Blending Innovation and Regulation: The New Data Centre Design Recipe

DCW 2025

13th March 2025

RED

2025

PUBLIC ☐ INTERNAL ☐ RESTRICTED ☐ SECRET

A company of TRACTEBEL ENGIE


Uptime Institute
Data Center Site Infrastructure
Tier Standard: Operational Sustainability

The Uptime Institute developed the Tier rating standard in 1994

The first Data Centre (DC) design standard of the modern era

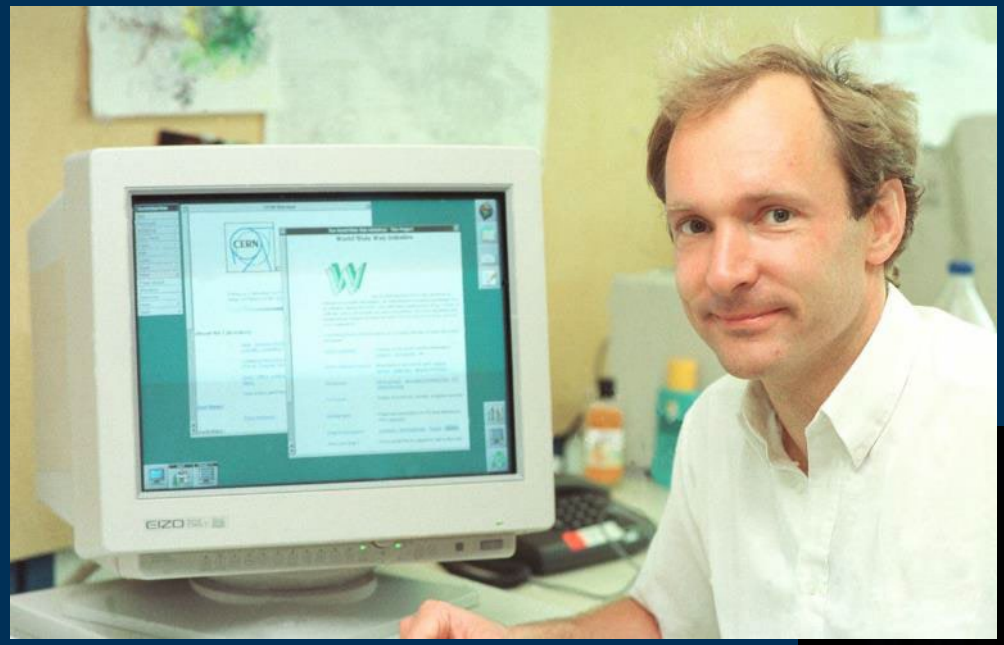
During this presentation we will try to answer the questions:

30 years after the first design guidance was released:
How have regulations & guidance changed?
Are current regulations & guides fit for purpose?

History

How did it start?

‘the birth of the internet’ - ‘World wide web’ - ‘information superhighway’



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1st Decade of internet growth

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NFPA 75
Standard for the Fire Protection of Information Technology Equipment - Addresses fire protection requirements for data centres.

