PATENT ASSIGNMENT COVER SHEET

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Stylesheet Version v1.2

EPAS ID: PAT4659388

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
ADVANCED ENERGY INDUSTRIES, INC.	09/13/2017

RECEIVING PARTY DATA

Name:	AES GLOBAL HOLDINGS, PTE. LTD.
Street Address:	18 TAI SENG
Internal Address:	#05-07
City:	SINGAPORE
State/Country:	SINGAPORE
Postal Code:	539775

PROPERTY NUMBERS Total: 11

Property Type	Number
Patent Number:	6392210
Patent Number:	6424232
Patent Number:	6567278
Patent Number:	6617679
Patent Number:	6661324
Patent Number:	6697265
Patent Number:	6724148
Patent Number:	6791274
Patent Number:	6888313
Patent Number:	6972079
Patent Number:	6979980

CORRESPONDENCE DATA

Fax Number: (970)407-5229

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 970-470-6229
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Address Line 4: FORT COLLINS, COLORADO 80525

NAME OF SUBMITTER:	JENNIFER ANDERSON
SIGNATURE:	/Jennifer Anderson/
DATE SIGNED:	10/26/2017
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 14
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Patent Assignment Agreement

This PATENT ASSIGNMENT AGREEMENT ("**Patent Assignment**"), dated as of September 13, 2017, is made by Advanced Energy Industries, Inc. ("**Transferor**"), a Delaware corporation, located at 1625 Sharp Point Drive, Fort Collins, Colorado, in favor of AES Global Holdings, Pte. Ltd. ("**Transferee**"), a private company limited by shares incorporated in Singapore, with its registered office located at 80 Robinson Road, #02-00, Singapore 068898. AEI and AESG may be collectively referred to herein as the "**Parties**."

WHEREAS, certain intellectual property has been conveyed, transferred, and assigned to Transferee, and Transferor has agreed to execute and deliver this Patent Assignment for recording with the United States Patent and Trademark Office and corresponding entities or agencies in any applicable jurisdictions.

NOW THEREFORE, The Parties agree as follows:

1. Assignment. For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Transferor hereby irrevocably conveys, transfers, and assigns to Transferee, and Transferee hereby accepts, all of Transferor's right, title, and interest in and to the following (the "**Assigned Patents**"):

(a) the patents and patent applications set forth in **Schedule 1** hereto and all issuances, divisions, continuations, continuations-in-part, reissues, extensions, reexaminations, and renewals thereof (the "**Patents**");

(b) all rights of any kind whatsoever of Transferor accruing under any of the foregoing provided by applicable law of any jurisdiction, by international treaties and conventions, and otherwise throughout the world;

(c) any and all royalties, fees, income, payments, and other proceeds now or hereafter due or payable with respect to any and all of the foregoing; and

(d) any and all claims and causes of action with respect to any of the foregoing, whether accruing before, on, or after the date hereof, including all rights to and claims for damages, restitution, and injunctive and other legal and equitable relief for past, present, and future infringement, misappropriation, violation, misuse, breach, or default, with the right but no obligation to sue for such legal and equitable relief and to collect, or otherwise recover, any such damages.

2. Recordation and Further Actions. Transferor hereby authorizes the Commissioner for Patents in the United States Patent and Trademark Office and the officials of corresponding entities or agencies in any applicable jurisdictions to record and register this Patent Assignment upon request by Transferee. Following the date hereof, upon Transferee's reasonable request, Transferor shall take such steps and actions, and provide such cooperation and assistance to Transferee and its successors, assigns, and legal representatives, including the execution and

delivery of any affidavits, declarations, oaths, exhibits, assignments, powers of attorney, or other documents, as may be necessary to effect, evidence, or perfect the assignment of the Assigned Patents to Transferee, or any assignee or successor thereto.

3. Counterparts. This Patent Assignment may be executed in counterparts, each of which shall be deemed an original, but all of which together shall be deemed one and the same agreement. A signed copy of this Patent Assignment delivered by facsimile, e-mail, or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original signed copy of this Patent Assignment.

