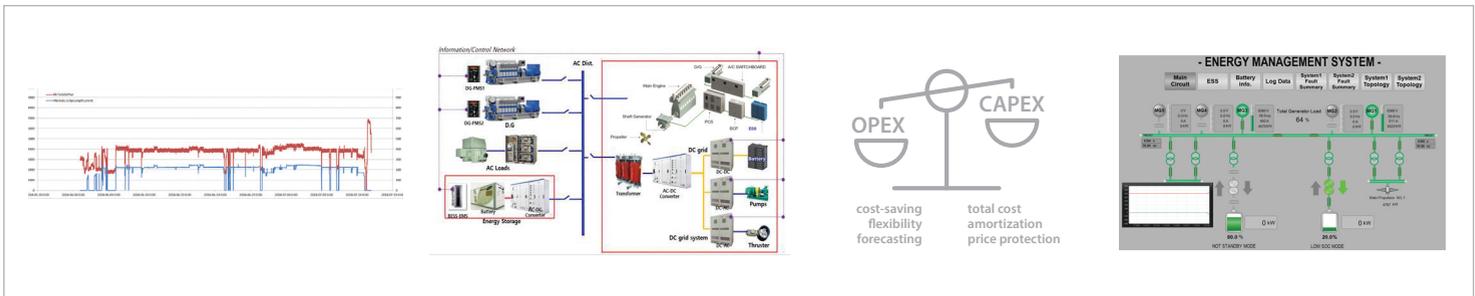
### Concept for Hybrid system



### Concept for Pure electric system



## Working principle



Analyze vessel operating data > Design system configuration > Analyze CAPEX/OPEX > Provide optimum condition

## System specifications

Single Module BBU	Power 66	Power 75	Energy 88
C Rate RMS (Continuous)	3C	3C	1C
Cycle Life @ 80% DoD	15000 cycles	15000 cycles	13000 cycles
Cell Chemistry	NMC	NMC	NMC
Dimensions	L 580mm, H 380mm, W 320mm	L 580mm, H 380mm, W 320mm	L 580mm, H 380mm, W 320mm
Weight	93kg	93kg	93kg
Energy	6.6kWh	7.5kWh	8.8kWh
Capacity	75Ah	85Ah	100Ah
Voltage Range	77-100VDC	77-100VDC	77-100VDC
Nominal Voltage	88.8VDC	88.8 VDC	88 VDC
RMS Continuous Current	225A	225A	100A
Max Discharge Current	450A	450A	200A
Max Charge Current	225A	225A	100A
Connectors	IP67	IP67	IP67
Terminal Isolation at Module	Contactator	Contactator	Contactator
Thermal-Stop™ Thermal Runaway Protection	Yes	Yes	Yes
Self Discharge Rate/Month	<2%	<2%	<2%
Internal resistance	13.2mΩ	9.6mΩ	13.2mΩ
Efficiency (at 1C)	>98%	>98%	>98%
Electrical Isolation	Open circuit when not in operation	Open circuit when not in operation	Open circuit when not in operation
Communication interface	UDP	UDP	UDP
Series String (1000V)	Power 66	Power 75	Energy 88
Dimensions (including racking, venting and lifting apparatus)	W 896mm, H 2550mm, D 632mm	W 896mm, H 2550mm, D 632mm	W 896mm, H 2550mm, D 632mm
Weight	1265 kg	1265 kg	1265 kg
Energy	66kWh	75kWh	88kWh
Capacity	75Ah	85Ah	100Ah
Voltage Range	770-1000VDC	770 - 1000VDC	770-1000VDC
Nominal Voltage	888VDC	888 VDC	880VDC
RMS Continuous Current	225A	225A	100A

# Energy Storage System Global Network



ASIA	
KOREA	S&SYS Co.,Ltd. (HQ)
KOREA	STK Engineering Co.,Ltd.
KOREA	JEWON Engineering Co.,Ltd.
KOREA	STA
KOREA	DEX
CHINA	Seven Seas Electronic Co.,Ltd.(Shanghai)
CHINA	Seven Seas Electronic Co.,Ltd.(Qingdao)
CHINA	Seven Seas Electronic Co.,Ltd.(Dalian)
CHINA	SAMSUN Marine Technology(HK) Co.,Ltd.
CHINA	Health Lead Development Co.,Ltd.
CHINA	SJE Engineering Co.,Ltd.
CHINA	SSMT
INDIA	Indostan Corporation
JAPAN	Orient Marine Co.,Ltd.

JAPAN	JRCS Co.,Ltd.
JAPAN	Tsuneishi Co.,Ltd.
JAPAN	Union.Co.,Ltd.
SINGAPORE	Treys Ple Ltd.
SINGAPORE	Mitsui & Co (Asia Pacific)
TAIWAN	YL Maritime Co.,Ltd.
CENTRAL AMERICA	
PANAMA	PASRAS S.A
MIDDLE EAST	
U.A.E	MARITRONICS
U.A.E	Tensosys
NORTH AMERICA	
USA	MarineBCTec(LA)
USA	MarineBCTec(NJ)

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EUROPE	
GERMANY	Mare systems
ITALY	MASTER CONTROL
GREECE	D.C.S.I Ltd.
TURKEY	Oceanist
AFRICA	
Nigeria	Radial Circle

\*\* Sales Agency



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