

Open Compute Project European Data Center Energy Efficiency Assessment

October 3, 2018

Cloud and Data Center Research Practice



Background

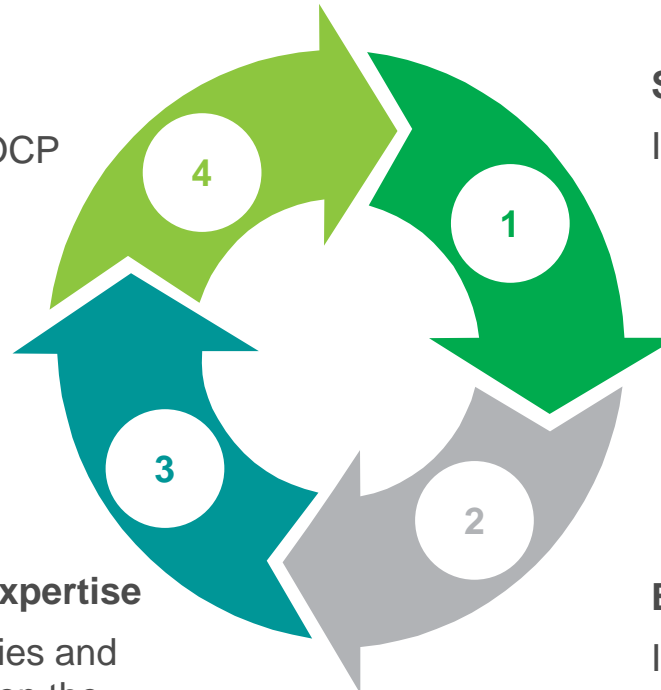
The **Open Compute Project (OCP)** commissioned **IHS Markit** to analyze the current and future state of data center energy efficiency in the European market, addressing if and how Open Compute Project equipment plays a role. **IHS Markit** completed its analysis relying on the four sources of information below.

2018 Study on OCP Market Assessment

Market sizing and forecasts for adoption of OCP certified and inspired equipment.

IHS Markit Data Center Power & Energy Expertise

A decade of research in backup power supplies and power distribution, along with recent studies on the use of renewable energy in data centers.



Suppliers of Data Center Equipment

Interviews with senior level decision makers

End-Users and Data Center Operators

Interviews with senior level decision makers

OCP operator and vendor survey results

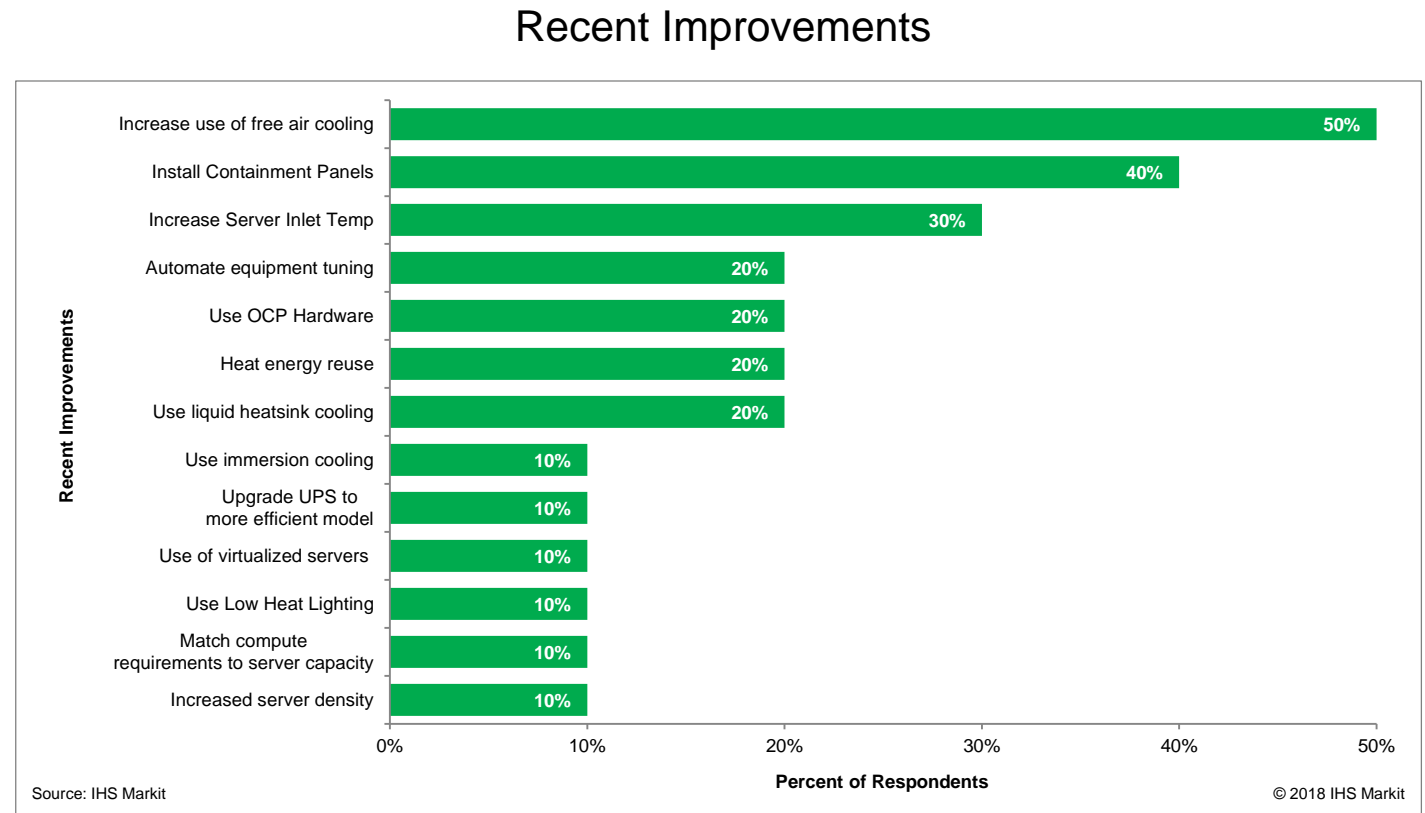
The following slides present findings from interviews with data center operators and OCP product vendors



