DNV·GL

VERIFICATION STATEMENT

FOR HOLCOMB ENERGY SYSTEM

Statement No:
N141VC7H
Rev.01

Valid for products not subject to DNV GL classification requirements.

Particulars of Product

Product Name:	**Holcomb Energy System**
Type designation:	**Prototype Generator**
Application/context:	**Solid-State Power Generation**
ID/Serial/Tag no:	**Prototype System**
The product is intended for:	**STOCK**
Requirements are based on:	**per Customer specifications**

Deviations and limitations, if any, are stated on page 2 onwards.

Particulars of Vendor and Purchaser

Vendor:	**Holcomb Scientific Research Ltd.**
Vendor reference:	**PO 0000A-1**
Purchaser:	
Purchaser reference:	

Issued at **Houston, Approval CMC** on **2019-11-04**

for **DNV GL**

This document has been digitally signed and will therefore not have handwritten signatures

Rektorik, Chad
Surveyor

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Statement No: **N141VC7H**
Rev.01

Verification extent and result

Verification extent:
Witness as independent third party of Holcomb Energy System: Solid-State Power Generation testing conducted on 2019, August 13 and 14 as documented on Holcomb Witness Performance Test Report: HES-000-2 (Revision 08-19-2019)

Verification result/comments:
Results were as documented

Surveyor Supplementary information:
Revision 1: Survey report revised to update stamping notes on attached client report.

Report
Outline of testing (see attached test report):
-Calibrations of instrumentation by comparison to calibrated Fluke 289 True RMS Multimeter
-Power efficiency testing of the Holcomb Energy System compared to two standard off the shelf generators
-Holcomb Energy System self-sustaining, self-charging power generation (6 hour performance test)
-Shut down/run down of Holcomb Energy System (witness of battery decay due to removal of charger regeneration "looping" system)
-Holcomb Power Source demonstration

Witness Performance Test Report Number: HES-000-2 Revision: 08-19-2019 Holcomb Energy System

Witnessed by:
DNV GL USA
Project #A0727967

Order/Project Id: A0727967

☑ Witnessed ☐ Reviewed
And found to comply with:
HSR Testing Protocol
(2019-Aug-07)
Date: 10/30/2019
Sign: CREK

Applicable only to the following parts of the report,
- Test procedure(s) undertaken
- Set-up of equipment used for test(s)
- Set-up arrangement of the test equipment used
- Confirmation that calibrated test equipment was used during tests
- Recorded results (data) during testing

For:
Holcomb Scientific Research Ltd.
Dublin, Ireland
August 13 – 14, 2019

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08/19/2019

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DNV GL Witnessed Test Report

Holcomb Energy System: Solid-State Power Generation

Introduction

This report is issued by Holcomb Scientific Research Ltd., in regards to the testing of the Holcomb Energy System (HES) undertaken on the 13th August 2019 and 14th August 2019 in the presence of a representative (as an independent third party) from DNV GL, located at the laboratories of Holcomb Scientific Research Ltd., in Bradenton, Florida. The observed and witnessed testing protocol was designed and executed to demonstrate the working parameters of the new, ultra high efficiency Holcomb Energy System (HES) and to provide insight into the source of energy powering the HES since the system is absent a fuel source.

The purpose of the witness testing is as follows: to compare the electric power generating efficiency of the HES to the power generating efficiency of two "off the shelf" standard electric power generators in side by side comparison tests using an identical power source and identical measuring meters and load banks; to demonstrate the capacity of the HES to operate indefinitely in self-powering, self-sustaining fashion while simultaneously powering a load, without the use of an outside fuel source; to demonstrate that the power source to operate the HES indefinitely while simultaneously powering a load does not originate from the HES onboard capacitor/battery bank; and finally to demonstrate the actual energy source from which the power to operate the HES originates.

In side by side comparison testing, it will be demonstrated that the HES is dramatically more efficient than the two standard "off the shelf" generators.

It will also be demonstrated that the ability of the HES to produce multiple times more power output than is required to operate it allows a self-regenerating loop to self-power the system while simultaneously supplying power to an electrical load, without the use of an outside fuel source and with no decline of the operative voltage of the HES onboard capacitor/battery interface.