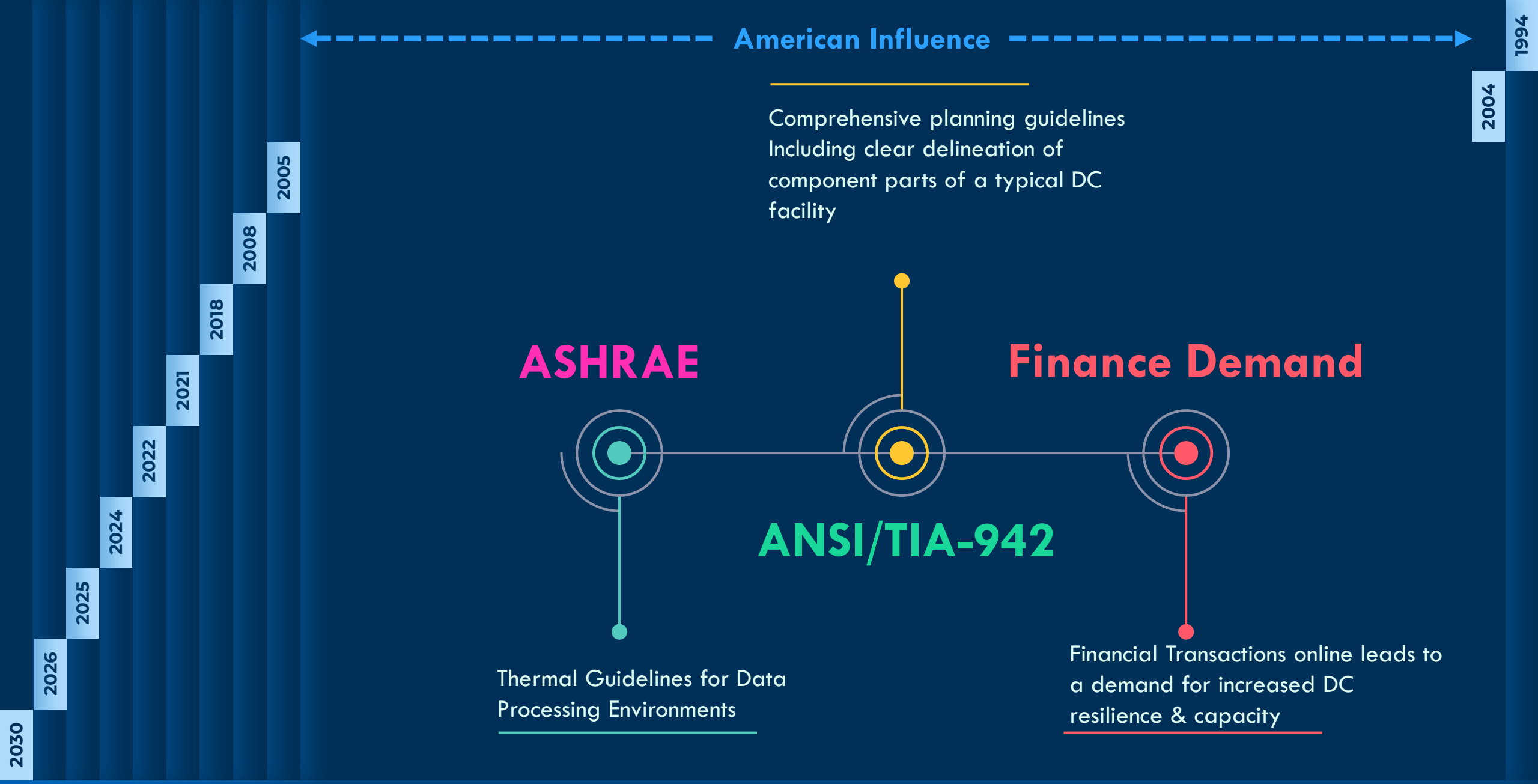
Up Time Institute

Telecoms

NFPA

Tier Rating Standard
Gained recognition in 1995

Most DCs were in fact Telecoms switch rooms


American Influence
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Comprehensive planning guidelines Including clear delineation of component parts of a typical DC facility
ASHRAE
Finance Demand
ANSI/TIA-942
Thermal Guidelines for Data Processing Environments
Financial Transactions online leads to a demand for increased DC resilience & capacity

Pre Financial 2008 Crash

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EU Code of Conduct

The first guidance referenced by regulation in the EU.

Trading

'Copy' & 'Mirror' & 'HFT' trading enabled by DCs helps spread the flash crash

Microsoft

Start running servers in tents.
The industry is eager to push the boundaries of efficiency to reduce energy cost.