Cooling, then compute

Q: What recent improvements have you made to your data center's energy efficiency?

- Improvements to address cooling costs are top focus for data center energy efficiency improvements
- Energy reuse important strategy, sometimes overlooked
- Optimizing compute efficiency limits need for additional cooling
- Elements on the horizon: software to automate cooling controls, OCP equipment

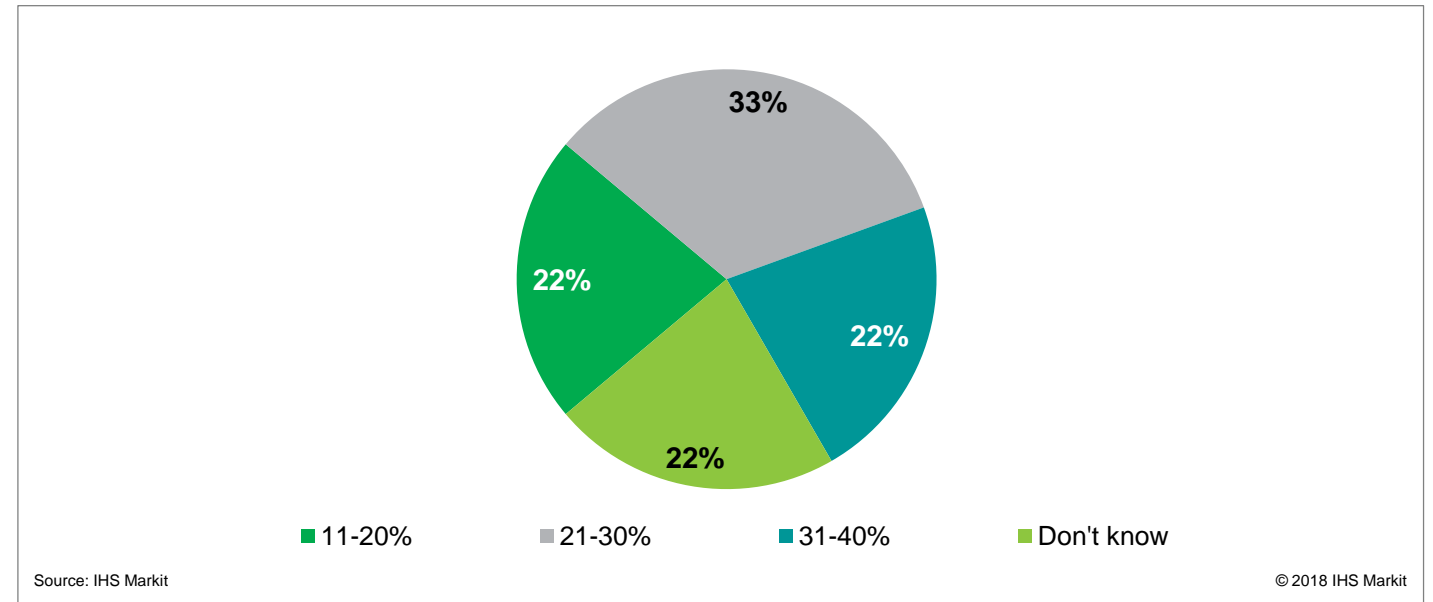


Respondents realized significant savings