It will also be demonstrated that the power to run the HES does not originate with its onboard capacitor/battery interface. In a demonstration test the self-regenerating looping system will be shut off, and the HES will be powered only by its onboard capacitor/battery interface. Within a short period of time, the operating voltage of the capacitor/battery interface will decline, rendering the system inoperable.

Finally, a demonstration test site will reveal where the actual power to run the HES originates.

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The HES was wired to demonstrate the method of its power magnification capacity by harvesting the energy from the magnetic domains of the rotor metal. When sequenced with the HES onboard computer system, the resulting powerful magnetic poles allows the HES to operate indefinitely without the use of an external fuel source.

The HES was developed to provide a unique method of harnessing the energy from magnetic domains generated by the electron spin of unpaired electrons in the atoms of ferromagnetic and paramagnetic materials. This test station was utilized to demonstrate that the energy produced from the magnetic domains was over and above the energy required to excite or align the magnetic domains. This explains how the HES is able to significantly magnify its power output.

The harnessing of the energy from the spin of these unpaired electrons in the magnetic domains are most certainly the source for the energy that powers the Holcomb Energy System.

Scope of Services

The following functions were performed by the HSR team in the presence of the representative from DNV GL.

1. **Witness Orientation**. The witness was first oriented to the HES technology and to the equipment being used by the HSR staff. [See appendix p.17]

2. **Calibration of Instruments**. All instruments were calibrated by comparison to a Fluke 289 True RMS Multimeter (Calibration Certificate Number 10050541 by Byram Laboratories, See Appendix p. 18). The load that was utilized to calibrate the instruments was 4.58 KW from a WEG 3-phase four pole 1800 rpm motor with an applied load by an Avtron load cell.

3. **Power Efficiency Testing of the HES Compared to Two Standard Off the Shelf Generators**. Side by side electric power generation efficiency testing was performed on the HES [See Appendix p. 19] compared to the performance of two standard "off the shelf" generators, a 2.6 KW and a 24 KW [see Appendix p. 20].

   For this comparison, the HES and the two "off the shelf" generators were powered by the same 3-phase 208 volt utility power from Florida Power and Light (FPL). The power conversion efficiency was calculated by measuring the total kilowatts of power required to drive the system (power input) divided into the total kilowatts of power output by the system to an electrical load. All three, the HES and the two "off the shelf" generators, were tested with mixed monitored loads. The power output was then divided by the power input.

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Efficiency = $\frac{\text{KW Output}}{\text{KW Input}}$

Measurements were taken on "power in – power out" using the above referenced calibrated multimeters. All three output loads were tested utilizing an Avtron 100 KW portable AC load bank. The input and output loads were measured utilizing identical Dent Elite Pro XC TM Portable Power Data Loggers along with calibrated hand-held multimeters.

4. **HES Self-Sustaining, Self-Charging Power Generation**. The HES was setup in a self charging, self-sustaining "looping" mode and ran for 6 hours with no decreased voltage of the onboard capacitor/battery bank. The system was setup with output to a mixed load consisting of a motor load, a resistive load bank and a recharging system consisting of AC to DC power supplies and routing relays. The recharging system fed DC power into the capacitor-battery interface. The startup of the system requires power from this capacitor-battery interface. The system then powered itself while simultaneously powering an electrical load with no deterioration in voltage of the onboard capacitor-battery bank. In previous runs, the HES was operated continuously for 24 hours, also with no deterioration of the voltage in the onboard capacitor/battery bank interface.

5. **Shut Down/Run Down to Demonstrate the Power to Operate the HES is Not the Onboard Capacitor/Battery Bank**. In this test the charger regeneration "looping" system was turned off, leaving the system to be powered solely by the onboard capacitor-battery bank. Absent the self-charging capacity of the HES looping system, the voltage of the capacitor-battery bank rapidly declined, rendering the system inoperable.

6. **Demonstration of Actual HES Power Source**. Since the HES operates with no outside fuel source, a demonstration was performed to illustrate the source of its power generation and magnification capacity. The HES was developed to provide a unique method of harnessing the energy from magnetic domains generated by the electron spin of unpaired electrons in the atoms of ferromagnetic and paramagnetic materials.