4. Successors and Assigns. This Patent Assignment shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and assigns.

5. Governing Law. This Patent Assignment and any claim, controversy, dispute, or cause of action (whether in contract, tort, or otherwise) based upon, arising out of, or relating to this Patent Assignment and the transactions contemplated hereby shall be governed by, and construed in accordance with, the laws of the United States and the State of Colorado, without giving effect to any choice or conflict of law provision or rule (whether of the State of Colorado or any other jurisdiction).

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[SIGNATURE PAGE TO PATENT ASSIGNEMENT]

IN WITNESS WHEREOF, Transferor has duly executed and delivered this Patent Assignment as of the date first above written.

Advanced Energy Industries, Inc.

By: _____
Name: Steven Mason
Title: Assistant Secretary
Address for Notices:
Legal Department
Advanced Energy Industries, Inc.
1625 Sharp Point Drive
Fort Collins, Colorado 80525

ACKNOWLEDGMENT

STATE OF COLORADO)
COUNTY OF LARIMER)SS.
)

On the 13 day of September, 2017, before me personally appeared **Steven Mason**, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the foregoing instrument, who, being duly sworn, did depose and say that he executed the same in his authorized capacity as the Assistant Secretary of Advanced Energy Industries, Inc., a Delaware corporation, and acknowledged the instrument to be his free act and deed/the free act and deed of Advanced Energy Industries, Inc. for the uses and purposes mentioned in the instrument.

My Commission Expires: 9-23-2021

_____
Notary Public
Printed Name: Jennifer Anderson

JENNIFER K ANDERSON
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20054037136
MY COMMISSION EXPIRES 09/23/2021

[SIGNATURE PAGE TO PATENT ASSIGNEMENT]

AGREED TO AND ACCEPTED:

AES Global Holdings, Pte. Ltd.

By: _____
Name: Thomas O. McGimpsey
Title: Director
Address for Notices:
C/O Legal Department
Advanced Energy Industries, Inc.
1625 Sharp Point Drive
Fort Collins, Colorado 80525

ACKNOWLEDGMENT

STATE OF COLORADO)
COUNTY OF LARIMER)SS.
)

On the 13 day of September, 2017, before me personally appeared **Thomas O. McGimpsey**, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the foregoing instrument, who, being duly sworn, did depose and say that he executed the same in his authorized capacity as the Director of AES Global Holdings, Ltd. Pte., a private company limited by shares incorporated in Singapore, and acknowledged the instrument to be his free act and deed/the free act and deed of AES Global Holdings, Ltd. Pte. for the uses and purposes mentioned in the instrument.

My Commission Expires: 9-23-2021

_____
Notary Public
Printed Name: Jennifer Anderson

JENNIFER K ANDERSON
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20054037136
MY COMMISSION EXPIRES 09/23/2021

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SCHEDULE 1

ASSIGNED PATENTS AND PATENT APPLICATIONS

Patents

Title	Jurisdiction	Patent Number	Issue Date
Methods and Apparatus for Plasma Processing	United States	6,156,667	12/5/2000
Methods and Apparatus for Igniting and Sustaining Inductively Coupled Plasma	United States	6,291,938	9/18/2001
Methods and Apparatus for RF Power Process Operations with Automatic Input Power Control	United States	6,392,210	5/21/2002
Method and Apparatus for Matching a Variable Load Impedance with an RF Power Generator Impedance	United States	6,424,232	7/23/2002
Electrical Power Supply Suitable in Particular for DC Plasma Processing	United States	6,567,278	5/20/2003
Semiconductor Package for Multiple High Power Transistors	United States	6,617,679	9/9/2003
Voltage and Current Sensor	United States	6,661,324	12/9/2003
Wide Range DC Power Supply Utilizing Voltage Doubling Output Capacitors and Inductive Choke to Extend Full Power Load Impedance Range	United States	6,697,265	2/24/2004
Mechanism for Minimizing Ion Bombardment Energy in a Plasma Chamber	United States	6,724,148	4/20/2004
An Improved RF Power Control Device for RF Plasma Applications	United States	6,791,274	9/14/2004
Impedance Matching Network with Termination of Secondary RF Frequencies	United States	6,888,313	5/3/2005
Dual Magnetron Sputtering Apparatus Utilizing Control Means for Delivering Balanced Power	United States	6,972,079	12/6/2005
Soft Switching Interleaved Power Converter	United States	6,979,980	12/27/2005