Q: What was the improvement in energy consumption?

- Top improvements cited:
 - Cooling systems, optimization with virtualization
 - Migrate to immersion cooling
 - Raise room temperature to 35C
 - Use OCP servers
 - Use 12V to server, limiting number of voltages used in the data center
 - Increase compute density

Cost savings from recent improvements

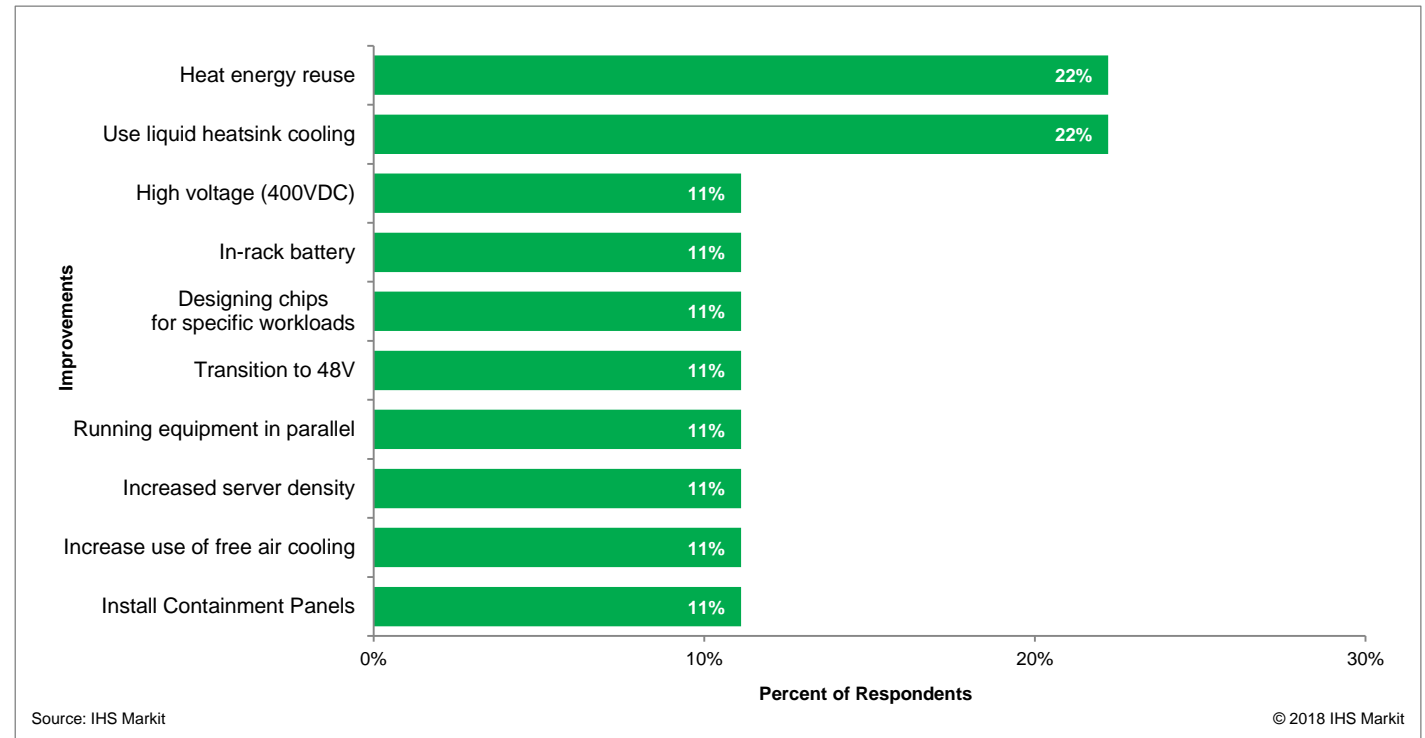


Liquid cooling more than just a science experiment

Q: What plans do you have over the next 2 years to improve data center energy efficiency?