British Influence

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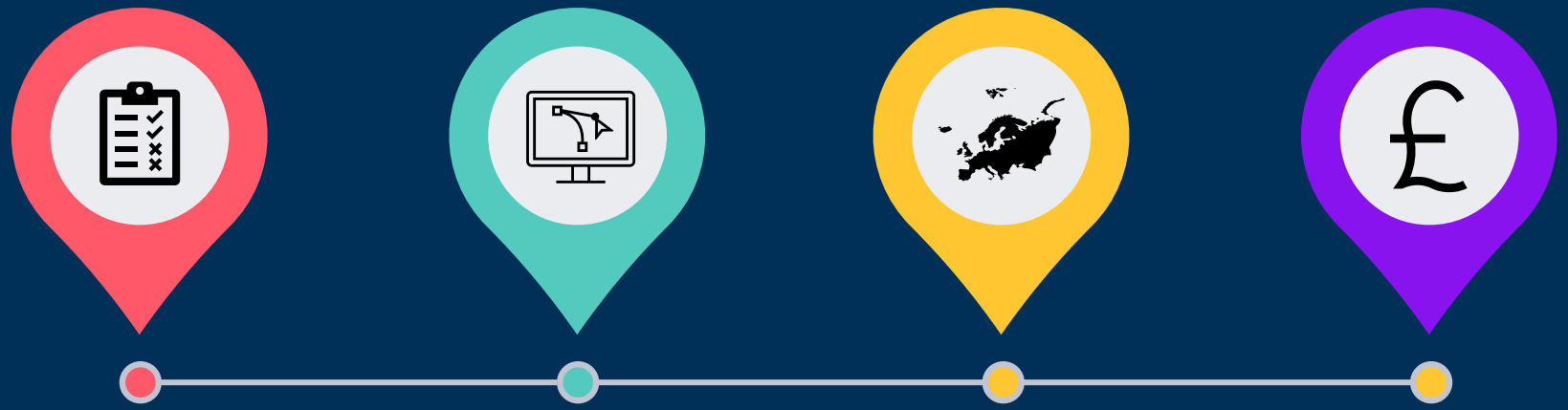

BREEAM DCs

Data Centre Scheme launched (certification started in 2010)

CIBSE KS18

CIBSE's only real DC guidance manual

BS EN 50600

The cornerstone of ISO 22237 and still one of the most influential guidance standards

RICS

Valuation for Data Centres

International collaboration

2021

NABERS The Rules Energy for Data Centres Version 1.0

2018

ISO 22237 – International version of BS EN 50600

2021

Climate Neutral Data Centre Pact Launched (CNDCP)

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EU Gets Serious

2022

2022

EU Energy Efficiency Directive (EED) REPowerEU plan proposed

Corporate Sustainability Due Diligence Directive (CSDDD) Adopted

2022

Council of the EU adopts is '*common position*' on the AI Act - DORA

1994 2004 2005 2008 2018 2021 2022 2024 2025 2026 2030

Updates and implementation

2023

LEED v5 Draft issued

2023

Energy Efficiency Directive stricter targets for DCs as part of the REPowerEU adoption

2023

German Energy Efficiency Act (EnEfG) all DCs in Germany to achieve 1.2 PUE from July 2026

2024

Corporate Sustainability Reporting Directive (CSRD) First Year of reporting

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It never rains, it only pours!

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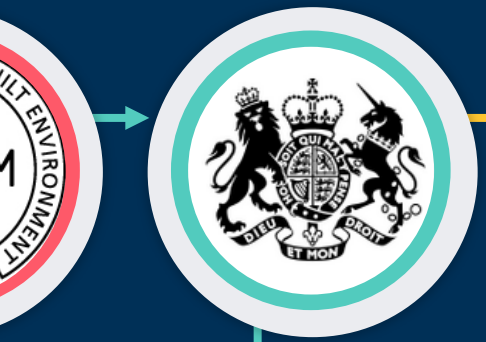
BREEAM v6
Draft for comment

F-Gas regulations
EU 2024/573 comes into force



UK CNI Designation
Data Centre now considered to be critical infrastructure in the UK

UK Net Zero Building Standard released
Version 1 due in 2025

What is going on this year!

