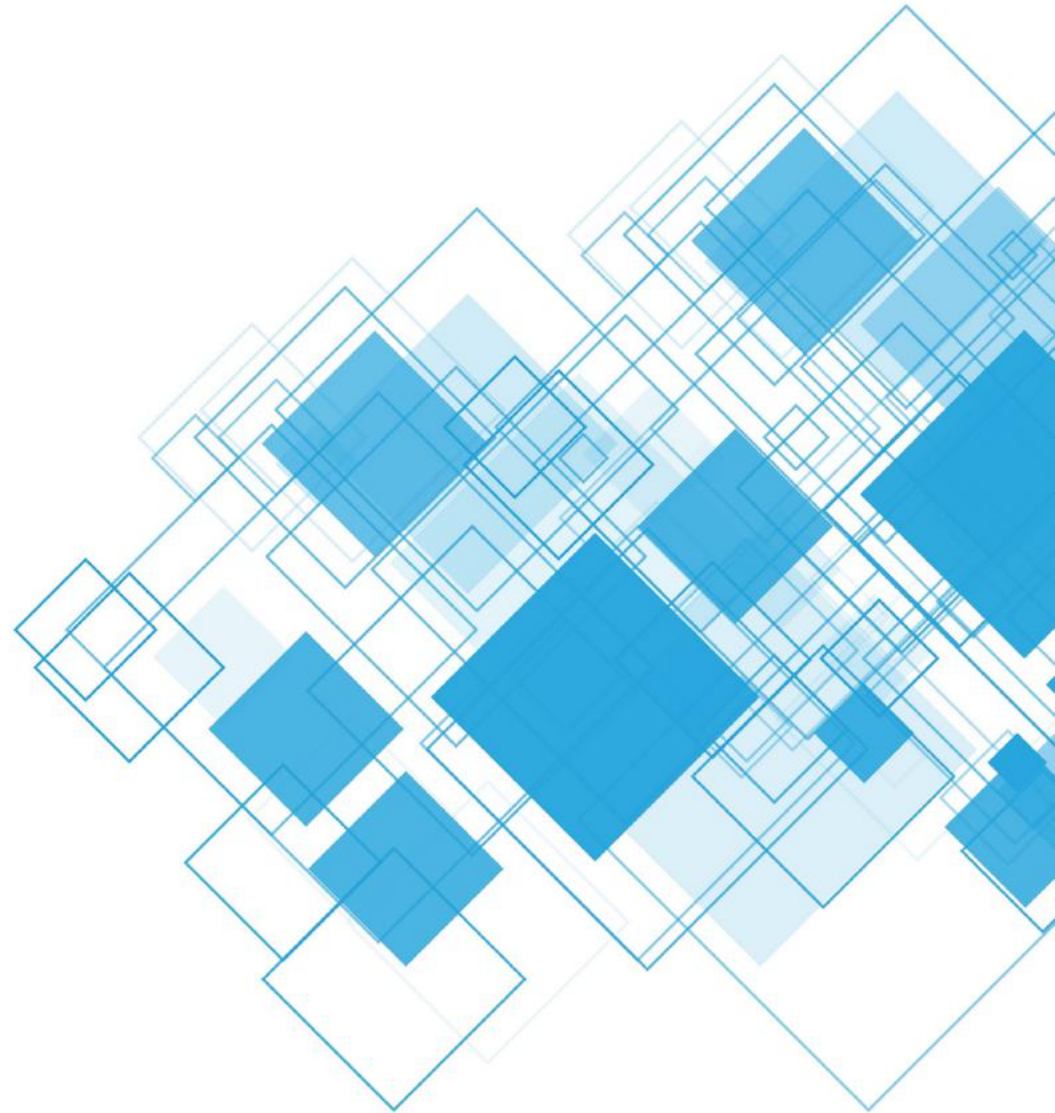# Uptime Institute®

Sustainability Imperatives 2021
