

CLAIMS

What is claimed is:

1. A distributed power arrangement to provide local power delivery in a plasma processing system during substrate processing, comprising:
 - a set of direct current (DC) power supply units; and
 - a plurality of power generators, said plurality of power generators being configured to receive power from said set of DC power supply units, wherein each power generator of said plurality of power generators being coupled to a set of electrical elements, thereby enabling said each power generator of said plurality of power generators to control said local power delivery.
2. The distributed power arrangement of claim 1 wherein said set of DC power supply units being a single DC power supply unit, wherein DC power is distributed to said plurality of power generators via a rail arrangement.
3. The distributed power arrangement of claim 1 wherein said set of DC power supply units includes more than one DC power supply unit, each DC power supply unit of said set of DC power supply units being coupled to a power generator of said plurality of power generators.
4. The distributed power arrangement of claim 1 wherein a DC power supply unit of said set of DC power supply unit is located within said each power generator of said plurality of power generators.
5. The distributed power arrangement of claim 1 wherein said plurality of power generators is a plurality of radio frequency (RF) generators.
6. The distributed power arrangement of claim 1 wherein said plurality of power generators is a plurality of microwave generators.
7. The distributed power arrangement of claim 1 wherein a power amplifier is located within said each power generator of said plurality of power generators.
8. The distributed power arrangement of claim 7 wherein a match component is located within said each power generator of said plurality of power generators, said match component being configured to match impedance within said each power generator with impedance of a processing chamber of said plasma processing system.
9. The distributed power arrangement of claim 8 wherein said match component is configured to perform different matching techniques, including variable frequencies and electronic switching.

10. The distributed power arrangement of claim 1 wherein a probe is coupled to said each power generator of said plurality of power generators.
11. The distributed power arrangement of claim 10 wherein said probe is configured to at least measure said local power delivery to said set of electrical elements.
12. The distributed power arrangement of claim 11 wherein said set of electrical elements being a set of electrodes.
13. The distributed power arrangement of claim 11 wherein said set of electrical elements being a set of antenna.
14. The distributed power arrangement of claim 1 further including a main controller, said main controller being configured to interact with said plasma processing system.
15. The distributed power arrangement of claim 14 wherein a local controller is located within said each power generator of said plurality of power generators, said local controller being configured to interact with said main controller, wherein interaction includes receiving instructions from said main controller.
16. The distributed power arrangement of claim 15 wherein said main controller is configured to monitor status for said each power generator by receiving status data from said local controller associated with said each power generator.
17. The distributed power arrangement of claim 1 wherein said each power generator of said plurality of power generators is a modularized unit, said each power generator including at least one of a power amplifier module, a match component, a probe, and a local controller.
18. The distributed power arrangement of claim 1 wherein said plurality of power generators is configured to enable local power control to a distributed array of nodes within a network.
19. The distributed power arrangement of claim 18 wherein said plurality of power generators is configured as a segmented concentric circle, wherein a power generator is positioned at each node of said distributed array of nodes.
20. The distributed power arrangement of claim 18 wherein said plurality of power generators is configured as a rectilinear arrangement, wherein a power generator is positioned at each node of said distributed array of nodes.

What is claimed is:

1. A distributed power arrangement to provide local power delivery in a plasma processing system during substrate processing, comprising:
 - a single direct current (DC) power supply;
 - a common rail arrangement coupled to the DC power supply; and
 - a plurality of power generators coupled to a single chamber, said plurality of power generators being configured to receive power from said single DC power supply via the common rail arrangement, wherein each power generator of said plurality of power generators being coupled to a set of electrical elements,
 - each power generator of said plurality of power generators to be at different locations in relation to others of said plurality of power generators during said substrate processing and to control said local power delivery to said each power generator of said plurality of power generators at said different locations, further wherein said each power generator of said plurality of power generators is a modularized unit, said each power generator including a power amplifier module, a match impedance component, a probe, and a local controller,
 - a main controller, said main controller being configured to interact with said plasma processing system, said local controller that is located within said each power generator of said plurality of power generators, said local controller being configured to interact with said main controller,
 - wherein interaction includes receiving instructions from said main controller, said main controller is configured to monitor status for said each power generator by receiving status data from said local controller associated with said each power generator.
2. The distributed power arrangement of claim 1 wherein said plurality of power generators is a plurality of radio frequency (RF) generators.
3. The distributed power arrangement of claim 1 wherein said plurality of power generators is a plurality of microwave generators.
4. The distributed power arrangement of claim 1, wherein said match impedance component being configured to match impedance within said each power generator with impedance of a processing chamber of said plasma processing system.
5. The distributed power arrangement of claim 4 wherein said match impedance

component is configured to perform different matching techniques, including variable frequencies and electronic switching.

6. The distributed power arrangement of claim 1 wherein said probe is configured to at least measure said local power delivery to said set of electrical elements.

