CLAIMS:

1. A vacuum pumping system comprising:

at least one vacuum pumping mechanism;

a motor for driving said at least one vacuum pumping mechanism;

means for determining a cumulative load on said vacuum pumping system over time by monitoring a characteristic of said motor over said time; and

means for activating a maintenance activity on said system when said cumulative load exceeds a predetermined amount.

2. A vacuum pumping system as claimed in claim 1, wherein said characteristic is a power required by the motor to drive the vacuum pumping mechanism.

3. A vacuum pumping system as claimed in claim 2, wherein said determining means can monitor a current in the motor in order to determine said power.

4. A vacuum pumping system as claimed in any preceding claim, wherein said cumulative load is equal to the total mass flow of fluid pumped by the vacuum pumping mechanism during its operation over a period of time.

5. A vacuum pumping system as claimed in claim 4, wherein a condition of said vacuum pumping system deteriorates in proportion to the mass flow of fluid pumped by the vacuum pumping mechanism and wherein said predetermined amount is predetermined such that when said cumulative load exceeds said predetermined amount said pumping system requires a maintenance activity to be performed in order to restore said condition.

6. A vacuum pumping system as claimed in any preceding claim for a processing system comprising a processing chamber in which wafers can be processed and a transfer chamber through which wafers can be transferred to the processing chamber for processing and transferred from the processing chamber after processing, said vacuum pumping system comprising:

a first said vacuum pumping mechanism driven by a first said motor for evacuating gas from the processing chamber; and

a second said vacuum pumping mechanism driven by a second said motor for evacuating gas from the transfer chamber;

wherein said determining means determines a cumulative load on said vacuum pumping system over time by monitoring said characteristic of said first motor or said second motor.

7. A vacuum pumping system as claimed in claim 6, wherein during pump down the second vacuum pumping mechanism reduces the pressure in the transfer chamber from a first pressure at which wafers are introduced to the transfer chamber to a second pressure at which wafers are transferred from the transfer chamber to the processing chamber for processing;

wherein said monitored characteristic of said second motor increases during each pump down and decreases when said second vacuum pumping mechanism is not reducing pressure in said transfer chamber; and

wherein said cumulative load is a number of wafers processed by the processing system and said determining means is configured to determine said cumulative load by counting a number of increases in said monitored characteristic of said second motor.

8. A vacuum pumping system as claimed in claim 6, wherein processing gas is introduced to the processing chamber during a processing step and evacuated from the processing chamber by the first vacuum pumping mechanism;

wherein said monitored characteristic of said first motor increases during each processing step and decreases when said first vacuum pumping mechanism is not evacuating gas from said processing chamber; and

wherein said cumulative load is equal to the total mass flow of processing gas pumped by the first vacuum pumping mechanism over a plurality of processing steps and said determining means is configured to determine said cumulative load by determining an amount by which said monitored characteristic of said first motor increases over time.

9. A vacuum pumping system as claimed in claim 8, wherein said cumulative load is proportional to an integral of said monitored characteristic with respect to time and said determining means comprises integrating means for integrating said characteristic with respect to time.

10. A vacuum pumping system as claimed in claim 7, wherein a condition of said vacuum pumping system associated with said first vacuum pumping mechanism and/or said second vacuum pumping mechanism deteriorates in proportion to a number of wafers processed by the processing system; and

wherein said activating means is configured to trigger a maintenance activity for restoring said condition when the number of wafers processed by the system exceeds a predetermined amount.

11. A vacuum pumping system as claimed in claim 8 or 9, wherein a condition of said vacuum pumping system associated with said first vacuum pumping mechanism and/or said second vacuum pumping mechanism deteriorates in proportion to a total mass flow of processing gas evacuated by the first vacuum pumping means from said processing chamber; and

wherein said activating means is configured to trigger a maintenance activity for improving said condition when said total mass flow of processing gas exceeds a predetermined amount.

