Claims:

1. A station comprising:

a control circuit (30);

a bidirectional interface (40) for coupling to an AC grid (15); and

a plurality of N flywheel based electrical storage units (50) coupled to said bidirectional interface,

characterized by wherein said control circuit is arranged to:

determine (2000) a demand for electrical power of an amount Preq;

determine (2000) a maximum amount of allowed ripple current;

determine (2010) available power from each of said plurality of N flywheel based electrical storage units;

select (2030) M+1 of said plurality of flywheel based electrical storage units having the highest determined available power such that the power available from the selected M of said plurality of flywheel based electrical storage units is less than Preq, and that the power available from the selected M+1 of said plurality of flywheel based electrical storage units is greater than, or equal to, Preq;

determine (2040) the desired change in output current for each of said N plurality of flywheel based electrical storage units;

reduce (2050) the output current of one of said N plurality of flywheel based electrical storage units for which said determination indicates a negative desired change up to the determined maximum ripple current;

increase (2060) the output current of one of said N plurality of flywheel based electrical storage units for which said determination indicates a positive desired change up to the determined maximum ripple current;

compare (2070) the output current of said N plurality of flywheel based electrical storage units to said determined desired changes; and

repeat (2070) said reducing, increasing and comparing until said determined desired change in output current for each of said N plurality of flywheel based electrical storage units is implemented.

2. The station of claim 1, wherein said bidirectional interface comprises a bidirectional AC/DC converter (40), and wherein the station further comprises:

at least one of an AC/DC charging (130) and a DC/DC charging (70) unit coupled to said one of a bidirectional AC/DC converter and arranged for coupling to a plug in electrical vehicle (80).

3. The station according to claim 2, wherein said control circuit is further in communication with a distribution service operator (20), said control circuit arranged to provide (2000) power to the AC grid responsive to a first request from the distribution service operator, and draw (3000) power from the AC grid responsive to a second request from the distribution service operator, and wherein said control circuit is further arranged to allocate a storage ability of said plurality of N flywheel based electrical storage units among:

a first portion allocated to provide power to said at least one AC/DC charging unit or DC/DC charging unit;

a second portion allocated to absorb electrical energy from said AC grid; and

a third portion allocated to provide electrical energy to said AC grid.

4. The station according to claim 3, wherein said first portion, second portion and third portion are allocated (1040) responsive to historical data.

5. The station of claim 1, further comprising:

a DC/DC charging unit (70) arranged for coupling to a plug in electrical vehicle (80), and wherein said bidirectional interface comprises a bidirectional AC/DC converter (40),

each of said plurality of flywheel based electrical storage units coupled to a common DC bus (60) to provide power to said DC/DC charging unit and to provide power to, or receive power from, said bidirectional AC/DC converter.

6. The station of claim 5, further comprising:

a voltage sensor (65) coupled to the common DC bus and in communication with said control circuit;

a current sensor (55) coupled to the DC/DC charging unit and in communication with said control circuit; and

a power sensor (35) coupled to the bidirectional AC/DC converter and in communication with said control circuit, said control circuit arranged to determine (4010) the amount of power drawn by, or provided from, the station, responsive to said power sensor coupled to the bidirectional AC/DC converter.

7. The station of claim 1, further comprising:

an AC/DC charging unit (130) arranged for coupling to a plug in electrical vehicle (80), and wherein said bidirectional interface comprises a bidirectional AC/DC converter, said AC/DC charging unit coupled to a common node of the station,

each of said plurality of flywheel based electrical storage units coupled to a common DC bus to provide power to, or receive power from, said bidirectional AC/DC converter;

a first power sensor coupled between the AC grid and the common node, said first power sensor in communication with said control circuit; and

a second power sensor coupled between the common node and said bidirectional AC/DC converter, said second power sensor in communication with said control circuit.

