

**Topic: Energy-related investment decisions for Data Centers.**

**Focus Group Questionnaire**

First name: Dave

1. Which of the following do you do in your position?

a. Participate in decisions about purchasing equipment for your data center (e.g., servers, software, racks, lighting, cooling equipment)?  Yes  No

b. Participate in decisions about servicing or maintaining equipment for your data center?

Yes  No

2. How many data centers, server rooms, and server closets does your company own or operate?

Enter number here 40 +

3. [If more than one data center] For how many data centers are you involved in major equipment purchase and maintenance decisions?

Enter number here All

4. The majority of the data centers you help manage are:

a. Server closets or rooms (less than 500 square feet)

b. Localized data centers (500 – 5,000 square feet)

c. Enterprise data centers (> 5,000 square feet)

d. Mega or utility-scale data centers (>10,000 square feet)

5. What is the average number of racks in your typical data center?

Enter number here 200 or  if > 2000

6. How many servers are there in your organization as a whole?

< 2000

2000 – 10,000

10,000 – 50,000

> 50,000

7. What type of data centers does your company operate?

- Server rooms or closets
- Enterprise/corporate data centers
- Cloud/hyperscale computing
- High-performance/scientific computing
- Multi-tenant/colocation data centers

8. Which sectors does your data center support? (Name top three)

- a. IT services
- b. Energy and utilities
- c. Media and telecommunications
- d. Banking and financial services
- e. Health care
- f. Education
- g. Co-location/shared
- h. Other: \_\_\_\_\_

9. What state(s) are your data centers located in?

Enter states here: Global

10. When did you last pursue a major equipment purchase/upgrade for your data center?

- a. Within the last 3 years
- b. 3-5 years ago
- c. More than 5 years ago

11. How often do you replace servers in your data centers?

5 years

12. How often do you make major infrastructure upgrades to your data centers? 2 years

13. Do you actively participate in the EnergySTAR Buildings, Green Grid, or another third-party energy-efficiency program?

- Yes
- No

14. Have you had an energy audit performed by a third party within the last three years?

Yes  No

15. Do you track energy use on a regular basis? Yes

a. What is the typical annual electricity consumption (kwh) of one of your data centers?

5 MW of average load globally

16. Do you track power usage effectiveness (PUE) or any other energy efficiency measures?

a. If so, what is the average PUE of your data centers? 1.5

17. Do you track server utilization? Yes

a. Is so, what is the average server utilization rate of your data centers? 60%

18. Do you rent data center space *from another company*?  Yes  No

If yes, what percentage of your data center needs are met by renting space from others?

35 %

19. Do you lease or outsource *from another company* any of the following elements of your data centers?

	Yes	No	Sometimes
b. Servers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Facility management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Maintenance & repairs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Do you lease space in your data center(s) *to other companies*?  Yes  No

If yes, what percentage of your racks are leased to other companies? \_\_\_\_\_ %

21. If you lease DC space to or from another company, does the tenant or facility owner typically pay for electricity costs? yes

22. Has your company considered or used any of the following technologies and energy saving strategies: **(check all that apply)**

	Has used		Never used		Don't know
	would use again	would not use again	would consider in the future	would not consider	
<b>Facility Management</b>					
Isolating hot/cold aisles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blanking panels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enclose server racks (e.g., strip curtains)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data center infrastructure management (DCIM) software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raising temperature set points	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
List typical facility temperature: _____					
Variable speed fan drives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficient air handling units	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modular facility design for data center expansion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air-side economizer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water-side economizer	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficiency lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Predictive modeling of future IT deployments	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Servers</b>					
Energy-efficient server hardware (e.g., power supply, fans, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Underclocking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virtualization	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decommission idle servers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consolidate lightly used servers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve data storage efficiency	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT power management software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>[Multi-tenant DCs] Adjust pricing models to incentivize energy efficiency</b>					
Space-based pricing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and power block pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and actual power pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Topic: Energy-related investment decisions for Data Centers.**

**Focus Group Questionnaire**

First name: Dooy

1. Which of the following do you do in your position?

a. Participate in decisions about purchasing equipment for your data center (e.g., servers, software, racks, lighting, cooling equipment)?  Yes  No

b. Participate in decisions about servicing or maintaining equipment for your data center?

Yes  No

2. How many data centers, server rooms, and server closets does your company own or operate?

Enter number here 11

3. [If more than one data center] For how many data centers are you involved in major equipment purchase and maintenance decisions?