12. A vacuum pumping system as claimed in claim 10 or 11, wherein a condition of said vacuum pumping system associated with said first vacuum pumping mechanism and/or said second vacuum pumping mechanism deteriorates according to the cumulative load as a function of a number of wafers processed by the processing system and a total mass flow of processing gas evacuated by the first vacuum pumping means from said processing chamber; and

wherein said activating means is configured to trigger a maintenance activity for improving said condition when said cumulative load exceeds a predetermined amount.

13. A vacuum pumping system as claimed in claim 12, wherein said determining means is configured to determine said cumulative load as function of the number of wafers adjusted by the total mass flow of gas.

14. A vacuum pumping system as claimed in any preceding claims, comprising:

a user interface disposed remotely from said at least one vacuum pumping mechanism the system being arranged such that said activating means can communicate a requirement for a maintenance activity to a user at said interface.

15. A maintenance detection unit for a vacuum pumping system, said system comprising:

A vacuum pumping mechanism;

a motor for driving said vacuum pumping mechanism; and

a system control unit;

wherein said maintenance unit comprises:

means for determining a cumulative load on said vacuum pumping system over time by monitoring a characteristic of said motor;

means for activating a maintenance activity on said system when said cumulative load exceeds a predetermined amount; and

an interface for allowing said maintenance detection unit to interface with said control unit so that said determining means can monitor said characteristic.

16. A processing system comprising a vacuum pumping sub-system for evacuating gas from a chamber in the system, wherein said vacuum pumping sub-system comprises:

at least one vacuum pumping mechanism; and

a motor for driving said at least one vacuum pumping mechanism; and wherein said processing system comprises:

means for determining a load on said vacuum pumping mechanism by monitoring a characteristic of said motor; and

control means for controlling operation of at least one other sub-system in said system in accordance with said determined load on said vacuum pumping mechanism.

17. A processing system as claimed in claim 16, wherein said characteristic is a power required by the motor to drive the vacuum pumping mechanism, said power being in proportion to a load on said vacuum pumping mechanism.

18. A processing system as claimed in claim 17, wherein said determining means can monitor a current in the motor in order to determine said power.

19. A processing system as claimed in any of claims 16 to 18, wherein said load is the mass flow of fluid pumped by the vacuum pumping mechanism.

20. A processing system as claimed in claim 19, wherein said determining means is configured to determine the mass flow of fluid being pumped by said vacuum pumping mechanism and to output to said control means a signal representative of the determined mass flow rate.

21. A processing system as claimed in claim 20, wherein said control means is configured to receive said signal from said determining means and to control operation of said other sub-system in accordance with the mass flow rate of gas exhausted from said vacuum pumping sub-system.

22. A processing system as claimed in claim 21, wherein said control means is configured to control said other sub-system to operate in idle mode to reduce consumption of resources by said other sub-system when the determined mass flow rate is below a threshold for a predetermined duration.

23. A processing system as claimed in any of claims 16 to 22, wherein said control means is configured to activate operation of said other sub-system when the determined load increases above a threshold.

24. A processing system as claimed in any of claims 16 to 23, wherein said vacuum pumping sub-system is for evacuating a load lock chamber.

25. A processing system as claimed in any of claims 16 to 24, wherein said other subsystem comprises an abatement system or a chiller or a second vacuum pumping sub-system.

26. A processing system as claimed in any of claims 16 to 25, wherein said determining means comprises a clock and differentiating circuitry and control comprises comparator and a memory.

27. A processing system comprising a processing chamber in which wafers can be processed and a load lock chamber through which wafers can be transferred to the processing chamber for processing and transferred from the processing chamber after processing, said vacuum pumping sub-system comprising:

a first said vacuum pumping mechanism driven by a first said motor for evacuating gas from the processing chamber; and

a second said vacuum pumping mechanism driven by a second said motor for evacuating gas from the load lock chamber;

wherein said determining means determines a load on said vacuum pumping subsystem by monitoring said characteristic of said first motor or said second motor.