Termination of Secondary Frequencies in RF Power Delivery	United States	7,049,751	5/23/2006
DC-DC Converter with Over-Voltage Protection Circuit	United States	7,081,598	7/25/2006
Pulsed Excitation of Inductively Coupled Plasma Sources	United States	7,115,185	10/3/2006
Stabilizing Plasma and Generator Interactions	United States	7,157,857	1/2/2007
Arc Detection and Handling in Radio Frequency Power Applications	United States	7,305,311	12/4/2007
Method and System for Conditioning a Vapor Deposition Target	United States	7,445,695	11/4/2008
High Power PIN Diode Switch	United States	7,498,908	3/3/2009
System and Method for Managing Power Supplied to a Plasma Chamber	United States	7,514,935	4/7/2009
System and Method for Delivering Vapor	United States	7,547,005	6/16/2009
Method and Apparatus for Modifying Interactions Between an Electrical Generator and a Nonlinear Load	United States	7,570,028	8/4/2009
Arc Detection and Handling in Radio Frequency Power Applications	United States	7,761,247	7/20/2010
Inverter BUS Structures and Associated Methods	United States	7,768,154	8/3/2010
System and Method for Ground Fault Detection and Interruption	United States	7,768,751	8/3/2010
Protection Method, System, and Apparatus for a Power Converter	United States	7,791,912	9/7/2010
System, Method and Apparatus for Monitoring Characteristics of RF Power	United States	7,822,565	10/26/2010
System and Method for Wideband Phase-Adjustable Common Excitation	United States	7,825,719	11/2/2010
Method and Apparatus for Advanced Frequency Tuning	United States	7,839,223	11/23/2010

Method and Apparatus for Preventing the Formation of a Plasma Inhibiting Substance	United States	7,942,112	5/17/2011
Method and Apparatus for Modifying Interactions Between an Electrical Generator and a Nonlinear Load	United States	8,004,251	8/23/2011
System, Method and Apparatus for Providing Direct Current	United States	8,026,634	9/27/2011
Power Supply Ignition System and Method	United States	8,044,594	10/25/2011
An Improved RF Power Control Device for RF Plasma Applications	United States	RE42,917	11/15/2011
Directional Coupler	United States	8,093,884	1/10/2012
Interleaved Soft Switching Bridge Power Converter	United States	8,111,531	2/7/2012
Methods and Apparatus for Sputtering Deposition Using Direct Current	United States	8,133,359	3/13/2012
Energy Conversion System with Fault Detection and Interruption	United States	8,134,812	3/13/2012
Arc Recovery Without Overvoltage for Plasma Chamber Power Supplies using a Shunt Switch	United States	8,217,299	7/10/2012
Dual Mode Control of a Power Generator	United States	8,258,874	9/4/2012
Passive Power Distribution for Multiple Electrode Inductive Plasma Source	United States	8,319,436	11/27/2012
Efficient Active Source Impedance Modification of a Power Amplifier	United States	8,330,432	12/11/2012
Method and Apparatus for Adjusting the Reference Impedance of a Power Generator	United States	8,344,704	1/1/2013
Multi-Feed RF Distribution System and Methods	United States	8,344,559	1/1/2013
Method and System for Conditioning a Vapor Deposition Target	United States	8,357,266	1/22/2013
Pre-Emptive Protection for a Power Converter	United States	8,391,025	3/5/2013