1

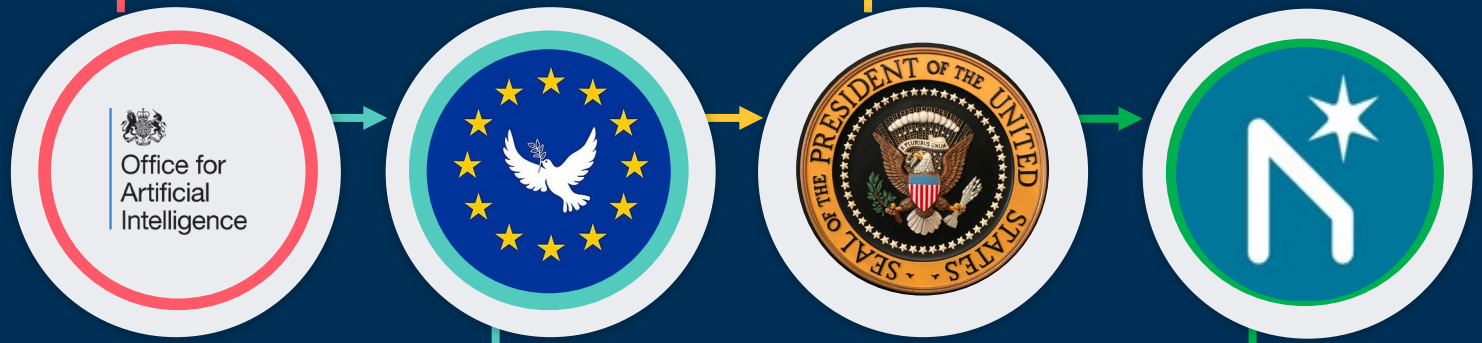
UK Gov. AI Strategy

'turbocharge AI adoption across the UK' – 'AI Growth Zones announced'

3

US Policy

Energy, trade, investment, tariffs. The new administration is shaking up world trade.



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EU Relax CSRD/CSDDD

Less companies need to report

4

Australian rules 5*

Federal government wants all DCs to maintain NABERS 5* (PUE 1.4)

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All bets are off

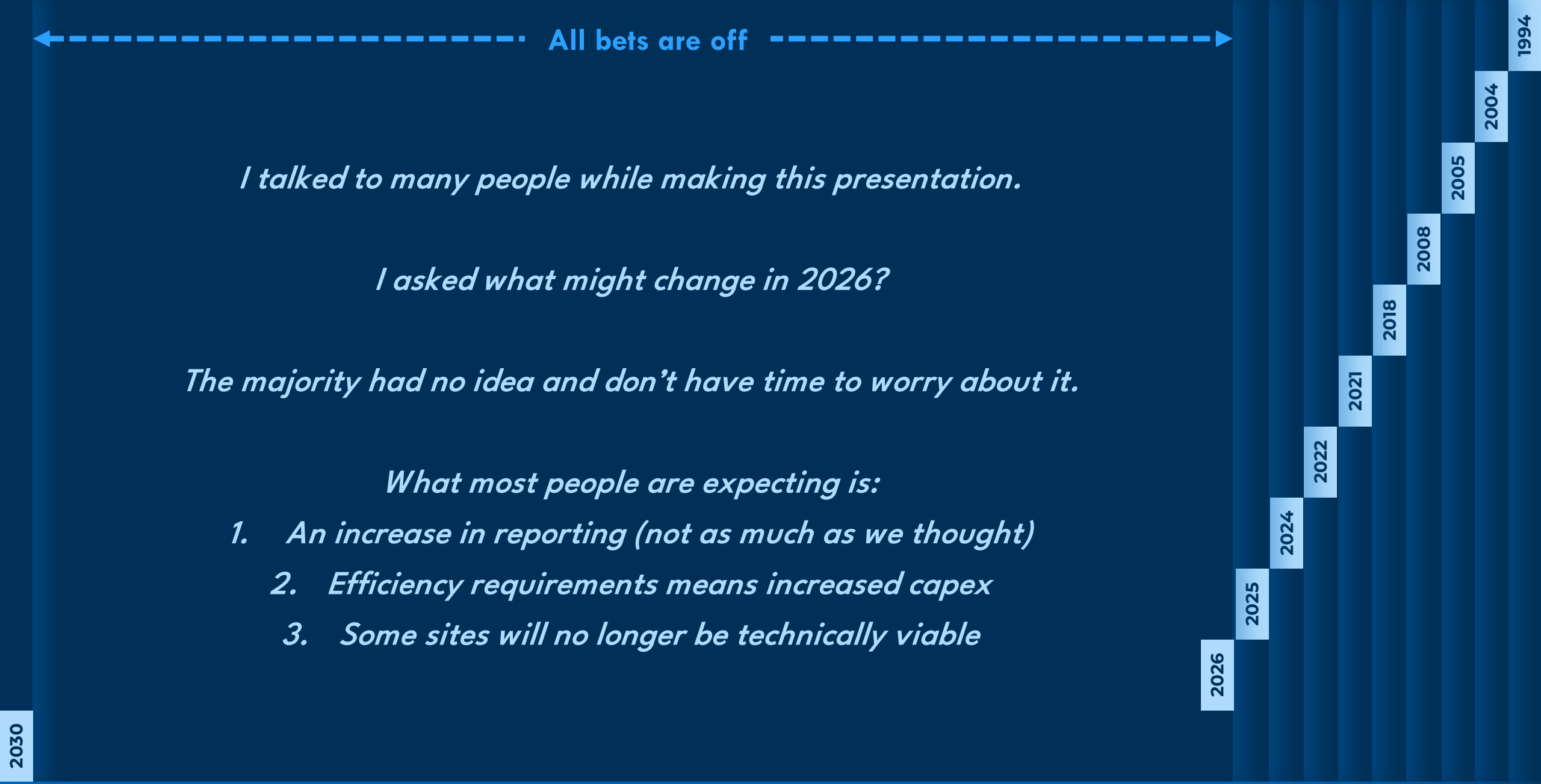
I talked to many people while making this presentation.