28. A processing system as claimed in claim 27, wherein in a pressure reduction step the second vacuum pumping mechanism reduces the pressure in the transfer chamber from a first pressure at which wafers are introduced to the transfer chamber to a second pressure at which wafers are transferred from the transfer chamber to the processing chamber for processing;

wherein said monitored characteristic of said second motor increases during each pressure reduction step and decreases when said second vacuum pumping mechanism is not reducing pressure in said transfer chamber; and

wherein when said determined characteristic has increased above a threshold, said control means activates said abatement system and when said characteristic has decreased below said threshold for a predetermined duration said control means causes said abatement system to adopt an idle mode.

29. A processing system as claimed in claim 27, wherein processing gas is introduced to the processing chamber during a processing step and evacuated from the processing chamber by the first vacuum pumping mechanism;

wherein said monitored characteristic of said first motor increases during each processing step.

30. A control unit for a processing system comprising a vacuum pumping sub-system

for evacuating gas from a chamber in the system, said vacuum pumping sub-system comprising:

a vacuum pumping mechanism; and

a motor for driving said vacuum pumping mechanism;

wherein said control unit comprises:

means for determining a load on said vacuum pumping sub-system by monitoring a characteristic of said motor;

means for controlling operation of at least one other sub-system in said system in accordance with a determined load on said vacuum pumping sub-system.

The invention claimed is:

1. A vacuum pumping system for a processing system comprising a processing chamber configured to process wafers and a transfer chamber configured to accept wafers being transferred to the processing chamber for processing and being transferred from the processing chamber after processing, the vacuum pumping system comprising:

a first motor;

a second motor;

a first vacuum pumping mechanism driven by the first motor for evacuating gas from the processing chamber;

a second vacuum pumping mechanism driven by the second motor for evacuating gas from the transfer chamber;

means for determining a cumulative load on the vacuum pumping system over time by monitoring a characteristic of the first motor or the second motor over the time; and

means for activating a maintenance activity on the vacuum pumping system when the cumulative load exceeds a predetermined amount.

2. The vacuum pumping system of claim 1, wherein the characteristic comprises a power required by the first motor to drive the first vacuum pumping mechanism or a power required by the second motor to drive the second vacuum pumping mechanism.

3. The vacuum pumping system of claim 2, wherein the means for determining monitors a current in the first motor in order to determine the power required by the first motor or monitors a current in the second motor in order to determine the power required by the second motor.

4. The vacuum pumping system of claim 1, wherein the cumulative load is equal to the total mass flow of fluid pumped by the first vacuum pumping mechanism or the second vacuum pumping mechanism during the time.

5. The vacuum pumping system of claim **4**, wherein a condition of the vacuum pumping system deteriorates in proportion to the mass flow of fluid pumped by the first vacuum pumping mechanism or the second vacuum pumping mechanism, and wherein the predetermined amount is predetermined such that when the cumulative load exceeds the predetermined amount the pumping system requires a maintenance activity to be performed in order to restore the condition.

6. The vacuum pumping system of claim **1**, wherein the means for determining monitors the characteristic of the second motor over the time;

wherein during pump down the second vacuum pumping mechanism reduces the pressure in the transfer chamber from a first pressure at which wafers are introduced to the transfer chamber to a second pressure at which wafers are transferred from the transfer chamber to the processing chamber for processing;

wherein the characteristic of the second motor increases during pump down and decreases when the second vacuum pumping mechanism is not reducing pressure in the transfer chamber; and

wherein the cumulative load is a number of wafers processed by the processing system and the means for determining means determines the cumulative load by counting a number of increases in the characteristic of the second motor.