Arc Recovery with Over Voltage Protection for Plasma Chamber Power Supplies	United States	8,395,078	3/12/2013
Impedance Matching Network Using BJT Switches in Variable-Reactance Circuits	United States	8,416,008	4/9/2013
High Frequency Solid State Switching for Impedance Matching	United States	8,436,643	5/7/2013
Compensation of Stray Light Interference in Substrate Temperature Measurement	United States	8,506,161	8/13/2013
Power Supply Device for Plasma Processing	United States	8,542,471	9/24/2013
Proactive Arc Management of a Plasma Load	United States	8,552,665	10/8/2013
Detecting and Preventing Instabilities in Plasma Processes	United States	8,674,606	3/18/2014
Method and Apparatus for Modifying the Sensitivity of an Electrical Generator to a Nonlinear Load	United States	8,716,984	5/6/2014
Electrostatic Remote Plasma Source	United States	8,723,423	5/13/2014
Passive Power Distribution for Multiple Electrode Inductive Plasma Source	United States	8,742,669	6/3/2014
Aspirating Particle Sensor for Smoke Detection within an Electronics Enclosure	United States	8,742,939	6/3/2014
Delivered Energy Compensation During Plasma Process	United States	8,815,329	8/26/2014
Power Supply Device for Plasma Processing	United States	8,837,100	9/16/2014
Apparatus, System and Method for Controlling a Matching Network	United States	8,847,561	9/30/2014
Power Supply Device for Plasma Processing	United States	8,854,781	10/7/2014
Over Voltage Protection during Arc-Recovery for Plasma Chamber Power Supplies	United States	8,884,180	11/11/2014
Remote Plasma Source Generating a Disc-Shaped Plasma	United States	8,884,525	11/11/2014

Methods and Apparatus for Applying Periodic Voltage Using Direct Current	United States	9,039,871	5/26/2015
Power Converter with Pre-Emptive Protection	United States	9,042,121	5/26/2015
High Frequency Solid State Switching for Impedance Matching	United States	9,065,426	6/23/2015
System Level Power Delivery to Plasma Processing Load	United States	9,088,267	7/21/2015
Wide Dynamic Range Ion Energy Bias Control; Fast Ion Energy Switching; Ion Energy control and a Pulsed Bias Supply and a Virtual Front Panel	United States	9,105,447	8/11/2015
Impedance Matching Network Using BJT Switches in Variable-Reactance Circuits	United States	9,124,248	9/1/2015
Differing Boost Voltages applied to Two or More Anodeless Electrodes for Plasma Processing	United States	9,129,776	9/8/2015
Capacitively Coupled Remote Plasma Source	United States	9,142,388	9/22/2015
Methods and Apparatus for Sputtering Deposition Using Direct Current	United States	9,150,960	10/6/2015
Systems and Methods for Calibrating a Switched Mode Ion Energy Distribution System	United States	9,210,790	12/8/2015
Method and Apparatus for Controlling Ion Energy Distribution	United States	9,208,992	12/8/2015
Power Supply Device for Plasma Processing	United States	9,214,801	12/15/2015
Adjustable Non-Dissipative Voltage Boosting Snubber Network	United States	9,226,380	12/29/2015
Adjustable Non Dissipative Voltage Boosting Snubber Network for Achieving Large Boost Voltages	United States	9,224,579	12/29/2015
Variable Class Amplifier, System and Method	United States	9,225,299	12/29/2015
Dual Beam Non-Contact Displacement Sensor	United States	9,228,878	1/5/2016
Current Threshold Response Mode for Arc Management	United States	9,263,241	2/16/2016

Method and Apparatus for Controlling Ion Energy Distribution	United States	9,287,092	3/15/2016
Passive Unipolar Referencing for Multiple non-isolated Inverters	United States	9,287,802	3/15/2016
System, Method and Apparatus for Controlling Ion Energy Distribution	United States	9,287,086	3/15/2016
Charge Removal from Electrodes in Unipolar Sputtering System	United States	9,287,098	3/15/2016
Frequency Tuning System and Method for Finding Global Optimum	United States	9,294,100	3/22/2016
System, Method and Apparatus for Controlling Ion Energy Distribution of a Projected Plasma	United States	9,309,594	4/12/2016
Arc Management with Voltage Reversal and Improved Recovery	United States	9,313,870	4/12/2016
Impedance Matching Network with High Frequency Switching	United States	9,337,804	5/10/2016
A Method of Controlling the Switched Mode Ion Energy Distribution System	United States	9,362,089	6/7/2016
Wafer Chucking System for Advanced Plasma Ion Energy Processing Systems	United States	9,435,029	9/6/2016
System Level Power Delivery to Plasma Processing Load	United States	9,478,397	10/25/2016
Adjustable Non-Dissipative Voltage Boosting Snubber Network	United States	9,483,066	11/1/2016
Three Terminal PIN Diode	United States	9,490,353	11/8/2016
Adjustable Non-Dissipative Voltage Boosting Snubber Network for Achieving Large Boost Voltages	United States	9,520,269	12/13/2016
Electrostatic Remote Plasma Source System and Method	United States	9,524,854	12/20/2016
Reliable Plasma Ignition and Reignition	United States	9,536,713	1/3/2017