   At this station, the observer was exposed to two experimental coil groups which were constructed in an identical fashion except that the laminates of one of the units was made of M19 electrical steel while the laminates of the second unit were constructed of plexiglass. The electrical steel unit contains magnetic domains in the metal while the plexiglass unit does not contain magnetic domains.

   Two sets of demonstrations were performed. The coils of the plexiglass unit and the coils of the electrical steel unit were connected in series in the same circuit with a Meanwell power supply. In the first demonstration all poles were north-pole wound.

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In the second demonstration, the poles were wound in alternating fashion, as north-south poles [see Appendix p. 58 – 65].

This experimental model clearly revealed that the HES generates greater than 4 times as much power as that required to excite and align the magnetic poles.

This demonstration illustrated that the energy source of the HES is derived from its ability to harness the energy from the magnetic domains of the electrical steel of the rotor poles. Magnetic domains are small groups of atoms which bond together into these areas called domains in which all the unpaired electrons in their spin patterns have the same magnetic orientation. The spin of the unpaired electrons of the atoms creates tiny magnets. The spinning of these electrons results in tiny but extremely significant magnetic fields. In most materials, atoms are arranged such that the magnetic orientation of one electron spin cancels out the orientation of another. In ferromagnetic substances, given their atomic makeup as unpaired electrons, smaller groups of atoms with like magnetic orientation bond together into domains in which all the electron spin orbitals have the same magnetic orientation. These domains are randomly aligned. However, when the domains are exposed to relatively weak magnetic fields, they all align in the same direction, creating a magnetic flux density many times the strength of the electromagnetic field required to align the domains.

This demonstration illustrated the power generation and magnification ability of the HES.

Results

Instrument Calibration. The hand-held multimeters were all calibrated utilizing a Fluke 289 Multimeter with a calibration certificate (see Appendix 7 and 8).

Fluke 289 Multimeter – Calibrated

Amps 14.80 L-L 210.30 L-N 121.53

Fluke 324 True RMS Clamp

Amps 14.46 L-L 209.90 V L-N 121.53 V

Klein CL800 True RMS Clamp - 1

Amps 14.78 L-L 210.43 V L-N 121.60 V

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Klein CL800 True RMS Clamp – 2

Amps 14.63   L-L 210.30 V   L-N 121-50

Side by Side Testing of the HES to Compare Its Performance to Two Standard "Off the Shelf" Single-Phase Generators (See Appendix 9 – 31).

Input – Measurement of Power Input to the Main Driver

2.6 KW "off the shelf" generators driven by a WEG 3-phase 3.7 KW 60 hz 1160 rpm electric motor.

Readings were taken with a Fluke multimeter 289 (Calibrated) and Dent Data Logger.

Input to Motor from FPL

Amps 5.246   Volts 209.56   pF 0.73

3-phase

KW = 209.6 x 5.246 x 0.73 x 1.73 = 1388.64 watts

Output to Load from Generator Single-Phase

Amps 2.63   Volts 141.08

Watts = 141.08 x 2.63 = 371.04

Efficiency = $\frac{371.04}{1388.64}$

= 0.27 or 27%

Input – Measurement of Power Input to the Main Driver

24 KW "off the shelf" generator driven by a WEG 3-phase 30 KW 60 hz 4-pole 1800 rpm electric motor.
Readings taken with a Fluke Multimeter 289 calibrated and Dent Data Logger.

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Input to Motor from FPL 3-phase

Amps 14.3 Volts 209.9 pF 0.67

KW = 209.9 x 14.3 x 0.67 x 1.73 = 3.479

Output to Load from Generator Single-Phase

Amps 4.430 Volts 299.4 pF 0.67

KW = 299.4 x 4.430 = 1.326

Efficiency = $\frac{1.326}{3.479}$

= 0.38

=38%

Input – Measurement of Power Input to the HES

Holcomb Energy System powered by 3-phase power from FPL used as single-phase.
Internal loop off.
Data taken from Dent Data Logger confirmed by Fluke 289 True RMS Multimeter (calibrated).