- Telco operators most to gain, moving away from -48V
- High runners for future improvements:
 - Running cooling equipment in most efficient operating range
 - Transition to 48V for server
 - Use of high voltage (400VDC)
 - Move to in-rack batteries
 - Use ASICs matched to workloads
 - Finding uses for heat generated

Planned Improvements



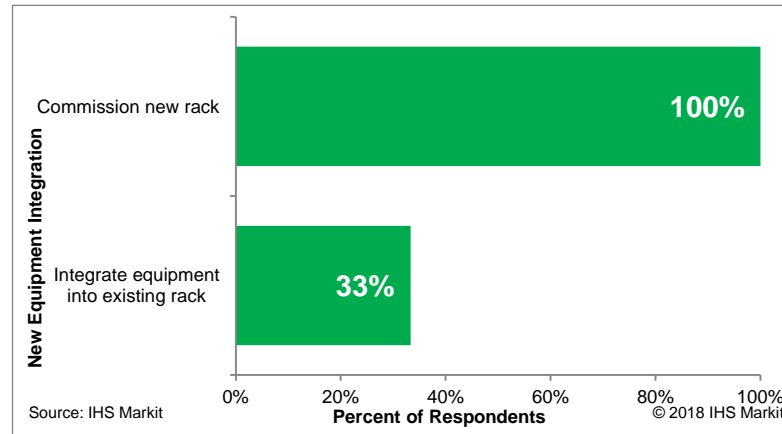
Opportunity for system integrators to deliver complete racks

Q: Commission complete racks?

- New form factor means complete racks
- Prefer in-factory cabling
- Racks deployed to match needs of a project

Note: "Rack integration" chart totals > 100% because respondents could chose "both" as an option.

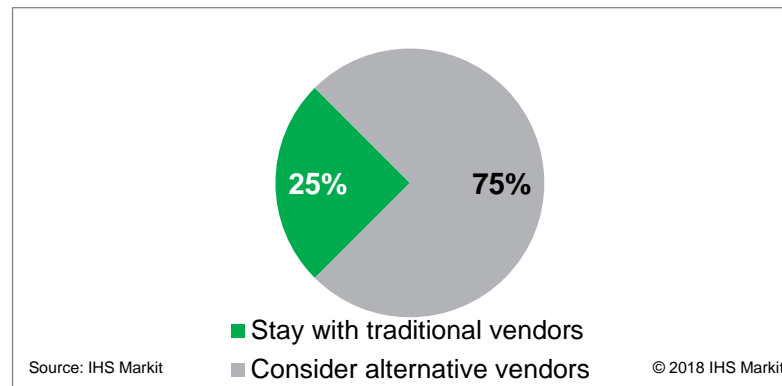
Rack Integration



Q: Considering new suppliers?

- Opportunity exists for new vendors
- System integrators play important role
- Performance and robustness still dominant criteria
- Suppliers need proof points
- Delivery time important
- Vendor lock-in not tolerated
- Supplier agreements take time

New Supplier acceptance

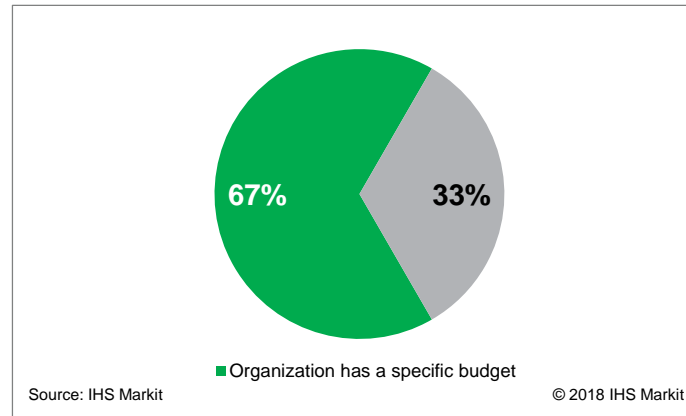


Budgets grow as ROI timeframe shortens

Q: DC energy efficiency budget?