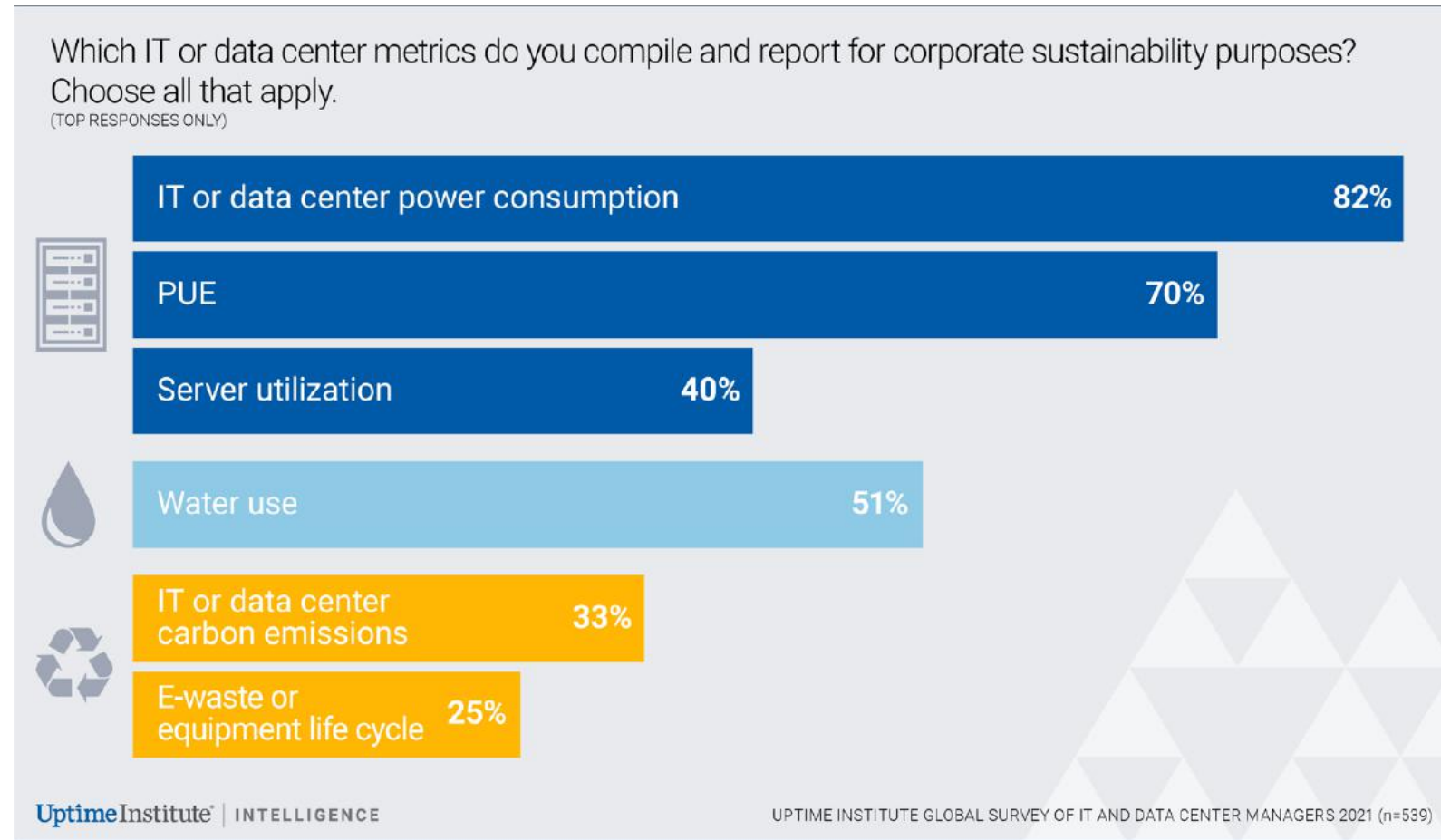
The changing environment of sustainable operations