7. The vacuum pumping system of claim 1, wherein the means for determining monitors the characteristic of the first motor over the time;

wherein the first vacuum pumping mechanism introduces processing gas to the processing chamber during a processing step and evacuates processing gas from the processing chamber;

wherein the characteristic of the first motor increases during each processing step and decreases when the first vacuum pumping mechanism is not evacuating gas from the processing chamber; and

wherein the cumulative load is equal to the total mass flow of processing gas pumped by the first vacuum pumping mechanism over a plurality of processing steps and the means for determining determines the cumulative load by determining an amount by which the characteristic of the first motor increases over time.

8. The vacuum pumping system of claim 7, wherein the cumulative load is proportional to an integral of the characteristic with respect to time and the means for determining comprises integrating means for integrating the characteristic with respect to time.

9. The vacuum pumping system of claim 6, wherein a condition of the vacuum pumping system associated with at least one of the first vacuum pumping mechanism and the second vacuum pumping mechanism deteriorates in proportion to a number of wafers processed by the processing system; and

wherein the means for activating triggers the maintenance activity for restoring the condition when the number of wafers processed by the system exceeds a predetermined amount.

10. The vacuum pumping system of claim **7**, wherein a condition of the vacuum pumping system associated with at least one of the first vacuum pumping mechanism and the second vacuum pumping mechanism deteriorates in proportion to a total mass flow of processing gas evacuated by the first vacuum pumping means from the processing chamber; and

wherein the means for activating triggers the maintenance activity for improving the condition when the total mass flow of processing gas exceeds a predetermined amount.

11. The vacuum pumping system of claim **9**, wherein the condition of the vacuum pumping system associated with the at least one of the first vacuum pumping mechanism or the second vacuum pumping mechanism deteriorates according to the cumulative load as a function of a number of wafers processed by the processing system and a total mass flow of processing gas evacuated by the first vacuum pumping mechanism from the processing chamber; and

wherein the means for activating triggers the maintenance activity for improving the condition when the cumulative load exceeds the predetermined amount.

12. The vacuum pumping system of claim **11**, wherein the means for determining determines the cumulative load as function of the number of wafers adjusted by the total mass flow of gas.

13. The vacuum pumping system of claim **1**, further comprising:

a user interface disposed remotely from the first vacuum pumping mechanism and the second vacuum pumping mechanism, the system being arranged such that the means for activating outputs a requirement for the maintenance activity at the user interface.

14. The vacuum pumping system of claim **1**, further comprising a booster pump, wherein the booster pump comprises at least one of the first vacuum pumping mechanism and the second vacuum pumping mechanism.

15. A maintenance detection unit for a vacuum pumping system for a processing system comprising a processing chamber configured to process wafers and a transfer chamber configured to accept wafers being transferred to the processing chamber for processing and being transferred from the processing chamber after processing, the vacuum pumping system comprising a first motor; a second motor; a first vacuum pumping mechanism driven by the first motor for evacuating gas from the processing chamber; and a second vacuum pumping mechanism driven by the second motor for evacuating gas from the transfer chamber; the maintenance detection unit comprising:

means for determining a cumulative load on the vacuum pumping system over time by monitoring a characteristic of the first motor or the second motor over the time;

means for activating a maintenance activity on the vacuum pumping system when the cumulative load exceeds a predetermined amount; and

an interface for between the maintenance detection unit and the vacuum pumping system control unit.

16. A processing system comprising:

a processing chamber configured for containing wafers during processing;

a transfer chamber configured to accept wafers being transferred to the processing chamber for processing and being transferred from the processing chamber after processing;

a vacuum pumping sub-system comprising:

a first motor;

a second motor;

a first vacuum pumping mechanism driven by the first motor for evacuating gas from the processing chamber;

a second vacuum pumping mechanism driven by the second motor for evacuating gas from the transfer chamber;

at least one other sub-system in addition to the vacuum pumping sub-system;

means for determining a load on the vacuum pumping sub-system by monitoring a characteristic of the first motor or the second motor; and

control means for controlling operation of the at least one other sub-system in accordance with the load on the vacuum pumping sub-system.