- Bundled with project budget
- Budget targets improved control systems
- R&D budgets used for efficiency research
- VP position for efficiency
- Utility incentives alternative to internal budget

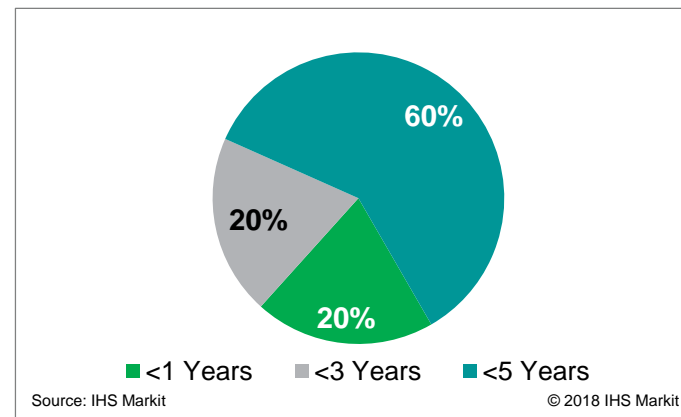
DC energy efficiency budget



Q: ROI time period?

- Larger data centers have shorter ROI timeframes
- Follows equipment life cycle
- No investment without return

ROI expectation

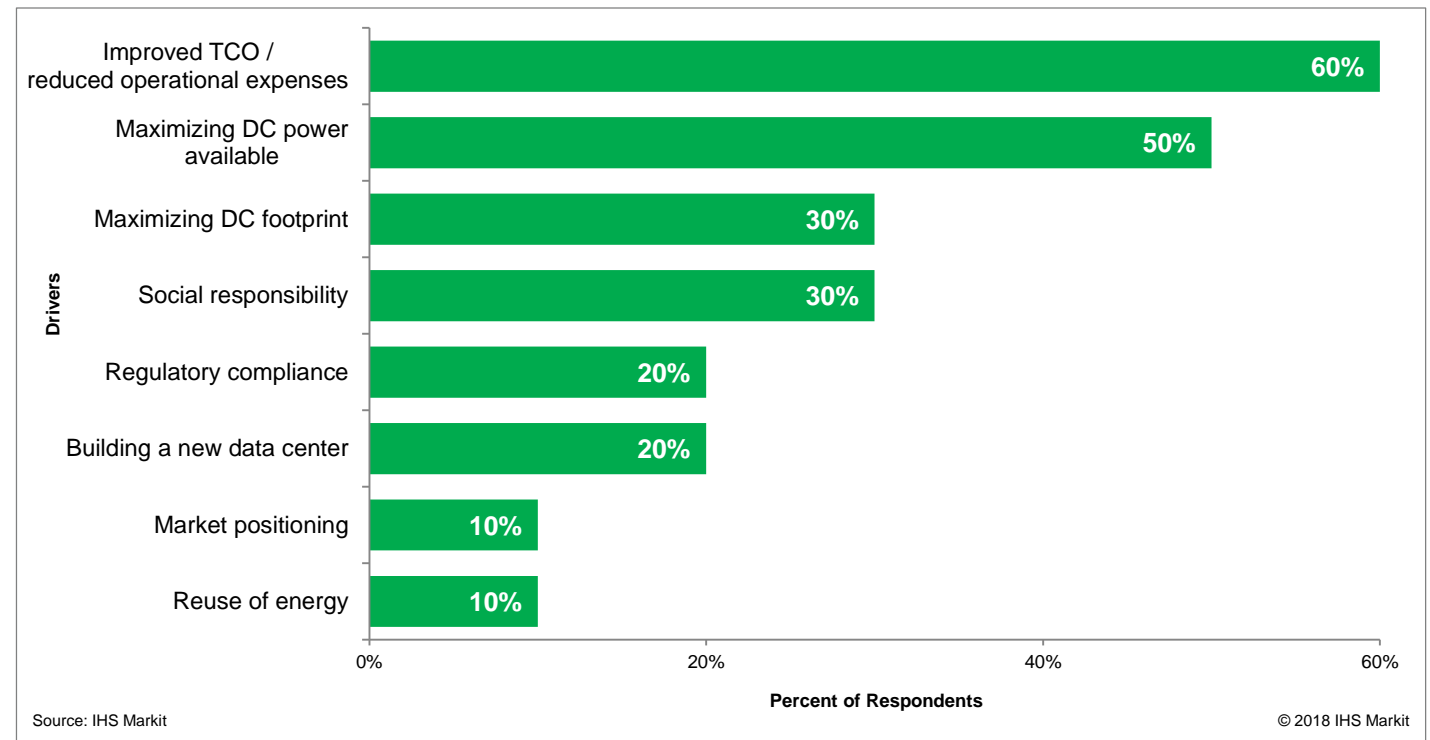


Operational expenses must come down

Q: Drivers for improving energy efficiency in data centers?