14th October 2021

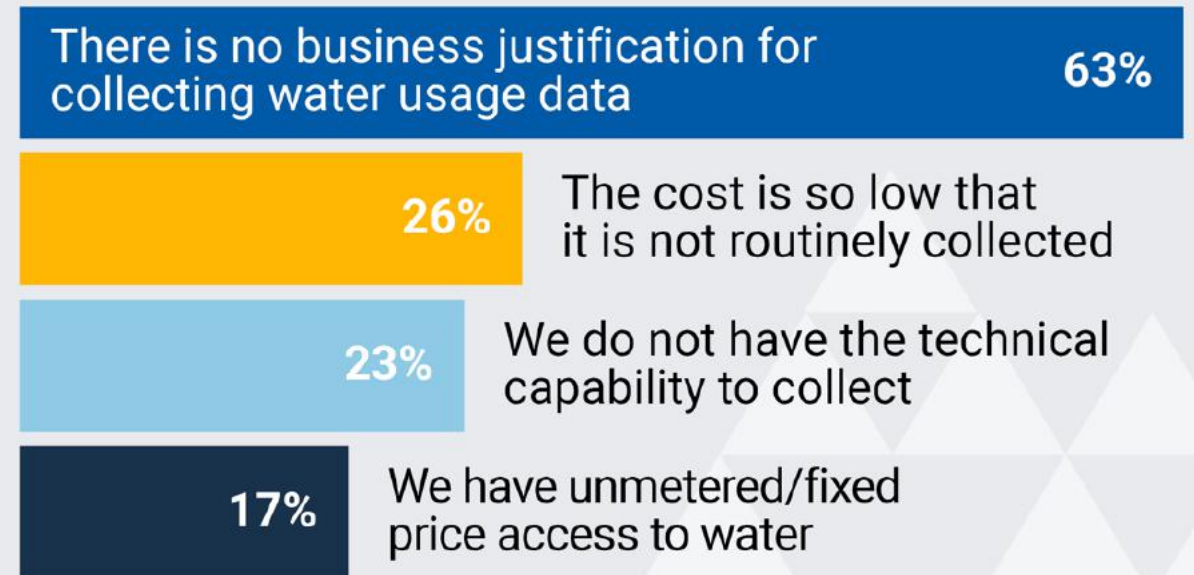**Ali Moinuddin, Managing Director, Uptime Institute Europe**

- Immaturity in adopting comprehensive sustainability is reflected in low tracking of emissions and the disposal of end-of-life kit

- Most (still) don't track server utilization, arguably the most important factor in overall efficiency

Which IT or data center metrics do you compile and report for corporate sustainability purposes? Choose all that apply.
(TOP RESPONSES ONLY)

Metric	Percentage
IT or data center power consumption	82%
PUE	70%
Server utilization	40%
Water use	51%
IT or data center carbon emissions	33%
E-waste or equipment life cycle	25%

- Most don't track water because there is no business justification

- This suggests a low priority for management – be it cost, risk or environmental considerations

- External and regulatory pressure may soon begin to drive down water use

Why doesn't your organization track data center water use? Choose all that apply.