Enter number here 1

4. The majority of the data centers you help manage are:

- a. Server closets or rooms (less than 500 square feet)
- b. Localized data centers (500 – 5,000 square feet)
- c. Enterprise data centers (> 5,000 square feet)
- d. Mega or utility-scale data centers (>10,000 square feet)

5. What is the average number of racks in your typical data center?

Enter number here \_\_\_\_\_ or  if > 2000

6. How many servers are there in your organization as a whole?

- < 2000
- 2000 – 10,000
- 10,000 – 50,000
- > 50,000

7. What type of data centers does your company operate?

- Server rooms or closets
- Enterprise/corporate data centers
- Cloud/hyperscale computing
- High-performance/scientific computing
- Multi-tenant/colocation data centers

8. Which sectors does your data center support? (Name top three)

- a. IT services
- b. Energy and utilities
- c. Media and telecommunications
- d. Banking and financial services
- e. Health care
- f. Education
- g. Co-location/shared
- h. Other: \_\_\_\_\_

9. What state(s) are your data centers located in?

Enter states here: \_\_\_\_\_

10. When did you last pursue a major equipment purchase/upgrade for your data center?

- a. Within the last 3 years
- b. 3-5 years ago
- c. More than 5 years ago

11. How often do you replace servers in your data centers?

\_\_\_\_\_

12. How often do you make major infrastructure upgrades to your data centers? 10 years

13. Do you actively participate in the EnergySTAR Buildings, Green Grid, or another third-party energy-efficiency program?

- Yes
- No

14. Have you had an energy audit performed by a third party within the last three years?

Yes       No

15. Do you track energy use on a regular basis? YES

a. What is the typical annual electricity consumption (kwh) of one of your data centers?  
\_\_\_\_\_

16. Do you track power usage effectiveness (PUE) or any other energy efficiency measures?

a. If so, what is the average PUE of your data centers? NO

17. Do you track server utilization?

a. If so, what is the average server utilization rate of your data centers? \_\_\_\_\_

18. Do you rent data center space *from another company*?       Yes       No

If yes, what percentage of your data center needs are met by renting space from others?  
\_\_\_\_\_ %

19. Do you lease or outsource *from another company* any of the following elements of your data centers?

	Yes	No	Sometimes
b. Servers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Facility management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Maintenance & repairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Do you lease space in your data center(s) *to other companies*?       Yes       No

If yes, what percentage of your racks are leased to other companies? \_\_\_\_\_ %

21. If you lease DC space to or from another company, does the tenant or facility owner typically pay for electricity costs? \_\_\_\_\_

22. Has your company considered or used any of the following technologies and energy saving strategies: (check all that apply)

	Has used		Never used		Don't know
	would use again	would not use again	would consider in the future	would not consider	
<u>Facility Management</u>					
Isolating hot/cold aisles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blanking panels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enclose server racks (e.g., strip curtains)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data center infrastructure management (DCIM) software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Raising temperature set points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
List typical facility temperature: <u>20</u>					
Variable speed fan drives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficient air handling units	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modular facility design for data center expansion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Air-side economizer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Water-side economizer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Energy-efficiency lighting	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Predictive modeling of future IT deployments	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Servers</u>					
Energy-efficient server hardware (e.g., power supply, fans, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Underclocking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Virtualization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Decommission idle servers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Consolidate lightly used servers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Improve data storage efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
IT power management software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>[Multi-tenant DCs] Adjust pricing models to incentivize energy efficiency</u>					
Space-based pricing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Space and power block pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Space and actual power pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



**Topic: Energy-related investment decisions for Data Centers.**

**Focus Group Questionnaire**

First name: Linsy

1. Which of the following do you do in your position?

a. Participate in decisions about purchasing equipment for your data center (e.g., servers, software, racks, lighting, cooling equipment)?  Yes  No

b. Participate in decisions about servicing or maintaining equipment for your data center?

Yes  No

2. How many data centers, server rooms, and server closets does your company own or operate?

Enter number here 40+

3. [If more than one data center] For how many data centers are you involved in major equipment purchase and maintenance decisions?

