WHAT IS CLAIMED IS:

1. A method for analyzing building sensor data, the method comprising:

receiving building sensor data for a building, the data comprising a plurality of values over time for a plurality of sensors;

determining at least one of:

phase and magnitude values associated with each sensor of the plurality of sensors based on a spectral analysis technique applied to the building sensor data, and

energy values associated with each sensor of the plurality of sensors based on an energy-based technique applied to the building sensor data;

performing at least one of the following tasks:

generating a visualization based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase, magnitude, or energy values associated with a plurality of sensors, and

determining a time to activate or to deactivate an actuator, based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors,

the method performed by a computer system comprising one or more computing devices.

2. The method of Claim 1, wherein the method comprises determining phase and magnitude values associated with each sensor of the plurality of sensors based on a spectral analysis technique applied to the building sensor data.

3. The method of Claim 1, wherein the method comprises determining energy values associated with each sensor based on an energy-based technique applied to the building sensor data.

4. The method of Claim 1, wherein the method comprises performing the task generating a visualization based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase, magnitude, or energy values associated with a plurality of sensors.

5. The method of Claim 1, wherein the method comprises performing the task determining a time to activate or to deactivate an actuator, based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors is performed.

6. The method of Claim 2, wherein the spectral analysis technique comprises a Koopman-based technique.

7. The method of Claim 3, wherein the energy-based technique comprises a Proper Orthogonal Decomposition.

8. The method of Claim 2, wherein the building sensor data comprises data from a real-world building and data from a simulated model of the building, the method further comprising comparing at least one Koopman mode amplitude or phase obtained from real-world building sensor data with at least one Koopman mode amplitude or phase obtained from simulated model sensor data.

9. The method of Claim 1, wherein the plurality of values over time comprises one of temperature values, humidity values, airflow values, pressure

values, people occupancy values, plug load density values, and light intensity values.

10. The method of Claim 1, further comprising:

identifying a final output of interest based on the at least one of the phase, magnitude, or energy values;

identifying a plurality of inputs affecting the final output of interest based on the at least one of the phase, magnitude, or energy values; and

representing the final output and the plurality of inputs affecting the final output as a graph, the graph comprising an edge between a first input from the plurality of inputs affecting the final output and the final output, wherein a thickness of the edge corresponds to the influence of the first input upon the final output of interest.

11. An electronic apparatus for assessing building properties comprising:

a memory configured to store a data set, the data set comprising building sensor data, the building sensor data comprising a plurality of values over time for a plurality of sensors;

one or more processors; and

software, stored in a memory, configured to cause the one or more processors to determine, based on the dataset, at least one of:

phase and magnitude values associated with each sensor of the plurality of sensors based on a spectral analysis technique applied to the building sensor data, and

energy values associated with each sensor of the plurality of sensors based on an energy-based technique applied to the building sensor data;

the software additionally configured to cause the one or more processors to perform at least one of the following tasks:

generating a visualization based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase, magnitude, or energy values associated with a plurality of sensors, and

determining a time to activate or to deactivate an actuator, based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors,

12. The electronic apparatus of Claim 11, wherein the one or more processors determine the phase and magnitude values associated with each sensor of the plurality of sensors based on a spectral analysis technique applied to the building sensor data.

13. The electronic apparatus of Claim 11, wherein the one or more processors determine the energy values associated with each sensor based on an energy-based technique applied to the building sensor data.

14. The electronic apparatus of Claim 11, wherein the one or more processors perform the task generating a visualization based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase, magnitude, or energy values associated with a plurality of sensors.

15. The electronic apparatus of Claim 11, wherein the one or more processors perform the task determining a time to activate or to deactivate an actuator, based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors.

16. The electronic apparatus of Claim 12, wherein the spectral analysis technique comprises a Koopman-based technique.

17. The electronic apparatus of Claim 13, wherein the energy-based technique comprises a Proper Orthogonal Decomposition.