- Limit need for additional power or space by increasing efficiency
- Stay even with the competition
- Legacy COs limited power capacity
- Low power availability in big cities
- Recession increased value of “green”

DC energy efficiency drivers

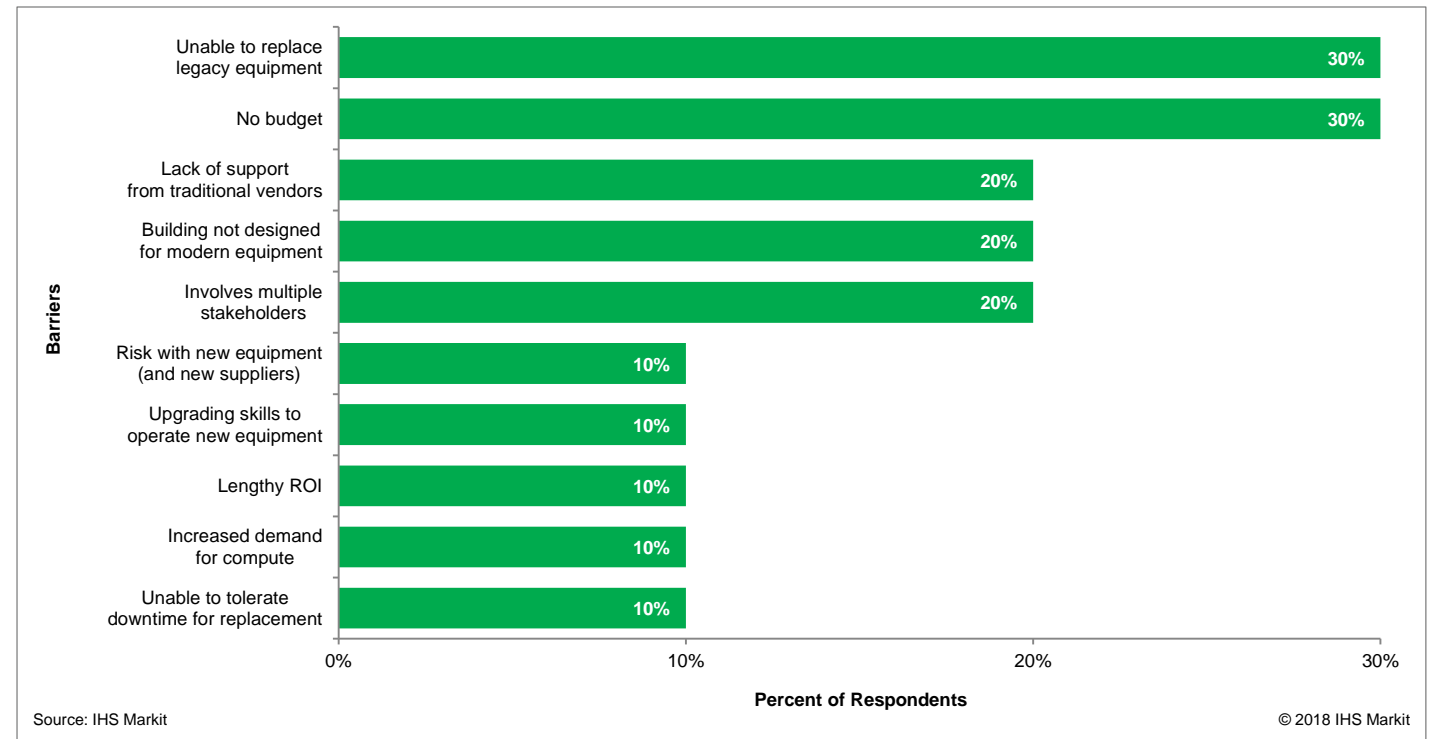


Budget constraints, changing vendors, legacy equipment impede progress

Q: Barriers for improving energy efficiency in data centers?