There is no business justification for collecting water usage data — 63%

The cost is so low that it is not routinely collected — 26%

We do not have the technical capability to collect — 23%

We have unmetered/fixed price access to water — 17%

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UPTIME INSTITUTE GLOBAL SURVEY OF IT AND DATA CENTER MANAGERS 2021 (n=268)
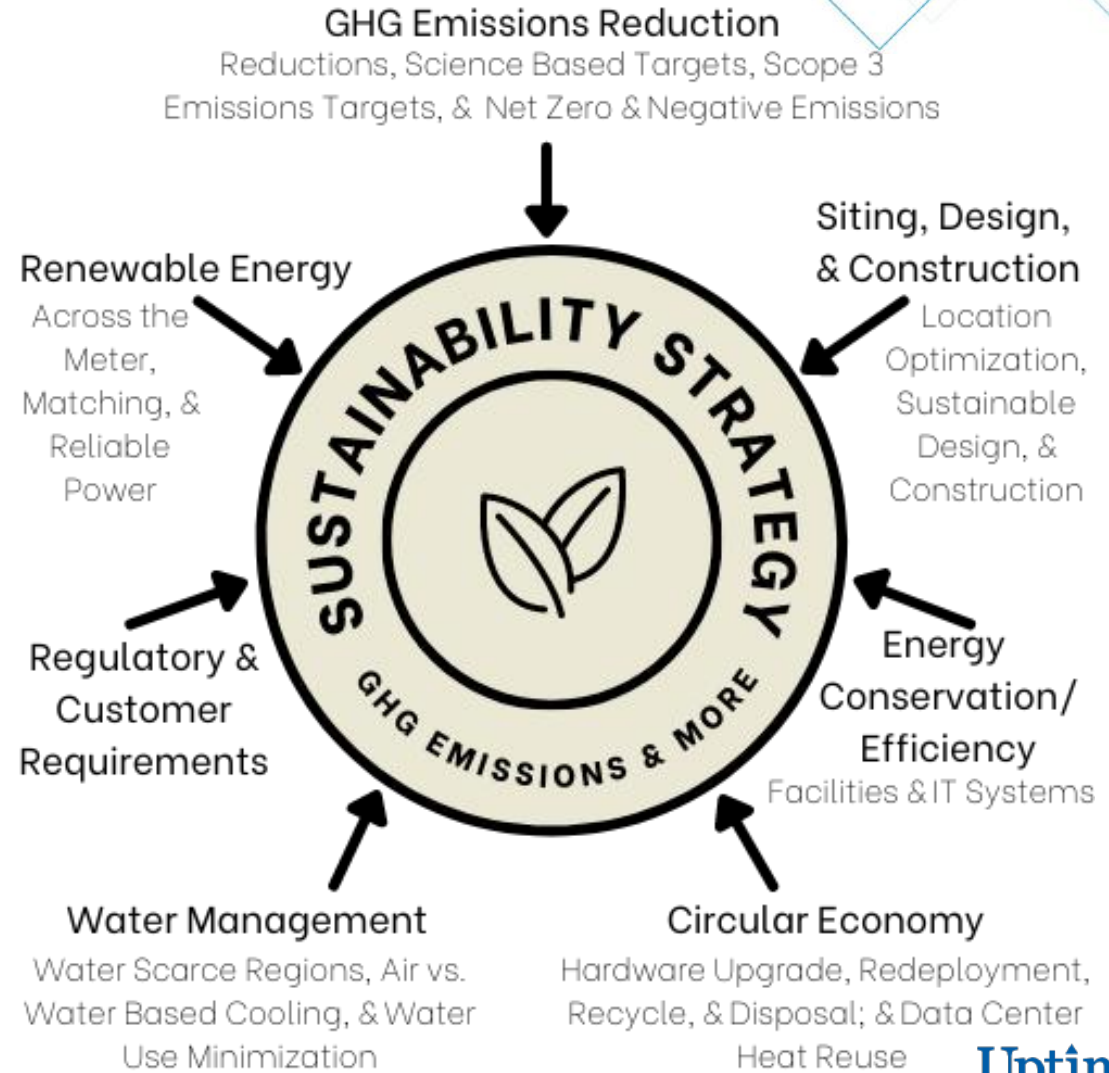
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Sustainability Strategy Agenda

The impact of climate change reporting requirements under securities reporting regulations:
1. Task force for climate-related financial disclosures requirements (TFCD)
2. Climate change resiliency audits

Energy Efficiency Directive: Data Center Requirements

Scope 3 Management considerations

GHG Emissions Reduction
Reductions, Science Based Targets, Scope 3 Emissions Targets, & Net Zero & Negative Emissions

Siting, Design, & Construction
Location Optimization, Sustainable Design, & Construction

Renewable Energy
Across the Meter, Matching, & Reliable Power

Energy Conservation/ Efficiency
Facilities & IT Systems

Regulatory & Customer Requirements

SUSTAINABILITY STRATEGY
GHG EMISSIONS & MORE

Water Management
Water Scarce Regions, Air vs. Water Based Cooling, & Water Use Minimization

Circular Economy
Hardware Upgrade, Redeployment, Recycle, & Disposal; & Data Center Heat Reuse

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Core Elements of Recommended Climate-Related Financial Disclosures

Governance
The organization's governance around climate-related risks and opportunities