17. The processing system of claim **16**, wherein the characteristic comprises a power required by the first motor to drive the first vacuum pumping mechanism or a power required by the second motor to drive the second vacuum pumping mechanism, the power being in proportion to a load on the first vacuum pumping mechanism or the second vacuum pumping mechanism.

18. The processing system of claim **17**, wherein the means for determining monitors a current in the first motor in order to determine the power required by the first motor or monitors a current in the second motor in order to determine the power required by the second motor.

19. The processing system of claim **16**, wherein the load comprises the mass flow of fluid pumped by the first vacuum pumping mechanism or the second vacuum pumping mechanism.

20. The processing system of claim **19**, wherein the means for determining determines the mass flow of fluid being pumped by the vacuum pumping mechanism or the second vacuum pumping mechanism and outputs, to the control means for controlling operation of the at least one other sub-system, a signal representative of the mass flow rate.

21. The processing system of claim **20**, wherein the control means for controlling operation of the at least one other sub-system controls operation of the at least one other sub-system in accordance with the flow rate of fluid.

22. The processing system of claim **21**, wherein the control means for controlling operation of the at least one other sub-system controls the at least one other sub-system to operate in idle mode to reduce consumption of resources by the at least one other sub-system when the mass flow rate of fluid is below a threshold mass flow rate of fluid for a predetermined duration.

23. The processing system of claim **16**, wherein the control means for controlling operation of the at least one other sub-system activates operation of the at least one other sub-system when the load increases above a threshold load.

24. The processing system of claim **16**, wherein the transfer chamber comprises a load lock chamber.

25. The processing system of claim **16**, wherein the at least one other sub-system comprises at least one of an abatement system, a chiller, or a second vacuum pumping sub-system.

26. The processing system of claim **16**, wherein the means for determining comprises a clock and differentiating circuitry and the control means comprises a comparator and a memory.

27. A processing system comprising:

an abatement system;

a processing chamber;

a load lock chamber;

a vacuum pumping sub-system comprising:

a first vacuum pumping mechanism driven by a first motor for evacuating gas from the processing chamber; and

a second vacuum pumping mechanism driven by a second motor for evacuating gas from the load lock chamber, wherein in a pressure reduction step the second vacuum pumping mechanism reduces the pressure in the load lock chamber from a first pressure at which wafers are introduced to the transfer chamber to a second pressure at which wafers are transferred from the transfer chamber to the processing chamber for processing;

determining means for determining a load on the vacuum pumping sub-systems by monitoring a characteristic of the second motor, wherein the characteristic of the second motor increases during each pressure reduction step and decreases when the second vacuum pumping mechanism is not reducing pressure in the transfer chamber; and

control means for activating the abatement system when the characteristic increases above a threshold and causing the abatement system to adopt an idle mode when the characteristic has decreased below the threshold for a predetermined duration.

28. The processing system of claim **27**, wherein the first vacuum pumping mechanism introduces processing gas to the processing chamber during a processing step and evacuates processing gas from the processing chamber.

29. A control unit for a processing system comprising a processing chamber configured to process wafers, a transfer chamber configured to accept wafers being transferred to the processing chamber for processing and being transferred from the processing chamber after processing, and a vacuum pumping sub-system, wherein the vacuum bumping sub-system comprises a first motor, a second motor, a first vacuum pumping mechanism driven by the first motor for evacuating gas from the processing chamber, a second vacuum pumping mechanism driven by the second motor for evacuating gas from the transfer chamber, the processing system further comprising at least one other sub-system in addition to the vacuum pumping sub-system, the control unit comprising:

means for determining a cumulative load on the vacuum pumping sub-system over time by monitoring a characteristic of the first motor or the second motor over the time; and

means for controlling operation of the at least one other sub-system in accordance with the cumulative load on the vacuum pumping sub-system.