Load

1. Capacitor 1035 µF
2. Motors: 7 at 3hp
   1 at 1hp

Input Power – AC/DC Single-Phase

	Volts		Amps		KW
L1	119.00	L1	24.81	L1	2.932
L2	118.63	L2	24.53	L2	2.912
L3	119.60	L3	24.46	L3	2.912

Avg: 119.08

Total KW 8.739 AC Single-Phase

DC Input – 66 volts 108 amps

KW = 66 volts x 108 amps
KW = 7.128

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Output Power – AC 3-phase

	Volts		Amps		KW
L1-L2	358.70	L1	63.55	L1	12.82
L2-L3	377.00	L2	61.00	L2	10.21
L1-L3	371.80	L3	55.40	L3	11.89

Total KW: 34.92

Efficiency = $\frac{34.920 \text{ KW AC}}{8.739 \text{ KW AC}}$ = 3.996 I/O ratio or 399.6% efficiency

= $\frac{34.920 \text{ KW AC}}{7.128 \text{ W DC}}$ = 4.899 I/O ratio or 489.9% efficiency

Holcomb Energy System powered by 3-phase power from FPL

Internal Loop ON: 1.232 KW 1.232 KW taken off stator and looped onto rotor.

Data taken from Dent Data Logger confirmed by Fluke 289 True RMS Multimeter (Calibrated).

Load

1. Capacitor 1035 µF
2. Motors: 7 at 3hp
   1 at 1hp
3. Load Cell: 5 KW

Input Power AC/DC Single-Phase

	Volts		Amps		KW
L1	119.01	L1	20.36	L1	2.41
L2	118.23	L2	20.37	L2	2.40
L3	119.46	L3	20.17	L3	2.40

Avg: 118.9 Total: 7.220 or 7.2 KW

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Output Power AC – 3-phase

	Volts		Amps		KW	PF
L1-L2	288.903	L1	51.77	L1	9.764	0.64
L2-L3	301.304	L2	49.29	L2	8.528	
L1-L3	285.997	L3	44.86	L3	8.737	

Avg: 48.59 Total: 27.010 or 27 KW

Efficiency = $\frac{27.010}{7.220}$

= 374.1% = 3.741 I/O Ratio or 374.1% efficiency

Holcomb Energy System Powered by 3-phase Power from FPL. Internal Loop On.

Data taken from Dent Data Logger, confirmed by Fluke 289 True RMS Multimeter (Calibrated).

Load

1. Capacitor 1035 μF
2. Motors: 7 at 3hp
   1 at 1hp
3. Load Cell
4. Internal Loop

Input Power AC/DC

	Volts		Amps		KW
L1-N	118.81	L1	20.52	L1	2.44
L2-N	118.36	L2	20.55	L2	2.43
L3-N	119.58	L3	20.32	L3	2.43

Total: 7.290

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Output Power AC 3-Phase

	Volts		Amps		KW
L1-L2	266.36	L1	48.3	L1	8.89
L2-L3	278.63	L2	45.83	L2	8.01
L1-L3	260.54	L3	41.35	L3	8.89
				Total:	24.74

Efficiency – $\frac{24.74}{7.29}$ = 3.394 I/O Ratio or 339.4% efficiency

Input Changes with Increased Output to a Load

FPL Input: 7.277 with load cell 1.612 KW
7.386 with load cell 3.017 KW

Increase Input with Power Output

7.386 KW – 7.270 KW = 0.109 KW
3.17 KW – 1.612 KW = 1.405 KW

Therefore 0.109 KW increased input for 1.405 KW output

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HES Regenerative Loop and Efficiency Test (See Appendix pages 32 – 36).

Load

1. Capacitors: 75 µF
2. Motors: 1 at 1hp
3. Light bulb bank

Input Power from Battery/Capacitor Interface into HES Excitation System

Volts DC	Amps DC	KW (DC)
72	22.8	1.642

Output Power from Holcomb Energy System to Self-Regenerative Loop and Load

	Volts		Amps		KW
L1	131.40	L1	24.5	L1	1.387
L2	129.90	L2	22.20	L2	1.370
L3	119.0	L3	22.84	L3	1.400

Total: 4.157 KW

Input is taken from the generator output, therefore classic efficiency is not an issue.

Output: 4.157 KW Input: 1.642 KW

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Monitoring of the Battery/Capacitor Interface Voltage

The unit was put into a self-sustaining mode for 6 hours with no significant change in battery/Capacitor voltage.