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Risk Management
The processes used by the organization to identify, assess, and manage climate-related risks
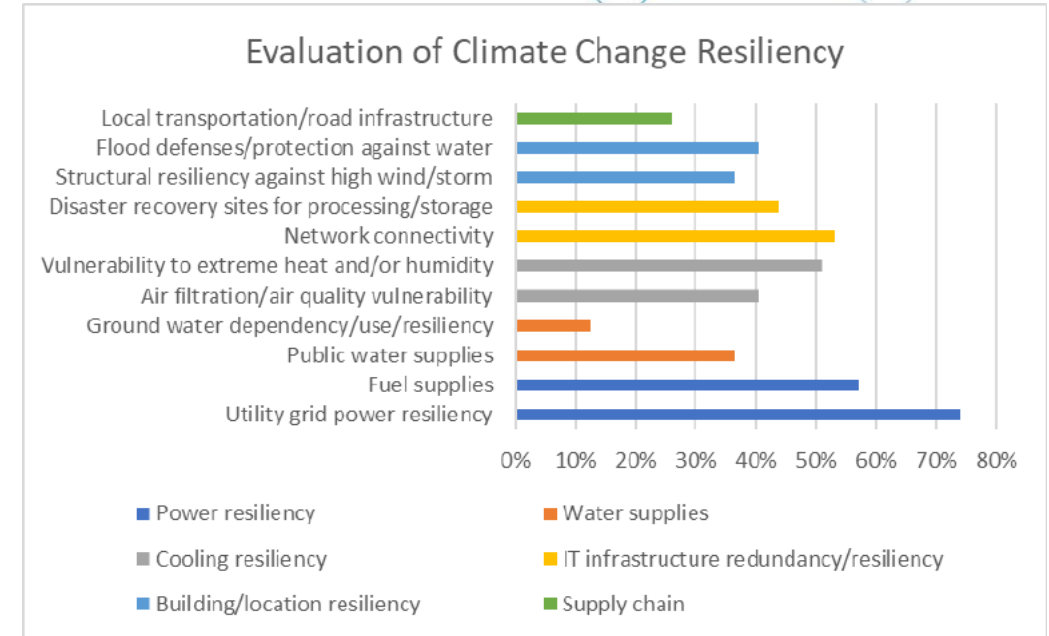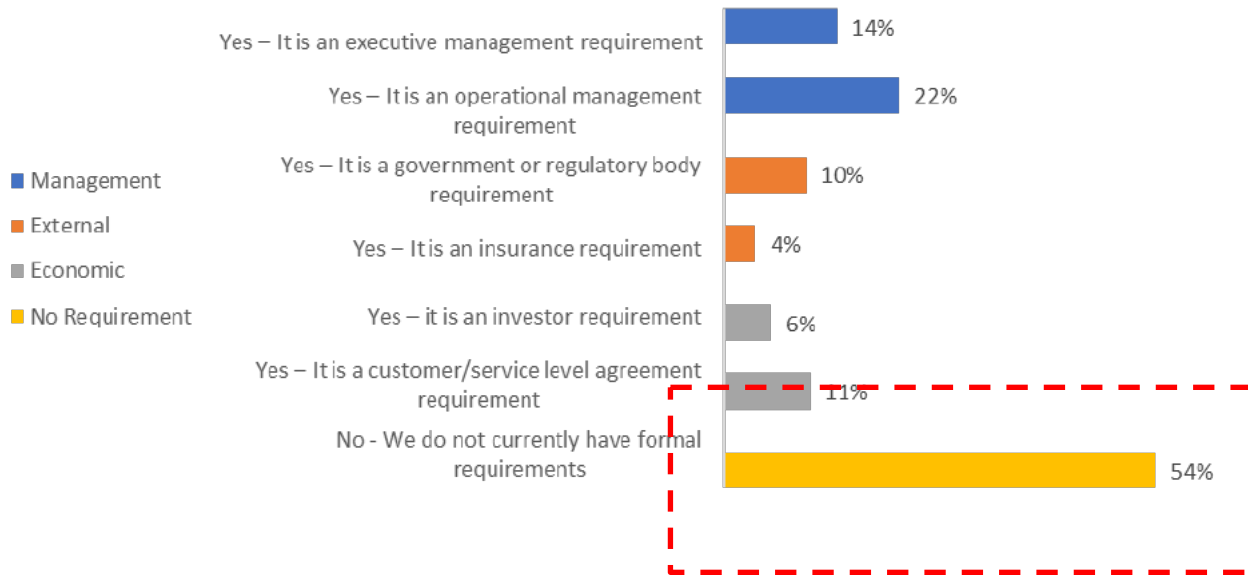
Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities

- EU and US SEC taking actions to make TCFD style reporting mandatory under security regulatory requirements
  - Current EU focus is on financial companies.
- TCFD require companies/data center operators to perform:
  - Climate risk management scenarios
  - Scopes 1, 2 and 3 inventories, reporting and goals
- Reported values will be scrutinized for accuracy
- Company financial and/or sustainability group will be involved in reporting.