7. The distributed power arrangement of claim 6 wherein said set of electrical elements being a set of electrodes.

8. The distributed power arrangement of claim 6 wherein said set of electrical elements being a set of antenna.

9. The distributed power arrangement of claim 1 wherein said plurality of power generators is configured to enable local power control to a distributed array of nodes within a network.

10. The distributed power arrangement of claim 9 wherein said plurality of power generators is configured as a segmented concentric circle, wherein a power generator is positioned at each node of said distributed array of nodes.

11. The distributed power arrangement of claim 9 wherein said plurality of power generators is configured as a rectilinear arrangement, wherein a power generator is positioned at each node of said distributed array of nodes.

12. The distributed power arrangement of claim 1, wherein each power generator is configured to locally generate less than 300 watts of power.

13. The distributed power arrangement of claim 1, wherein the main controller is configured to send instructions to the local controller of the plurality of power generators to cause one or more of the plurality of power generators to turn on or off, or to pulse a level of power, or to synchronize, or to run diagnostics, or to monitor matching conditions, or to send alerts.

14. The distributed power arrangement of claim 1, wherein an RF power transmission line is not provided between the power supply and each of the plurality of power generators.

15. A distributed power system to provide local power delivery in a plasma processing system during substrate processing, comprising:

a power supply source;

a plurality of power generators;

a common rail arrangement coupling the power supply source to each of the plurality of power generators;

a main controller configured for interacting with said plasma processing system, wherein the main controller is separately located away from the plurality of power generators; and

said plurality of power generators being coupled to a single chamber and configured to receive said power from said power supply source, wherein each power generator of said plurality of power generators being coupled to a set of electrical elements,

each power generator of said plurality of power generators to be at different locations in relation to others of said plurality of power generators during said substrate processing and to control power delivery to said each power generator of said plurality of power generators at said different locations;

wherein said each power generator of said plurality of power generators is a modularized unit, said each power generator including a power amplifier module, a match impedance component, a probe, and a local controller,

wherein said power amplifier module is employed by said power generator of said plurality of power generators to at least accept and transform said power from said power supply source;

wherein said match impedance component is employed by said power generator of said plurality of power generators to at least match impedance within said each power generator with impedance of the single chamber of said plasma processing system;

wherein said probe is coupled to said each power generator of said plurality of power generators, said probe usable to measure said local power delivery power to said set of electrical elements; and

wherein said local controller is employed by said each power generator to at least interact with said main controller, wherein interaction includes at least receiving instructions from said main controller.

16. The distributed power arrangement of claim wherein said set of electrical elements being a set of antenna.

17. The distributed power system of claim 15, wherein each power generator of said plurality of power generators generate less than about 300 watts.

18. The distributed power system of claim 15, wherein the main controller is configured to send instructions to the local controller of the plurality of power generators to cause one or more of the plurality of power generators to turn on or off, or to pulse a level of power, or to synchronize, or to run diagnostics, or to monitor matching conditions, or to send alerts.

19. The distributed power system of claim 15, wherein an RF power transmission line is not provided between the power supply source and each of the plurality of power generators.

20. A distributed power arrangement to provide local power delivery in a plasma processing system during substrate processing, comprising:

- a set of direct current (DC) power supply units; and

- a plurality of power generators, said plurality of power generators coupled to a single chamber and being configured to receive power from said set of DC power supply units, wherein a DC power supply unit of said set of DC power supply unit is located within said each power generator of said plurality of power generators, wherein each power generator of said plurality of power generators being coupled to a set of electrical elements, each power generator of said plurality of power generators to control amount of said local power delivery to the set of electrical elements, further wherein said each power generator of said plurality of power generators is a modularized unit, said each power generator including a power amplifier module, a match impedance component, a probe, and a local controller

- wherein each one of said modularized units is replaceable relative to other ones of said plurality of modularized units and being replaceable relative to said plasma processing system, further including,

- a main controller, said main controller being configured to interact with said plasma processing system, said local controller is located within said each power generator of said plurality of power generators, said local controller being configured to interact with said main controller, wherein interaction includes receiving instructions from said main controller, said main controller is configured to monitor status for said each power generator by receiving status data from said local controller associated with said

each power generator, wherein the status data is used to independently identify a condition of each of the plurality of power generators.

21. The distributed power arrangement of claim 20, wherein each power generator is configured to locally generate less than 300 watts of power.

22. The distributed power arrangement of claim 20, wherein the main controller is configured to send instructions to the local controller of the plurality of power generators to cause one or more of the plurality of power generators to turn on or off, or to pulse a level of power, or to synchronize, or to run diagnostics, or to monitor matching conditions, or to send alerts.

23. The distributed power arrangement of claim 20, wherein an RF power transmission line is not connected between the main controller and each of the plurality of power generators.