Frequency Tuning for Pulsed Radio Frequency Plasma Processing	United States	9,544,987	1/10/2017
Adjustable Non-Dissipative Voltage Boosting Snubber Network for Achieving Large Boost Voltages	United States	9,558,917	1/31/2017
Apparatus for Controlled Overshoot in a RF Generator	United States	9,577,516	2/21/2017
Systems and Methods for Obtaining Information about a Plasma Load	United States	9,578,731	2/21/2017
Systems, Methods and Apparatus for Minimizing Cross Coupled Wafer Surface Potentials	United States	9,589,767	3/7/2017
Charge Removal from Electrodes in Unipolar Sputtering System	United States	9,620,340	4/11/2017
Adjustable Non-Dissipative Voltage Boosting Snubber Network	United States	9,651,957	5/16/2017
Impedance Matching Network Using BJT Switches in Variable-Reactance Circuits	United States	9,660,613	5/23/2017
Arc Management with Voltage Reversal and Improved Recovery	United States	9,673,028	6/6//2017
Systems and Methods for Monitoring Faults, Anomalies and Other Characteristics of a Switched Mode Ion Energy Distribution System	United States	9,685,297	6/20/2017
System and Method for Balancing Consumption of Targets in Pulsed Dual Magnetron Sputtering (DMS) Processes	United States	9,711,335	7/18/2017
Frequency Tuning for Pulsed Radio Frequency Plasma Processing	United States	9,711,331	7/18/2017

Patent Applications

Title	Jurisdiction	Application/ Publication Number	Filing Date
Projected Plasma Source	United States	13/173,752	6/30/2011
Current Threshold Response Mode for Arc Management	United States	15/002,213	1/20/2015
Rate Enhanced Pulsed DC Sputtering System	United States	14/697,267	4/27/2015
Ion Energy Bias Control Apparatus	United States	14/803,815	7/20/2015
Systems and Methods for Single Magnetron Sputtering	United States	14/809,084	7/24/2015
Noise Based Frequency Tuning and Identification of Plasma Characteristics	United States	14/885,444	10/16/2015
Power Supply Device for Plasma Processing	United States	14/935,910	11/9/2015
Plasma Source Device and Methods	United States	15/067,060	3/10/2016
Adjustable Non-Dissipative Voltage Boosting Snubber Network	United States	15/222,597	7/28/2016
Application of Diode Box to Reduce Crazing in Glass Coatings	United States	15/226,463	8/2/2016
Gate Drive Circuit and Method of Operating the Same	United States	15/374,242	12/9/2016
Apparatus for Controlled Overshoot in a RF Generator	United States	15/415,597	1/25/2017
Systems and Methods for Monitoring Faults, Anomalies and Other Characteristics of a Switched Mode Ion Energy Distribution System	United States	15/495,513	4/24/2017
Frequency Tuning for Pulsed Radio Frequency Plasma Processing	United States	15/499,567	4/27/2017
System and Method for Balancing Consumption of Targets in Pulsed Dual Magnetron Sputtering (DMS) Processes	United States	15/608,478	5/30/2017

Inter-period Control System for Plasma Power Delivery System and Method of Operating the Same	United States	62/529,963	7/7/2017
Apparatus for Frequency Tuning in a RF Generator	United States	15/657,525	7/24/2017
System and Method for Control of High Efficiency Generator Source Impedance	United States	15/664,646	7/31/2017
A Method of Controlling the Switched Mode Ion Energy Distribution System	United States	15/667,239	8/2/2017