Enter number here 7

4. The majority of the data centers you help manage are:

- a. Server closets or rooms (less than 500 square feet)
- b. Localized data centers (500 – 5,000 square feet)
- c. Enterprise data centers (> 5,000 square feet)
- d. Mega or utility-scale data centers (>10,000 square feet)

5. What is the average number of racks in your typical data center?

Enter number here 500-1000 or  if > 2000

6. How many servers are there in your organization as a whole?

- < 2000
- 2000 – 10,000
- 10,000 – 50,000
- > 50,000



14. Have you had an energy audit performed by a third party within the last three years?

Yes  No

15. Do you track energy use on a regular basis? yes

a. What is the typical annual electricity consumption (kwh) of one of your data centers?  
100 M

16. Do you track power usage effectiveness (PUE) or any other energy efficiency measures?

a. If so, what is the average PUE of your data centers? 1.6

17. Do you track server utilization?

a. If so, what is the average server utilization rate of your data centers? \_\_\_\_\_

18. Do you rent data center space **from another company**?  Yes  No

If yes, what percentage of your data center needs are met by renting space from others?  
20 %

19. Do you lease or outsource **from another company** any of the following elements of your data centers?

	Yes	No	Sometimes
b. Servers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Facility management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Maintenance & repairs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Do you lease space in your data center(s) **to other companies**?  Yes  No

If yes, what percentage of your racks are leased to other companies? 50 %

21. If you lease DC space to or from another company, does the tenant or facility owner typically pay for electricity costs? Facility owner first, then passed on to tenant.

22. Has your company considered or used any of the following technologies and energy saving strategies: (check all that apply)

	Has used		Never used		Don't know
	would use again	would not use again	would consider in the future	would not consider	
<u>Facility Management</u>					
Isolating hot/cold aisles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blanking panels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enclose server racks (e.g., strip curtains)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data center infrastructure management (DCIM) software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raising temperature set points	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
List typical facility temperature: <u>74° F @ Face of Rack</u>					
Variable speed fan drives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficient air handling units	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modular facility design for data center expansion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air-side economizer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water-side economizer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficiency lighting	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Predictive modeling of future IT deployments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Servers</u>					
Energy-efficient server hardware (e.g., power supply, fans, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Underclocking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Virtualization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Decommission idle servers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Consolidate lightly used servers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Improve data storage efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
IT power management software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>[Multi-tenant DCs] Adjust pricing models to incentivize energy efficiency</u>					
Space-based pricing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and power block pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and actual power pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Topic: Energy-related investment decisions for Data Centers.**

**Focus Group Questionnaire**

First name: STEVE

1. Which of the following do you do in your position?

a. Participate in decisions about purchasing equipment for your data center (e.g., servers, software, racks, lighting, cooling equipment)?  Yes  No

b. Participate in decisions about servicing or maintaining equipment for your data center?

Yes  No

2. How many data centers, server rooms, and server closets does your company own or operate? THOUSANDS

Enter number here \_\_\_\_\_

3. [If more than one data center] For how many data centers are you involved in major equipment purchase and maintenance decisions?

Enter number here 2

4. The majority of the data centers you help manage are:

- a. Server closets or rooms (less than 500 square feet)
- b. Localized data centers (500 – 5,000 square feet)
- c. Enterprise data centers (> 5,000 square feet)
- d. Mega or utility-scale data centers (>10,000 square feet)

5. What is the average number of racks in your typical data center? 10,000+

Enter number here 10,000+ or  if > 2000

6. How many servers are there in your organization as a whole?

- < 2000
- 2000 – 10,000
- 10,000 – 50,000
- > 50,000

7. What type of data centers does your company operate?

- Server rooms or closets
- Enterprise/corporate data centers
- Cloud/hyperscale computing
- High-performance/scientific computing
- Multi-tenant/colocation data centers

8. Which sectors does your data center support? (Name top three)

- a. IT services
- b. Energy and utilities
- c. Media and telecommunications
- d. Banking and financial services
- e. Health care
- f. Education
- g. Co-location/shared
- h. Other: \_\_\_\_\_

9. What state(s) are your data centers located in?

Enter states here: TEXAS, NEW JERSEY, NEW YORK

10. When did you last pursue a major equipment purchase/upgrade for your data center?

- a. Within the last 3 years (IT)
- b. 3-5 years ago
- c. More than 5 years ago

11. How often do you replace servers in your data centers?

1 TO 3 YRS

12. How often do you make major infrastructure upgrades to your data centers? 10-15 YRS

13. Do you actively participate in the EnergySTAR Buildings, Green Grid, or another third-party energy-efficiency program?