18. The electronic apparatus of Claim 12, wherein the building sensor data comprises data from a real-world building and data from a simulated model of the building, the method further comprising comparing at least one Koopman mode amplitude or phase obtained from real-world building sensor data with at least one Koopman mode amplitude or phase obtained from simulated model sensor data.

19. The electronic apparatus of Claim 11, wherein the plurality of values over time comprises one of temperature values, humidity values, airflow values, pressure values, people occupancy values, plug load density values, and light intensity values.

20. The electronic apparatus of Claim 11, the software additionally configured to cause the one or more processors to:

identify a final output of interest based on the at least one of the phase, magnitude, or energy values;

identify a plurality of inputs affecting the final output of interest based on the at least one of the phase, magnitude, or energy values; and

represent the final output and the plurality of inputs affecting the final output as a graph, the graph comprising an edge between a first input from the plurality of inputs affecting the final output and the final output, wherein a thickness of the edge corresponds to the influence of the first input upon the final output of interest.

21. A non-transitory computer storage comprising instructions that direct a computing system to perform a process that comprises:

receiving building sensor data for a building, the data comprising a plurality of values over time for a plurality of sensors;

determining at least one of:

phase and magnitude values associated with each sensor of the plurality of sensors based on a spectral analysis technique applied to the building sensor data, and

energy values associated with each sensor of the plurality of sensors based on an energy-based technique applied to the building sensor data;

performing at least one of the following tasks:

generating a visualization based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase, magnitude, or energy values associated with a plurality of sensors, and

determining a time to activate or to deactivate an actuator, based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors,

the method performed by a computer system comprising one or more computing devices.

22. An electronic apparatus for assessing building properties comprising:

means for storing a data set, the data set comprising building sensor data, the building sensor data comprising a plurality of values over time for a plurality of sensors;

processing means configured to determine, based on the dataset, at least one of:

phase and magnitude values associated with each sensor of the plurality of sensors based on a spectral analysis technique applied to the building sensor data, and

energy values associated with each sensor of the plurality of sensors based on an energy-based technique applied to the building sensor data;

the processing means additionally configured to perform at least one of the following tasks:

generating a visualization based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase, magnitude, or energy values associated with a plurality of sensors, and

determining a time to activate or to deactivate an actuator, based on at least one of the phase, magnitude, or energy values associated with a plurality of sensors.

23. The electronic apparatus of Claim 22, wherein the processing means comprises one or more processors.

24. A method of representing influential factors in a building, comprising:

identifying a final output of interest;

identifying a plurality of inputs affecting the final output of interest; and

representing the final output and the plurality of inputs affecting the final output as a graph, the graph comprising an edge between a first input from the plurality of inputs affecting the final output and the final output,

wherein a thickness of the edge corresponds to the influence of the first input upon the final output of interest,

the method performed by a computer system comprising one or more computing devices.

25. The method of Claim 24, wherein the representation of at least one of the plurality of inputs affecting the final output comprises a circle, the circle illustrating the uncertainty of the at least one of the plurality of inputs.

26. The method of Claim 24, wherein identifying a plurality of inputs affecting the final output of interest comprises determining a plurality of values for the first input and modeling the effect on the output when the first input is set to each of the plurality of values.

27. The method of Claim 26, wherein the influence of the first input upon the final output of interest is determined using quasi-monte carlo methods.

28. The method of Claim 24, wherein the final output of interest comprises at least one of domestic hot water energy, air conditioning usage, electricity usage for a particular room, pump, fan usage, lighting system, usage chiller usage, and cooling system usage.

29. An electronic apparatus for representing influential factors in a building, comprising:

one or more processors configured to:

identify a final output of interest;

identify a plurality of inputs affecting the final output of interest; and

represent the final output and the plurality of inputs affecting the final output as a graph, the graph comprising an edge between a first input from the plurality of inputs affecting the final output and the final output, wherein a thickness of the edge corresponds to the influence of the first input upon the final output of interest.