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The challenge of climate change risk assessments

Are you formally required to conduct climate change/weather-related resiliency assessments for your data center infrastructure? (Choose all that apply)

- Management
- External
- Economic
- No Requirement

Yes – It is an executive management requirement	14%
Yes – It is an operational management requirement	22%
Yes – It is a government or regulatory body requirement	10%
Yes – It is an insurance requirement	4%
Yes – it is an investor requirement	6%
Yes – It is a customer/service level agreement requirement	11%
No - We do not currently have formal requirements	54%

Evaluation of Climate Change Resiliency

- Local transportation/road infrastructure
- Flood defenses/protection against water
- Structural resiliency against high wind/storm
- Disaster recovery sites for processing/storage
- Network connectivity
- Vulnerability to extreme heat and/or humidity
- Air filtration/air quality vulnerability
- Ground water dependency/use/resiliency
- Public water supplies
- Fuel supplies
- Utility grid power resiliency

Legend:
- Power resiliency
- Water supplies
- Cooling resiliency
- IT infrastructure redundancy/resiliency
- Building/location resiliency
- Supply chain

Often held views on climate risk/resiliency assessments:

Climate change resiliency assessments should be covered outside of the operator's risk management process.

Operators will have physical climate change impacts: Impacts will be assumed until proved otherwise.

Planning models are quantitative – they can reliably predict the future.
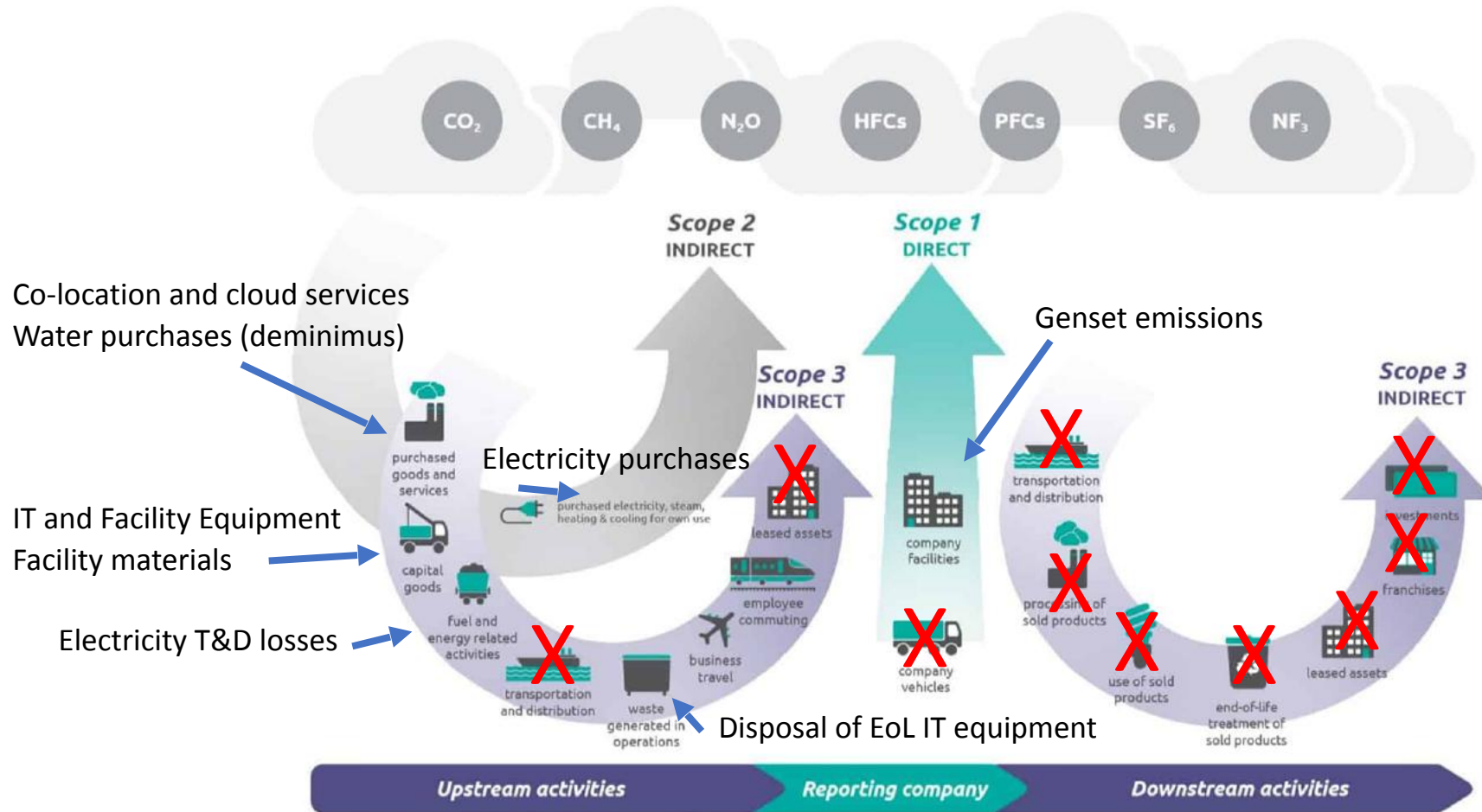
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EU Energy Efficiency Directive: Data Centre Requirements