I asked what might change in 2026?

The majority had no idea and don't have time to worry about it.

What most people are expecting is:

1. *An increase in reporting (not as much as we thought)*
2. *Efficiency requirements means increased capex*
3. *Some sites will no longer be technically viable*



Net Zero?

By 2030 Progress towards 'Net Zero' should be well advanced for Paris Agreement countries.

Companies with 'Net Zero by 2030' commitments face a test of resolve

For those who have not...you will still have to deal with:

New standards & regulations: *New standards & regulations: UK Net Zero Building Standards, SBTi targets, IFRS reporting, NABERS, MEES, Greenmark, UK building regulations, GRESB Benchmarks.*

New reporting requirements in: *EU, UK, Singapore, Japan, Australia, California, Iceland, Norway, US (SEC), ISSB, SDS, TNFD & TCDF.*

UNITED NATIONS PARIS CLIMATE AGREEMENT

GRESB

U.S. SECURITIES AND EXCHANGE COMMISSION · MCMXXXIV ·

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30 years after the first design guidance was released:

How have regulations & guidance changed?

Are current regulations & guides fit for purpose?

How have regulations & guidance changed?

Clearly the number, diversity and technical content has grown exponentially.

*The majority of changes have been driven by **climate change** and **H&S** risk mitigation.*

*Little consideration has been given to how projects are **procured** or how the **ICT technology** within the buildings effect the building's performance.*

Developers:

We building process-driven, business-critical machines with real estate considerations. Not the other way around. Regulations have changed to require more reporting and increased efficiency but fail to address our business: Building ICT Infrastructure.

Designers:

Regulations have been updated but still lag far behind the designs we are delivering; our compliance is measured against client requirements rather than guidance documents or regulations. (EG. 99.999)

Are current regulations & guides fit for purpose?

Developers: No

For projects in Europe we have **no idea which standards or regulations are here to stay** and which are likely to change in the next few years.

If our competitors decide to take the risk and ignore a regulation, they could have a competitive advantage!

and, Yes

The relaxation of EU regulations announced in Feb 2025 will assist many businesses in our sector.

Guidance and lobbying from the EUDCA, Climate Neutral Data Centre Pact and other trade organisations are helping us navigate the ever-changing political landscape.

In the UK the new Climate Change Agreement incentive scheme could help the sector reduce energy costs from reduced Climate Chance Levy payments from 2026 onwards.

Are current regulations & guides fit for purpose?

Designers: Yes

We have specific efficiency targets, design limits for PUE/WUE/CUE, KPIs and metering requirements.

We can design to these and advise clients on site due diligence and systems design.

The efficiency targets are technically feasible but are marginalising solutions in some regions.

Groups like the ASHRAE (T9.9), UK NZ BS, the ASHRAE DCSIG and CIBSE DCSIG can help our sector grow sustainability

and, No

A 1.2 PUE (annualised) without adequate water is not feasible in many locations!

Regulations do not address Waste heat reuse, Grid connections, Planning requirements etc

Still using outdated procurement & delivery structures borrowed from the construction sector.

International & National v's Regional & Local?

There are rules and regulations coming from all angles! International, national, regionals and local.