8. The station according to any of claims 1, 2 and 5 – 7, wherein said control circuit is further arranged to:

determine (3000) an amount of power to store, Pavail;

determine (3000) a maximum amount of allowed ripple current;

determine (3010) available power storage from each of said plurality of N flywheel based electrical storage units;

select (3030) M+1 of said plurality of flywheel based electrical storage units having the lowest determined available power such that the power available from the selected M of said plurality of flywheel based electrical storage units is greater than Pavail, and that the power available from the selected M+1 of said plurality of flywheel based electrical storage units is less than, or equal to, Pavail;

determine (3040) the desired change in output current for each of said N plurality of flywheel based electrical storage units;

increase (3050) the output current of one of said N plurality of flywheel based electrical storage units for which said determination indicates a positive desired change up to the determined maximum ripple current;

decrease (3060) the output current of one of said N plurality of flywheel based electrical storage units for which said determination indicates a negative desired change up to the determined maximum ripple current;

compare (3070) the output current of said N plurality of flywheel based electrical storage units to said determined desired changes; and

repeat (3070) said increasing, reducing and comparing until said determined desired change in output current for each of said N plurality of flywheel based electrical storage units is implemented.

9. The station according to any of claims 1, 2 and 5 – 7, wherein said control circuit is further in communication with a distribution service operator (20), said control circuit arranged to provide power to the AC grid responsive to a first request from the distribution service operator, and draw power from the AC grid responsive to a second request from the distribution service operator.

10. A method of controlling a plurality of N flywheel based electrical storage units (50), **characterized by**:

determining (2000) a demand for electrical power of an amount Preq;

determining (2000) a maximum amount of allowed ripple current;

determining (2010) available power from each of the plurality of N flywheel based electrical storage units;

selecting (2030) M+1 of said plurality of flywheel based electrical storage units having the highest determined available power such that the power available from the selected M of said plurality of flywheel based electrical storage units is less than Preq, and that the power available from the selected M+1 of said plurality of flywheel based electrical storage units is greater than, or equal to, Preq;

determining (2040) the desired change in output current for each of said N plurality of flywheel based electrical storage units;

reducing (2050) the output current of one of said N plurality of flywheel based electrical storage units for which said determination indicates a negative desired change up to the determined maximum ripple current;

increasing (2060) the output current of one of said N plurality of flywheel based electrical storage units for which said determination indicates a positive desired change up to the determined maximum ripple current;

comparing (2070) the output current of said N plurality of flywheel based electrical storage units to said determined desired changes; and

repeating (2070) said reducing, increasing and comparing until said determined desired change in output current for each of said N plurality of flywheel based electrical storage units is implemented.

11. The method according to claim 10, further comprising:

providing (2000) power to an AC grid responsive to a first request from a distribution service operator (20);

drawing (3000) power from the AC grid responsive to a second request from the distribution service operator; and

allocating a storage ability of said plurality of N flywheel based electrical storage units among:

a first portion allocated to provide power to at least one AC/DC charging unit or DC/DC charging unit;

a second portion allocated to absorb electrical energy from said AC grid; and

a third portion allocated to provide electrical energy to said AC grid.

12. The method according to claim 11, wherein said first portion, second portion and third portion are allocated (104) responsive to historical data.

13. The method according to any of claims 10 – 12, further comprising:

determining (3000) an amount of power to store, Pavail;

determining (3000) a maximum amount of allowed ripple current;

determining (3010) available power storage from each of said plurality of N flywheel based electrical storage units;

selecting M+1 (3030) of said plurality of flywheel based electrical storage units having the lowest determined available power such that the power available from the selected M of said plurality of flywheel based electrical storage units is greater than Pavail, and that the power available from the selected M+1 of said plurality of flywheel based electrical storage units is less than, or equal to, Pavail;

determining (3040) the desired change in output current for each of said N plurality of flywheel based electrical storage units;

increasing (3050) the output current of one of said N plurality of flywheel based electrical storage units for which said determination indicates a positive desired change up to the determined maximum ripple current;

decreasing (3060) the output current of one of said N plurality of flywheel based electrical storage units for which said determination indicates a negative desired change up to the determined maximum ripple current;

comparing (3070) the output current of said N plurality of flywheel based electrical storage units to said determined desired changes; and

repeating (3070) said increasing, reducing and comparing until said determined desired change in output current for each of said N plurality of flywheel based electrical storage units is implemented.

14. The method according to claim 10, further comprising:

providing power to the AC grid responsive to a first request from a distribution service operator (20); and

drawing power from the AC grid responsive to a second request from the distribution service operator.

15. The method according to claim 13, further comprising:

providing (2000) power to the AC grid responsive to a first request from the distribution service operator; and

drawing (3000) power from the AC grid responsive to a second request from the distribution service operator.