30. The electronic apparatus of Claim 29, wherein the representation of at least one of the plurality of inputs affecting the final output comprises a circle, the circle illustrating the uncertainty of the at least one of the plurality of inputs.

31. The electronic apparatus of Claim 29, wherein identifying a plurality of inputs affecting the final output of interest comprises determining a plurality of values for the first input and modeling the effect on the output when the first input is set to each of the plurality of values.

32. The electronic apparatus of Claim 31, wherein the influence of the first input upon the final output of interest is determined using quasi-monte carlo methods.

33. The electronic apparatus of Claim 29, wherein the final output of interest comprises at least one of domestic hot water energy, air conditioning usage, electricity usage for a particular room, pump, fan usage, lighting system, usage chiller usage, and cooling system usage.

34. A non-transitory computer storage comprising instructions that direct a computing system to perform a process that comprises:

identifying an final output of interest;

identifying a plurality of inputs affecting the final output of interest; and

representing the final output and the plurality of inputs affecting the final output as a graph, the graph comprising an edge between a first input from the plurality of inputs affecting the final output and the final output, wherein a thickness of the edge corresponds to the influence of the first input upon the final output of interest,

the method performed by a computer system comprising one or more computing devices.

35. An electronic apparatus for representing influential factors in a building, comprising:

means for processing configured to:

identify a final output of interest;

identify a plurality of inputs affecting the final output of interest; and

represent the final output and the plurality of inputs affecting the final output as a graph, the graph comprising an edge between a first input from the plurality of inputs affecting the final output and the final output, wherein a thickness of the edge corresponds to the influence of the first input upon the final output of interest.

36. The electronic apparatus of Claim 35, wherein the processing means comprises a processor.

**WHAT IS CLAIMED IS:**

1. A method for analyzing building sensor data, the method comprising:

receiving building sensor data for a building, the data comprising a plurality of values over time for a plurality of sensors;

determining phase and magnitude values associated with one or more sensors of the plurality of sensors based on a spectral analysis technique applied to the building sensor data; and

generating a visualization based on at least one of the phase or magnitude values associated with the plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase or magnitude values associated with the plurality of sensors,

the method performed by a building energy management system comprising one or more computing devices.

2. The method of claim 1, wherein the method comprises determining energy values associated with one or more sensors based on an energy-based technique applied to the building sensor data.

3. The method of claim 2, wherein generating a visualization further comprises generating the visualization based on at least one of the phase, magnitude, or energy values associated with the plurality of sensors, the overlay depicting at least one of the phase, magnitude, or energy values associated with the plurality of sensors.

4. The method of claim 2, wherein the method comprises determining a time to activate or to deactivate an actuator based on at least one of the phase, magnitude, or energy values associated with the plurality of sensors.

5. The method of claim 1, wherein the spectral analysis technique comprises a Koopman-based technique.

6. The method of claim 2, wherein the energy-based technique comprises a Proper Orthogonal Decomposition.

7. The method of claim 1, wherein the building sensor data comprises data from a real-world building and data from a simulated model of the building, the method further comprising comparing at least one Koopman mode amplitude or phase obtained from real-world building sensor data with at least one Koopman mode amplitude or phase obtained from simulated model sensor data.

8. The method of claim 1, wherein the plurality of values over time comprises one of temperature values, humidity values, airflow values, pressure values, people occupancy values, plug load density values, and light intensity values.

9. The method of claim 1, further comprising:

identifying a final output of interest based on the at least one of the phase or magnitude values;

identifying a plurality of inputs affecting the final output of interest based on the at least one of the phase or magnitude values; and

representing the final output and the plurality of inputs affecting the final output as a graph, the graph comprising an edge between a first input from the plurality of inputs affecting the final output and the final output, wherein a thickness of the edge corresponds to the influence of the first input upon the final output of interest.

