

# SPECIAL SEISMIC CERTIFICATION

*Shake Table Tested* OSP-0826



## **BSD SSC Power Plant**

Specifically engineered to meet California's OSHPD/HCAi seismic requirements by adding additional strength to the overall packaged solution. The BSD SSC Power Plant provides customers with resiliency in case of a power outage by the ability to run on two types of fuel sources as required. Once integrated with the BSD Microgrid Distribution Panel, it will connect directly into the customer's electrical infrastructure allowing operation with the utility as well as when the utility is not available.

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The BSD SSC Power Plant product line consists of two configurations utilizing the 2G gas engine designs – rich burn and lean burn. The rich burn solutions ranges from 100 to 420 kWe in size and is ideally suited to customer applications that prioritize great thermal output, low operating costs and structural compactness. The lean burn includes the following sizes: 600, 800 and 1000 kWe. Per the requirements of HCAI, the units are oversized at a minimum of 125% of peak load for the specific project. When sites require lower demand, 2G uses an integrated load bank for energy demand flexibility. The required minimum gas pressure at full load is 0.29 psig.

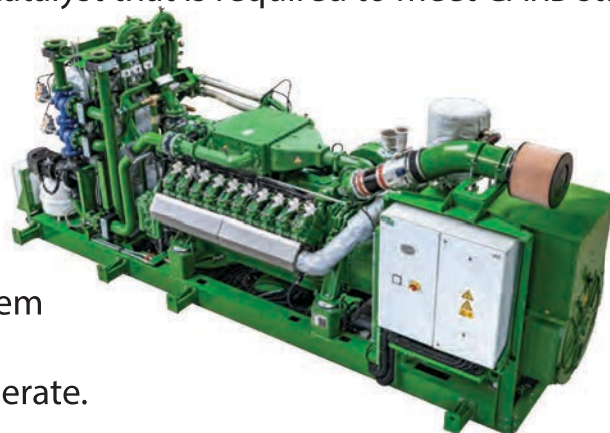
The BSD SSC Power Plant complies with the following standards: DIN EN ISO 9001, ISO 8528-3, UL508A, UL778, UL1004, UL1446, UL2200 Field Inspected and NFPA37.

MODEL	ELECTRICAL	ENERGY INPUT	RECOVERABLE THERMAL	EFFICIENCY		
				ELECTRICAL	THERMAL	TOTAL
BSD SSC 100	100 kW	968 MBTU	361 MBTU	35.3%	37.3%	72.6%
BSD SSC 135	135 kW	1,326 MBTU	525 MBTU	34.7%	39.6%	74.4%
BSD SSC 170	170 kW	1,615 MBTU	616 MBTU	35.9%	38.2%	74.1%
BSD SSC 200	200 kW	1,856 MBTU	658 MBTU	36.8%	35.4%	72.2%
BSD SSC 280	280 kW	2,564 MBTU	946 MBTU	37.3%	36.9%	74.2%
BSD SSC 420	420 kW	3,850 MBTU	1,420 MBTU	37.2%	36.9%	74.1%
BSD SSC 600	600 kW	4,988 MBTU	2,925 MBTU	41.0%*	46.0%	87.0%
BSD SSC 800	800 kW	6,480 MBTU	2,859 MBTU	42.1%*	44.1%	86.2%
BSD SSC 1000	1000 kW	8,074 MBTU	3,608 MBTU	42.3%*	44.7%	87.0%

\*Includes energy from engine exhaust.

The BSD SSC 100 to 420 kWe utilizes the Lambda-1 technology which is the heart and soul of the aura series. It was developed in-house by 2G and is based on the precise ratio of fuel and air theoretically required to completely burn the fuel. This provides very low levels of NOx in the exhaust emissions. In addition, 2G includes a 3-way catalyst that is required to meet CARB standards within California.

- Low emissions
- High heat efficiency
- Reliable, service-friendly engine
- Designed as a ready-to-connect solution
- Higher performance than 15% of conventional system with the same displacement
- Hydrogen Proven – can run up to 40% H2 with no derate.



For systems above 600 kWe, the BSD SSC Power Plant utilizes the 2G avus architecture. The avus is a highly-efficient engine that is used in larger industrial projects and microgrids. The engines are designed with a lean burn concept, which provides the lowest fuel consumption possible while maintaining engine stability and performance.

- The BSD SSC Microgrid system is modular and includes all components.
- Interconnection of multiple units allows for higher electrical output. The BSD SSC Microgrid Controller enables synchronization and load sharing up to 5 modules.
- Efficient running mode and operation times due to excellent engine quality.
- Hydrogen Proven: The BSD SSC Power Plant can run up to 100% H2 with optional equipment or 40% H2 without any changes.

## Fuel Type

The design of the BSD SSC engines provide fuel flexibility for any application. 2G Energy has designed these engines so that they can operate with a fuel blend or complete fuel change as the project may require. The BSD SSC Fuel Storage System utilizes a vertical fuel storage tank filled with compressed natural gas as a secondary fuel source. The BSD SSC units are designed to run on pipeline natural gas, but when the natural gas infrastructure is down during an emergency, it will switch over to the stored CNG on site automatically with no service interruption.

