CLAIMS

What is claimed is:

1. A method of managing a photovoltaic device, comprising:

applying a first component of a voltage signal to the photovoltaic device, the first component representing an on state for generating an external electric field across the photovoltaic device; and

applying a second component of the voltage signal to the photovoltaic device, the second component representing an off cycle.

2. The method of claim 1, wherein said applying the first component comprises applying a high voltage of a time-varying voltage pulse from a voltage pulser circuit, and wherein said applying the second component comprises shutting off the voltage pulser circuit.

3. The method of claim 1 or claim 2, wherein said applying the first component comprises connecting a voltage source and the photovoltaic device in a first position of a switch disposed between the voltage source and the photovoltaic device, and wherein said applying the second component comprises disconnecting the voltage source and the photovoltaic device in a second position of the switch to optionally provide electrical isolation between the voltage source and a load driven by the photovoltaic device when the switch is in the second position.

4. The method of any one of the above claims, wherein said applying the first component comprises impressing an output of a high voltage source of the voltage pulser circuit onto the photovoltaic device when a switching transistor of the voltage pulser circuit is in an on position for generating the first state, and optionally continuing said impressing the output of the high voltage source until a pulse generator of the voltage pulser circuit turns the switching transistor to an off position for generating the second state.

5. The method of any one of the above claims, wherein said applying the first component comprises generating the external electric field with a first direction or a second direction, the first direction and a polarity of internal electrodes of the photovoltaic device being in a same direction for increasing a power output of the photovoltaic device, and the second direction being in an opposite direction of the polarity of the internal electrodes for decreasing the power output.

6. The method of any one of the above claims, further comprising monitoring an output voltage of the photovoltaic device, wherein said monitoring the output voltage optionally is performed via a voltage probe coupled across the photovoltaic device, or monitoring an output current of the photovoltaic device, wherein said monitoring the output current optionally is performed via a current sensor coupled in series between the photovoltaic device and a load driven by the photovoltaic device.

7. The method of claim 6, further comprising adjusting, wherein said adjusting optionally is performed via a control circuit coupled to the voltage source, at least one of a magnitude, a duration, and a frequency of the first component to maximize a power output of the photovoltaic device based on said monitoring.

8. The method of any one of the above claims, wherein said applying the first component comprises generating the external electric field across at least one of a solar cell, an array of solar cells, a solar panel, and an array of solar panels.

9. A method of managing a photovoltaic device, comprising:

enabling a voltage pulser to be coupled to the photovoltaic device; and

applying a voltage signal generated by the voltage pulser to the photovoltaic device, the voltage signal having a first state for generating an external electric field across the photovoltaic device and a second state representing an off cycle.

10. The method of claim 9, wherein said applying the voltage signal comprises applying an adjustable voltage to the photovoltaic device, and

optionally impressing an output of a high voltage source of the voltage pulser onto the photovoltaic device when a switching transistor of the voltage pulser is in an on position for generating the first state, and optionally continuing said impressing the output of the high voltage source until a pulse generator of the voltage pulser turns the switching transistor to an off position for generating the second state.

11. The method of claim 9 or claim 10, further comprising enabling one or more series inductors to be coupled between the voltage pulser and a load of the photovoltaic device for blocking frequencies of the voltage signal to the load that are greater than a predetermined frequency.

12. The method of any one of claims 9-11, further comprising controlling at least one of a frequency and a duration of the first state and the second state via a control circuit coupled to the voltage pulser.

13. A method of managing a photovoltaic device, comprising:

enabling a first port of a switch to be coupled to the photovoltaic device;

enabling a second port of the switch to be coupled to a load driven by the photovoltaic device;

enabling a third port of the switch to be coupled to a voltage source, wherein the switch can operate in a first position for providing a current path between the photovoltaic device and the voltage source and a second position for providing the current path between the photovoltaic device and the load; and

applying a voltage signal generated by the voltage source to the photovoltaic device when the switch is in a first position, the voltage signal having a first state for generating an external electric field across the photovoltaic device when the switch is in the first position, and a second state to provide electrical isolation between the voltage source and the load when the switch is in the second position.

14. The method of claim 13, wherein said enabling the first port of the switch comprises enabling a first port of a double throw switch to be coupled to the photovoltaic device.

15. The method of claim 13 or claim 14, further comprising controlling at least one of a frequency and a duration of switching between the first position and the second position via a switch controller coupled to the double throw switch.

16. The method of any one of claims 13-15, further comprising enabling a device for mitigating any voltage drop-out of the first component to be coupled between the load and the photovoltaic device.

17. The method any one of claims 13-16, wherein said applying the voltage signal comprises applying an adjustable voltage to the photovoltaic device.

18. The method of any one of claims 13-17, further comprising controlling at least one of a frequency, a magnitude, and a duration of the first state and the second state, wherein said controlling optionally is performed via a control circuit coupled to at least one of the voltage source and the switch based on an output current of the photovoltaic device optionally measured by a current sensor coupled in series between the photovoltaic device and the load and an output voltage of the photovoltaic device optionally measured by a voltage probe coupled across the photovoltaic device.

CLAIMS

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1. A method of managing a photovoltaic device, comprising:

enabling a first port of a switch to be coupled to the photovoltaic device;

enabling a second port of the switch to be coupled to a load driven by the photovoltaic device;

enabling a third port of the switch to be coupled to a voltage source, wherein the switch can operate in a first position for providing a current path between the photovoltaic device and the voltage source and a second position for providing the current path between the photovoltaic device and the load; and

applying a voltage signal generated by the voltage source to the photovoltaic device when the switch is in a first position, the voltage signal having a first state for generating an external electric field across the photovoltaic device when the switch is in the first position, and a second state to provide electrical isolation between the voltage source and the load when the switch is in the second position.

2. The method of claim 1, wherein said enabling the first port of the switch comprises enabling a first port of a double throw switch to be coupled to the photovoltaic device.

3. The method of claim 1 or claim 2, further comprising controlling at least one of a frequency and a duration of switching between the first position and the second position via a switch controller coupled to the double throw switch.

4. The method of any one of claims 1-3, further comprising enabling a device for mitigating any voltage drop-out of the first component to be coupled between the load and the photovoltaic device.

5. The method any one of claims 1-4, wherein said applying the voltage signal comprises applying an adjustable voltage to the photovoltaic device.

6. The method of any one of claims 1-5, further comprising controlling at least one of a frequency, a magnitude, and a duration of the first state and the second state, wherein said controlling optionally is performed via a control circuit coupled to at least one of the voltage source and the switch based on an output current of the photovoltaic device optionally measured by a current sensor coupled in series between the photovoltaic device and the load and an output voltage of the photovoltaic device optionally measured by a voltage probe coupled across the photovoltaic device.