- Yes
- No



22. Has your company considered or used any of the following technologies and energy saving strategies: (check all that apply)

	Has used		Never used		Don't know
	would use again	would not use again	would consider in the future	would not consider	
<u>Facility Management</u>					
Isolating hot/cold aisles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blanking panels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enclose server racks (e.g., strip curtains)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data center infrastructure management (DCIM) software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raising temperature set points	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
List typical facility temperature: _____					
Variable speed fan drives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficient air handling units	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modular facility design for data center expansion	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air-side economizer	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water-side economizer	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficiency lighting	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Predictive modeling of future IT deployments	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Servers</u>					
Energy-efficient server hardware (e.g., power supply, fans, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Underclocking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virtualization	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decommission idle servers	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consolidate lightly used servers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve data storage efficiency	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT power management software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>[Multi-tenant DCs] Adjust pricing models to incentivize energy efficiency</u>					
Space-based pricing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and power block pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and actual power pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**Topic: Energy-related investment decisions for Data Centers.**

**Focus Group Questionnaire**

First name: Thomas

1. Which of the following do you do in your position?

a. Participate in decisions about purchasing equipment for your data center (e.g., servers, software, racks, lighting, cooling equipment)?  Yes  No

b. Participate in decisions about servicing or maintaining equipment for your data center?

Yes  No

2. How many data centers, server rooms, and server closets does your company own or operate?

Enter number here 40+

3. [If more than one data center] For how many data centers are you involved in major equipment purchase and maintenance decisions?

Enter number here 154

4. The majority of the data centers you help manage are:

- a. Server closets or rooms (less than 500 square feet)
- b. Localized data centers (500 – 5,000 square feet)
- c. Enterprise data centers (> 5,000 square feet)
- d. Mega or utility-scale data centers (>10,000 square feet)

5. What is the average number of racks in your typical data center? 150

Enter number here \_\_\_\_\_ or  if > 2000

6. How many servers are there in your organization as a whole?

- < 2000
- 2000 – 10,000
- 10,000 – 50,000
- > 50,000

7. What type of data centers does your company operate?

- Server rooms or closets
- Enterprise/corporate data centers
- Cloud/hyperscale computing
- High-performance/scientific computing
- Multi-tenant/colocation data centers

8. Which sectors does your data center support? (Name top three)

- a. IT services
- b. Energy and utilities
- c. Media and telecommunications
- d. Banking and financial services
- e. Health care
- f. Education
- g. Co-location/shared
- h. Other: Corporate ; Hosting Services

9. What state(s) are your data centers located in?

Enter states here: Global as well as <sup>multiple</sup> Domestic

10. When did you last pursue a major equipment purchase/upgrade for your data center?

- a. Within the last 3 years
- b. 3-5 years ago
- c. More than 5 years ago

11. How often do you replace servers in your data centers?

3 to 4

12. How often do you make major infrastructure upgrades to your data centers? 5-10 yrs.

13. Do you actively participate in the EnergySTAR Buildings, Green Grid, or another third-party energy-efficiency program?

- Yes
- No

14. Have you had an energy audit performed by a third party within the last three years?

Yes  No

15. Do you track energy use on a regular basis? yes

a. What is the typical annual electricity consumption (kwh) of one of your data centers?  
varies from small to millions of dollars

16. Do you track power usage effectiveness (PUE) or any other energy efficiency measures?

a. If so, what is the average PUE of your data centers? varies under 2.0

17. Do you track server utilization?

a. If so, what is the average server utilization rate of your data centers? yes in some

18. Do you rent data center space **from another company**?  Yes  No

If yes, what percentage of your data center needs are met by renting space from others?  
less than 5%

19. Do you lease or outsource **from another company** any of the following elements of your data centers?

	Yes	No	Sometimes
b. Servers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Facility management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> <i>Some are corporate</i>
d. Maintenance & repairs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> <i>Some are 3rd party</i>
e. Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Do you lease space in your data center(s) **to other companies**?  Yes  No *Partly*

If yes, what percentage of your racks are leased to other companies? 50%

21. If you lease DC space to or from another company, does the tenant or facility owner typically pay for electricity costs? facility owner

22. Has your company considered or used any of the following technologies and energy saving strategies: (check all that apply)

	Has used		Never used		Don't know
	would use again	would not use again	would consider in the future	would not consider	
<b>Facility Management</b>					
Isolating hot/cold aisles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blanking panels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enclose server racks (e.g., strip curtains)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data center infrastructure management (DCIM) software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raising temperature set points	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
List typical facility temperature: <u>70°F average</u>					
Variable speed fan drives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficient air handling units	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modular facility design for data center expansion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air-side economizer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water-side economizer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficiency lighting	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Predictive modeling of future IT deployments	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Servers</b>					
Energy-efficient server hardware (e.g., power supply, fans, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Underclocking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virtualization	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decommission idle servers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consolidate lightly used servers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve data storage efficiency	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT power management software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>[Multi-tenant DCs] Adjust pricing models to incentivize energy efficiency</b>					
Space-based pricing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and power block pricing (differentiate power and energy)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and actual power pricing (differentiate power and energy)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Topic: Energy-related investment decisions for Data Centers.**