## DESIGNED FOR RELIABILITY & SAFETY

**The BSD SSC Power Plant provides full integration of alarms and automatic shutdown of the unit. This integration includes the following:**

- Monitoring/Control of engine operation achieving engine power regulation and constant exhaust temperatures. Fully integrated Generator Protection relay, including reverse power, voltage, frequency, and overload protection
- Temperature detection for individual cylinders and knocking sensors with alarm and fault capabilities
- Ignition system monitoring which helps in detecting ignition failures. Remote and local audible/visual alarms
- Control and regulation of all auxiliary drives and additional actuators including ventilation louvers
- Exterior and interior Emergency Stop control via safety chain with safety relay. Exit signage and safety placards posted
- Methane, Carbon Monoxide and Smoke Detection are included
- Grid monitoring: Voltage and frequency monitoring for generator and grid as well as monitoring reserve power and automatic overload protection



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## Long Term Maintenance Agreement

The BSD SSC Microgrid system has partnered with 2G Energy which provides top rated industrial CHP maintenance as well as provides parts and service support for the BSD SSC Power Plants as required by our customers.

The BSD SSC Power Plant has a 20-25-year useful life provided that the owner/operator follows the preventative maintenance schedule and the detailed tasks under the Platinum agreement as prescribed by the manufacturer. 2G Energy includes a 10-year Platinum maintenance plan that will provide full coverage of the products during that term. This will include a planned or corrective maintenance that is needed during the term as well as a site supervision from a 2G operator. The following is the Coverage that is included with the Platinum maintenance agreement.



### Coverage

The Platinum maintenance package is the most comprehensive maintenance package offered by 2G. It covers all preventative and corrective maintenance of the covered unit(s) as defined in Schedule B and includes all parts, labour and travel in accordance with the below:

<b>Preventative Maintenance</b> All preventative maintenance according to the OEM maintenance schedule excluding overhauls which are listed as separate line items.	
<b>Fluids</b> Oil and Glycol will be changed based on sample results or a pre-determined interval and includes supply, filters, and sample bottles (samples to be taken by operator).	
<b>Corrective Maintenance / Breakdown Coverage</b> Covered Unit(s) coverage in the event of an unplanned breakdown or failure under normal operating conditions and OEM operating requirements.	
<b>Minor Overhaul</b> Minor overhaul according to the OEM maintenance schedule listed as M5	
<b>Major Overhaul</b> Major overhaul according to the OEM maintenance schedule listed as M7	
<b>After Hours Remote Support</b> After hours remote support via service email and service hotline, with tech intervention on site if required.	
<b>Availability Guarantee</b> Guaranteed system availability of 91% when maintained in accordance with this agreement	
<b>System Operations</b> A weekly site visit by 2G to perform operations required under the OEM operations log, including starting, stopping, adjusting system operation points, maintaining a clean and professional jobsite, and responding to alarms and trips on the 2G scope of supply.	
<b>Remote operations and Monitoring</b> 2G will support operations remotely and maintain remote monitoring of the system to support in all O&M functions	



**BSD SSC Power Plant advantages:**

The BSD SSC Power Plant is mounted on a robust, torsion-resistant base frame. This design ensures optimal accessibility of all components and parts, thus saving time and effort during service.

- Modular assembly enables transport and delivery in sub-components
- Compact design enables installation in areas with spatial restrictions
- Specially configured sound insulation elements insulate the installation site from the structure-borne sound of the frame. The transmission of engine vibrations to the frame is reduced by absorbers underneath engine and generator. As a result, engine vibrations do not transfer to the installation site surface.
- Powder-coated frame surface (structured paint) ensuring permanent anti-corrosion protection
- Oil collection trough integrated in the module frame
- Electrical sub-distribution and cable routing integrated in the module frame

**Water / gas transfer points:**

The following water/gas transfer points are integrated and ready-to-connect

- Gas connection
- Exhaust connection
- Heating circuit connection
- Emergency cooling circuit connection

**Electrical connections / energy supply company interface**



## Additional BSD SSC Power Plant Details:

The BSD SSC Power Plants are highly efficient, and robust Combined Heat and Power (CHP) system for the cogeneration of heat and power. The system is delivered as a compact, ready-to-connect module. The system allows for different modes of operation, focusing either on the production of electricity or the production of heat while being seamlessly and flexibly switchable between full and partial load to respond to the current energy demands.

## Depending on the Model, the system meets the requirements of the following essential norms and guidelines:

- Manufactured according to DIN EN ISO 9001
- Generators according to IEC 60034, NEMA MG 1.32-33, ISO 8528-3
- Generators according to UL1446 (UL1004 upon request), CSA C22.2 n°100-14
- Gas train according to NFPA37 (USA)/CSA 149.3 (natural gas in Canada) / CSA 149.6 (biogas in Canada) (others upon request)
- Pumps according to UL778
- Control panels according to UL508A/CSA22.2 No.286
- UL2200 Field Inspected (USA, upon request)
- ESA Field/Factory approval (US & Canada)

## Basic module 60 Hz / 480 V (UL 1446 & UL 1004) bt NG

In addition, this power plant also includes the ready-to-connect heat extraction. Aside from the existing interfaces for gas, electricity and exhaust gas, all water circuits can also be directly connected.

## The BSD SSC Power Plant complies with the following essential standards:

- Generator according to UL 1004 & UL 1446
- Switchgear according to UL 508 A
- Gas train according to NFPA 37
- Installation inside module according to Multinorm

A factory test and standard documentation (including warning notices) are also included on delivery.

**Enclosure Footprint:** 315" (8m) x 116" (2.95m)

**Enclosure Weight:** SSC100/135 (34,750 lbs), SSC170/200 (36,550 lbs), SSC280 (37,600 lbs), SSC420 (38,640 lbs)

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