International and national policies broadly support sector growth (economic growth & investment) and local policies react to voter considerations (Environment and community) requiring differing levels of EIA/EMISSIONS/BREEAM/LEED etc.

It is not clear which we should be paying attention to.

Who has the time to check them all?

It is like wading through treacle.

We have too many ingredients.

One size does not fit all.

Early regulations & guides where 'one size fits all' reaction to the demands of the prevalent ICT technologies.

These aimed to look after the humans servicing the ICT as much as looking after the ICT itself.

(Human scale, building regulations)

Later regulations looked to standardise the approach to DCs as businesses morphed into multinational conglomerates.

(The birth of the BOD approach)

But the regulators caught up! The second generations of guides and regulations aiming to increase efficiency, reduce energy consumption and carbon usage and increase reporting. National governing bodies driven by the voting public have swung from being pro sustainability to being pro business, aimed to control the growth of the sector.

Then the technology jumped ahead.

The DCs we are building today have little in common to the IT Cupboards we used to call data centres.

Meanwhile, regulators are scrambling to catch up, chasing down the positive potential in the industry opening the door as wide as they dare without inviting the destruction of the environment and power infrastructure.

The gap between national government policies chasing sector growth and local NIMBY concerns means DCs are now, more constrained by hyper local influence.

Conclusion:

The gap between national government policies which is supporting sector growth and local NIMBY concerns means DCs are more constrained by local influence than ever before.

Country by Country, region by region, site by site,

One size does not fit all.

Any neither do most BODs

Shameless Plug: UK Net Zero Building Standard

ASHRAE UK
DC Special Interest Group

CIBSE
DC Special Interest Group

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1. 1995: Uptime Institute's Tier Standard - Introduced to evaluate the reliability and redundancy of data centre infrastru
2. 1995: NFPA 75: Standard for the Fire Protection of Information Technology Equipment - Addresses fire protection requ
3. 2004: ASHRAE Thermal Guidelines for Data Processing Environments - Provides environmental parameters for operati
4. 2005: ANSI/TIA-942: Telecommunications Infrastructure Standard for Data Centers - Comprehensive guidelines for pla
5. 2008: EU Code of Conduct for Data Centres (Energy Efficiency) - Voluntary initiative to improve energy efficiency in da
6. 2009: BREEAM for Data Centres - Specific criteria for assessing the sustainability of data centres.
7. 2011: RICS Valuation of Data Centres, 1st edition - Guidance for valuers to assess the market value or rent for data cer
8. 2012: CIBSE KS18: Data Centres: An Introduction to Concepts & Design - Introduction to the design, operation, and sp
9. 2014: BS EN 50600-2-1:2014 - Detailed guidelines for the construction of data centre facilities and infrastructures.
10. 2018: ISO/IEC TS 22237-1:2018 - General concepts and guidelines for data centre facilities and infrastructures.
11. 2021: IMechE Guidelines - Addressing engineering challenges in critical environments like data centres.
12. 2021: ISO/IEC 22237-1:2021 - Revised guidelines for data centre facilities and infrastructures.
13. 2022: EU Energy Efficiency Directive (EED) - Updated to include stricter energy efficiency targets for data centres.
14. 2023: EU Corporate Sustainability Reporting Directive (CSRD) - Requires data centres to report sustainability indicato
15. 2024: BREEAM (Building Research Establishment Environmental Assessment Method) - Updated to include specific c
16. 2025: UK Government's AI Strategy - Announced to turbocharge AI adoption across the UK, including the creation of

17. 2025: LEED (Leadership in Energy and Environmental Design) - New version expected to include enhanced guidelines
18. 2026: NABERS (National Australian Built Environment Rating System) - Anticipated update to include data centre-spe
19. 2027: GRESB (Global Real Estate Sustainability Benchmark) - Expected to introduce new benchmarks for data centre
20. 2028: STBI (Swedish Technical Building Institute) - Planned release of guidelines for sustainable data centre construct
21. 2029: Greenmark - Singapore's green building rating system expected to include new standards for data centres.
22. 2030: UK Building Regulations - Anticipated updates to include stricter energy efficiency and sustainability requireme
23. 2030: MEES (Minimum Energy Efficiency Standards) & EPCs (Energy Performance Certificates) - Expected to introduc