**Focus Group Questionnaire**

First name: Scott

1. Which of the following do you do in your position?

a. Participate in decisions about purchasing equipment for your data center (e.g., servers, software, racks, lighting, cooling equipment)?  Yes  No

b. Participate in decisions about servicing or maintaining equipment for your data center?  
 Yes  No

2. How many data centers, server rooms, and server closets does your company own or operate?

Enter number here 3

3. [If more than one data center] For how many data centers are you involved in major equipment purchase and maintenance decisions?

Enter number here 3

4. The majority of the data centers you help manage are:

- a. Server closets or rooms (less than 500 square feet)
- b. Localized data centers (500 – 5,000 square feet)
- c. Enterprise data centers (> 5,000 square feet)
- d. Mega or utility-scale data centers (>10,000 square feet)

5. What is the average number of racks in your typical data center?

Enter number here \_\_\_\_\_ or  if > 2000

6. How many servers are there in your organization as a whole?

- < 2000
- 2000 – 10,000
- 10,000 – 50,000
- > 50,000

7. What type of data centers does your company operate?

- Server rooms or closets
- Enterprise/corporate data centers
- Cloud/hyperscale computing
- High-performance/scientific computing
- Multi-tenant/colocation data centers

8. Which sectors does your data center support? (Name top three)

- ③ a. IT services
- b. Energy and utilities
- c. Media and telecommunications
- ② d. Banking and financial services
- ① e. Health care
- f. Education
- g. Co-location/shared
- h. Other: \_\_\_\_\_

9. What state(s) are your data centers located in?

Enter states here: TX \_\_\_\_\_

10. When did you last pursue a major equipment purchase/upgrade for your data center?

- ① a. Within the last 3 years
- b. 3-5 years ago
- c. More than 5 years ago

11. How often do you replace servers in your data centers?

3-5 yrs \_\_\_\_\_

12. How often do you make major infrastructure upgrades to your data centers? 8-10 yrs

13. Do you actively participate in the EnergySTAR Buildings, Green Grid, or another third-party energy-efficiency program?

- Yes
- No

14. Have you had an energy audit performed by a third party within the last three years?

Yes  No

15. Do you track energy use on a regular basis? yes

a. What is the typical annual electricity consumption (kwh) of one of your data centers?

2.4mwh

16. Do you track power usage effectiveness (PUE) or any other energy efficiency measures? Yes

a. If so, what is the average PUE of your data centers? N/A

17. Do you track server utilization? Yes

a. Is so, what is the average server utilization rate of your data centers? 30%

18. Do you rent data center space *from another company*?  Yes  No

If yes, what percentage of your data center needs are met by renting space from others?

10-15 %

19. Do you lease or outsource *from another company* any of the following elements of your data centers?

	Yes	No	Sometimes
b. Servers	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Facility management	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Maintenance & repairs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Do you lease space in your data center(s) *to other companies*?  Yes  No

If yes, what percentage of your racks are leased to other companies? \_\_\_\_\_ %

21. If you lease DC space to or from another company, does the tenant or facility owner typically pay for electricity costs? \_\_\_\_\_

22. Has your company considered or used any of the following technologies and energy saving strategies: (check all that apply)

	Has used		Never used		Don't know
	would use again	would not use again	would consider in the future	would not consider	
<u>Facility Management</u>					
Isolating hot/cold aisles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blanking panels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enclose server racks (e.g., strip curtains)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Data center infrastructure management (DCIM) software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raising temperature set points	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
List typical facility temperature: <u>72</u>					
Variable speed fan drives	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy-efficient air handling units	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modular facility design for data center expansion	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air-side economizer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Water-side economizer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Energy-efficiency lighting	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Predictive modeling of future IT deployments	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Servers</u>					
Energy-efficient server hardware (e.g., power supply, fans, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Underclocking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Virtualization	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decommission idle servers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consolidate lightly used servers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve data storage efficiency	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT power management software	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>[Multi-tenant DCs] Adjust pricing models to incentivize energy efficiency</u>					
Space-based pricing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and power block pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Space and actual power pricing (differentiate power and energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>