- Proposal published July 14, 2021 set specific data center requirements (Article 11 and Annex VI)
  - Enterprises exceeding 2,777 or 27,777 MWH/year average energy consumption for 3 years shall perform energy audits.
  - Annual public reporting by March 15, 2024 and every year thereafter:
    - Facility Details: Address, IT space area, installed power, incoming and outgoing data traffic, quantity of data stored and processed.
    - Performance data: energy consumption, power utilization, temperature setpoints, waste heat utilization, water use and use of renewable energy.
  - The commission will establish sustainability ratings for data centers, optional for member states, covering:
    - How efficiently energy is used.
    - Percent of energy procured from renewable sources
    - Quantity of reused waste heat
    - Water use.
- Things to consider:
  - Energy audit will have to cover facilities and IT operations – this will be a major burden for all and a challenge for co-location providers
  - Industry needs to be involved in development of Sustainability Indicators: Can't be just hyperscale focused.
  - Major industry data will be made public.

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GHG emissions management

Focus on Scope 3

Co-location and cloud services
Water purchases (deminimus)

IT and Facility Equipment
Facility materials

Electricity T&D losses

Electricity purchases

Genset emissions

Disposal of EoL IT equipment

Source: GHG Protocol Scope 3 Guidance

Observations:

Scope 3 accounting is expected, but largely qualitative.

- Stakeholders are pushing for reduction goals.
- Scope 3 is triple counting

Co-location services accounting:

- IT power – scope 2
- Facilities power – scope 3

Cloud services is scope 3

Genset emissions are only scope 1, small part of inventory.

Calculation of other scope 3 categories will require use of standard factors.

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IT Metrics

- Power management enablement:
  - Percent of installed base with power management on.
  - Estimated energy savings from power management enablement.
- Virtualization metrics:
  - Average CPU or memory utilization
  - Server capacity utilization – use SERT transaction measurement as a capacity proxy
    - SERT maximum transaction data can be requested from server manufacturer – they have to run the test for the EU market
  - Images per server
- Workload metrics:
  - Transactions or utilized capacity (CPU, storage, network) per MWh
  - Average percent of transaction capacity used – actual transactions divided by transaction capacity
  - Energy saved from avoided hardware deployments
- Cloud conversion/operation metrics:
  - % reduction in server count and energy consumption with move from enterprise to cloud.
  - Average % utilization of cloud servers and benefits of power management enablement if power aware workload placement software is used in real-time.

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Building Limits and Certifications

- Amsterdam data center power and space caps:
  - Building confined to 4 locations each in the two metropolitan districts.
  - Cap set on total MWs.
  - PUE of 1.2 or less for new data center builds.
- Frankfurt Germany and Singapore have also set limits on data center growth
- Shanghai China has set data center PUE requirements.
- Boulder CO USA Building Efficiency Requirements
  - Reporting and certification to ENERGY STAR building portfolio.
- EU Energy Performance of buildings directive
  - Requires building performance assessment and periodic third-party audit or validation

These restrictions and requirements will become more prevalent with time.

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