- Organizational structure a barrier to change
- Long design cycles for silicon may slow progress for traditional vendors
- No competitive advantage in certain markets
- DC not yet viewed as part of a larger ecosystem
- Enterprises lack capabilities to test new suppliers' products

DC energy efficiency barriers

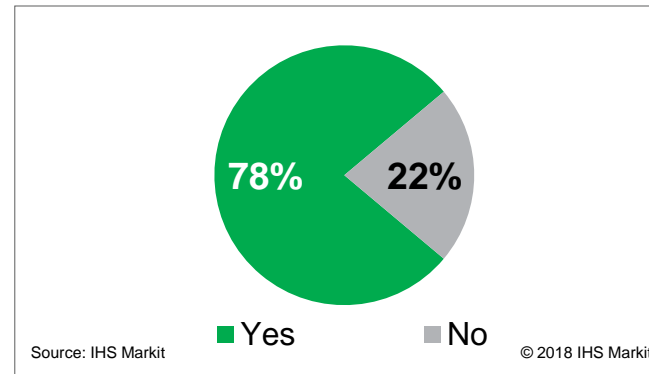


EU-ECO Awareness: Yes. Change? Maybe.

Q: Awareness of EU Eco-design?

- Designed to measure and limit idle power of server
- Respondents have limited knowledge of details
- Not expected to be punitive

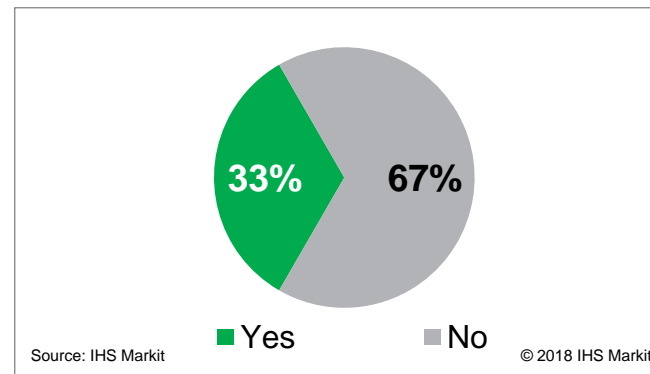
Awareness



Q: Affecting change?

- Expectation that reputable vendors will adjust for requirements
- Server manufacturers expect it will drive purchasing

Change

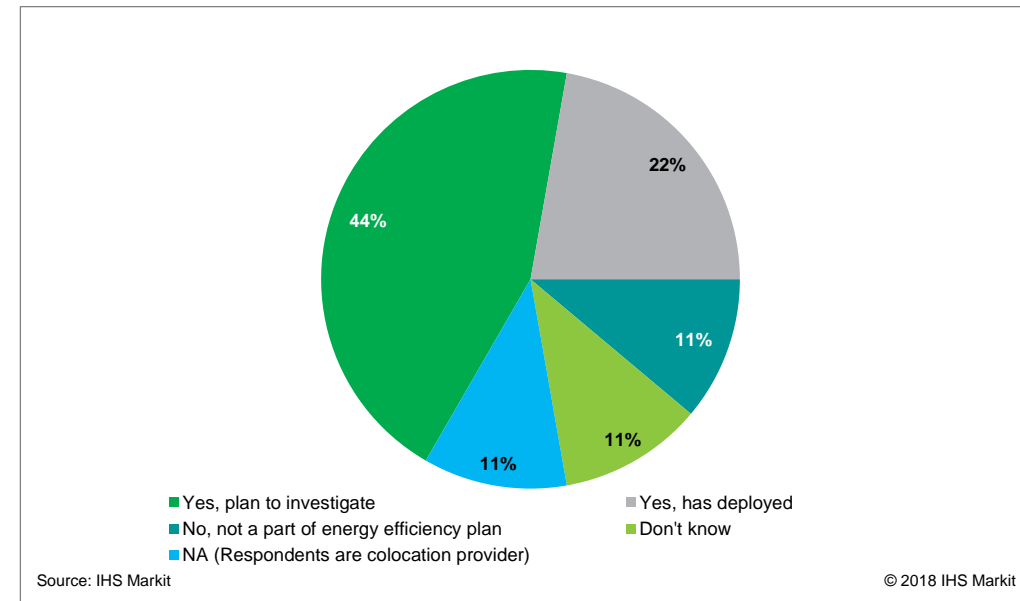


2/3rds look to OCP equipment for energy reduction

Q: OCP equipment a part of plans for energy reduction?

- Higher compute utilization an important component to achieve savings
- OCP equipment alone not enough to succeed
- Industry still lacks quantification of potential savings
- CapEx drives OCP purchasing, but OpEx should also be considered

OCP equipment plans



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