10. An electronic apparatus for assessing building properties comprising:

a memory configured to store a data set, the data set comprising building sensor data, the building sensor data comprising a plurality of values over time for a plurality of sensors;

one or more processors; and

software, stored in a memory, configured to cause the one or more processors to determine phase and magnitude values associated with one or more sensors of the plurality of sensors based on a spectral analysis technique applied to the building sensor data; and

the software additionally configured to cause the one or more processors to generate a visualization based on at least one of the phase, magnitude, or energy values associated with the plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase or magnitude values associated with the plurality of sensors.

11. The electronic apparatus of claim 10, wherein the one or more processors determine the energy values associated with one or more sensors based on an energy-based technique applied to the building sensor data.

12. The electronic apparatus of claim 11, wherein the one or more processors generate a visualization based on at least one of the phase, magnitude, or energy values associated with the plurality of sensors, the overlay depicting at least one of the phase, magnitude, or energy values associated with the plurality of sensors.

13. The electronic apparatus of claim 10, wherein the one or more processors determine a time to activate or to deactivate an actuator, based on at least one of the phase or magnitude values associated with the plurality of sensors.

14. The electronic apparatus of claim 10, wherein the spectral analysis technique comprises a Koopman-based technique.

15. The electronic apparatus of claim 11, wherein the energy-based technique comprises a Proper Orthogonal Decomposition.

16. The electronic apparatus of claim 10, wherein the building sensor data comprises data from a real-world building and data from a simulated model of the building, the software additional configured to cause the one or more processors to compare at least one Koopman mode amplitude or phase obtained from real-world building sensor data with at least one Koopman mode amplitude or phase obtained from simulated model sensor data.

17. The electronic apparatus of claim 10, wherein the plurality of values over time comprises one of temperature values, humidity values, airflow values, pressure values, people occupancy values, plug load density values, and light intensity values.

18. The electronic apparatus of claim 10, the software additionally configured to cause the one or more processors to:

identify a final output of interest based on the at least one of the phase or magnitude values;

identify a plurality of inputs affecting the final output of interest based on the at least one of the phase or magnitude values; and

represent the final output and the plurality of inputs affecting the final output as a graph, the graph comprising an edge between a first input from the plurality of inputs affecting the final output and the final output, wherein a thickness of the edge corresponds to the influence of the first input upon the final output of interest.

19. A non-transitory computer storage comprising instructions that direct a computing system comprising one or more computing devices to perform a process that comprises:

receiving building sensor data for a building, the data comprising a plurality of values over time for a plurality of sensors;

determining phase and magnitude values associated with one or more sensors of the plurality of sensors based on a spectral analysis technique applied to the building sensor data; and

generating a visualization based on at least one of the phase or magnitude values associated with the plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase or magnitude values associated with the plurality of sensors.

**20**. An electronic apparatus for assessing building properties comprising:

means for storing a data set, the data set comprising building sensor data, the building sensor data comprising a plurality of values over time for a plurality of sensors;

processing means configured to determine, based on the dataset, phase and magnitude values associated with one or more sensors of the plurality of sensors based on a spectral analysis technique applied to the building sensor data; and

the processing means additionally configured to generate a visualization based on at least one of the phase or magnitude values associated with the plurality of sensors, the visualization comprising an overlay upon a building floorplan, the overlay depicting at least one of the phase or magnitude values associated with the plurality of sensors.

**21**. The electronic apparatus of claim **20**, wherein the processing means comprises one or more processors.

**22**. The non-transitory computer storage of claim **19**, wherein the process further comprises determining energy values associated with each sensor of the plurality of sensors based on an energy-based technique applied to the building sensor data.

**23**. The non-transitory computer storage of claim **19**, wherein the process further comprises determining a time to activate or to deactivate an actuator, based on at least one of the phase or magnitude values associated with a plurality of sensors.

**24**. The electronic apparatus of claim **20**, wherein the processing means is additionally configured to determine energy values associated with each sensor of the plurality of sensors based on an energy-based technique applied to the building sensor data.

25. The electronic apparatus of claim 20, wherein the processing means is additionally configured to determine a time to activate or to deactivate an actuator, based on at least one of the phase or magnitude values associated with a plurality of sensors.