	Time	Volts
1.	"0"	13.06
2.	½ hr	13.04
3.	1 hour	12.96
4.	1.5 hour	13.07
5.	2 hour	13.09
6.	2.5 hour	13.09
7.	3 hour	13.08
8.	3.5 hour	13.12
9.	4 hour	13.33
10.	4.5 hour	13.08
11.	5 hour	13.06
12.	5.5 hour	13.06
13.	6 hour	13.04

The HES powered itself and an electrical load for 6 hours with no drop in the battery/capacitor interface voltage.

Regenerative Loop Off

In order to demonstrate that the Holcomb Energy System was not powered by its onboard capacitor/battery interface, the regenerative loop was turned off. The HES was run on power solely from the battery-capacitor interface which progressively discharged (See appendix pages 37 – 40). The voltage of the capacitor-battery interface progressively declined, eventually causing the system to become inoperable.

The input to the HES taken from the capacitor/battery interface was 1389 watts. The output from the HES was 4118 watts. The battery/capacitor interface began to discharge immediately and dropped from 13.04 DC volts to 11.97 volts which amounts to 1.07 volts drop in 1 hour.

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Demonstration of the Actual HES Power Source

This test station was organized to reveal the true power source of the HES by comparing the flux density in plexiglass to the flux density in M19 electrical steel. Under identical experimental conditions in which all poles were of the same polarity, the average gauss reading for the plexiglass poles was 78 gauss. In comparison, the average gauss reading for the poles made of M19 electrical steel was 298.6 gauss, or 3.8 times greater flux density than the unit made of plexiglass.

Under alternating polarity, the plexiglass poles reveal a flux density of 106.25 gauss while the M19 electrical steel poles reveal a flux density of 1,206.5 gauss. That's 11.35 times more flux density than the unit constructed of plexiglass. This indicates that the unit constructed of M19 electrical steel creates 11.35 times more flux density than the plexiglass, which equates up to 11.35 times more power output in the HES.

Conclusions

In the presence of the representative of DNV GL, the testing of the Holcomb Energy System demonstrated the following;

1. **HES Ultra High Efficiency**

   In side by side performance testing, the HES is dramatically more efficient than the two standard "off the shelf" generators. For this demonstration, all three units utilized a common power supply and monitoring equipment.

   The two standard generators with electric motor drives were 29% efficient and 38% efficient.

   The HES efficiency derived from 3 test protocols was:

   - 374.1% efficient
   - 399.6% efficient
   - 489.9% efficient

   That is 4.899 units of power output for every 1 unit of power input.

2. **HES Self-Regenerating Capacity**

   The ability of the HES to put out 4 times as much power as is required for its operation allows a continuous self-regeneration 'loop' of the entire system, while the HES simultaneously powers an electrical load.

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For this demonstration, the HES ran for six hours with no depletion of its onboard capacitor/battery interface. At the start of the six hour run, the capacitor/battery interface voltage was 13.06. At the conclusion of the run, the capacitor/battery interface voltage was 13.04.

In a prior run, the HES was operational for 24 hours in a self-regenerating capacity with no decrease in voltage of the onboard capacitor/battery interface.

3. The HES is Not Powered by its Onboard Capacitor/Battery Interface.

It was demonstrated that the energy to run the HES does not originate with its onboard capacitor/battery interface. When the HES self-regeneration loop is disconnected and the HES is powered solely by its onboard capacitor/battery interface, the operating voltage of the capacitor/battery bank declines quickly and precipitously, making the system inoperable. The starting voltage of the capacitor/battery interface was 13.04. Within one hour of running time with the self-regeneration loop turned off, the capacitor/battery voltage dropped to 11.97 volts, a 1.07 volts drop in one hour. This further proves that the power to run the HES is not coming from its onboard capacitor/battery interface.

4. The Actual Energy Source of the HES

Lastly, an experimental test station was utilized to demonstrate that the energy to power the HES is most certainly derived from the alignment of the magnetic domains of the electrical steel which make up the rotor. This alignment results in powerful moving magnetic poles which, when sequenced by the HES onboard computer system, powers the HES without the need for an external fuel source while simultaneously powering an electrical load.

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