Data Centre Trends

Where next?

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Foreword

Adapt and thrive

If you thought the last two years were dynamic, hang onto your hat, because the winds of change are blowing hard in the data centre sector. There's a perfect storm of net zero carbon targets, AI demands, resource and land constraints and public concern to deal with.

With that in mind, it is perhaps not surprising that some data centre providers were taking time out of the development race to reassess their strategies at the turn of the year. Engineering solutions, carbon and water considerations and financial models were all up for discussion as companies worked out who they are going to serve with what, and how they will do it.

Expect change on several levels. There will be a reshaping of the market as hyperscalers change their strategies, causing unrest in the market. The fittest will survive while others could fall prey to mergers and acquisitions. Power supply issues are driving changes in location and practice too.

All that said, we can still expect growth in 2023 and into 2024. Researchers at Dell'Oro Group predict that hyperscale data centre capex will grow at 28% in 2023[1].

So, while new technologies and strategies are under discussion, here are Soben's thoughts about how the market is changing.

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01 New approach to r!sk

Penalty clauses do nothing to reduce risk when geopolitics are preventing the movement of products and components – as the last year taught us. Instead, a new approach to risk management and risk sharing is needed.

More clients are moving away from lump sum fixed price contracts to forms which include an element of pain-gain share, such as guaranteed maximum price (GMP) and target cost (TC).

The supply chain itself is driving changes in some regions, according to Mathew Smith, director for hyperscale predevelopment and construction at GAW Capital. "In Japan, we are finding that general contractors are moving away from lump sum fixed price contracts," he says.

The most mature of clients are pursuing an Integrated Project Delivery (IPD) approach where all the key stakeholders – designers, engineers, cost consultants, contractors, commissioning body – sit down around a table with a proposed budget and work out whether a project is viable. For those clients and markets that cannot move to collaborative approaches, there is room for manoeuvre at the edges of contracts.

Hyperscalers are investing billions of dollars in forward orders, with delivery dates of key equipment controlling start dates for the next wave of projects. Others should foster longer-term relationships with key suppliers too; ditch lengthy tender processes which leave most of your bidders disappointed and instead switch to a high-level process that doesn't waste companies' time and resources.

This isn't going to be easy though. Long-term relationships are based on trust – and that may be in short supply if suppliers have been on the receiving end of some harsh contractual practices on previous projects.

> **Make sure your suppliers are culturally aligned with your company, that your values are aligned and you speak the same language, that is you understand each other's engineering principles and execution philosophy.**

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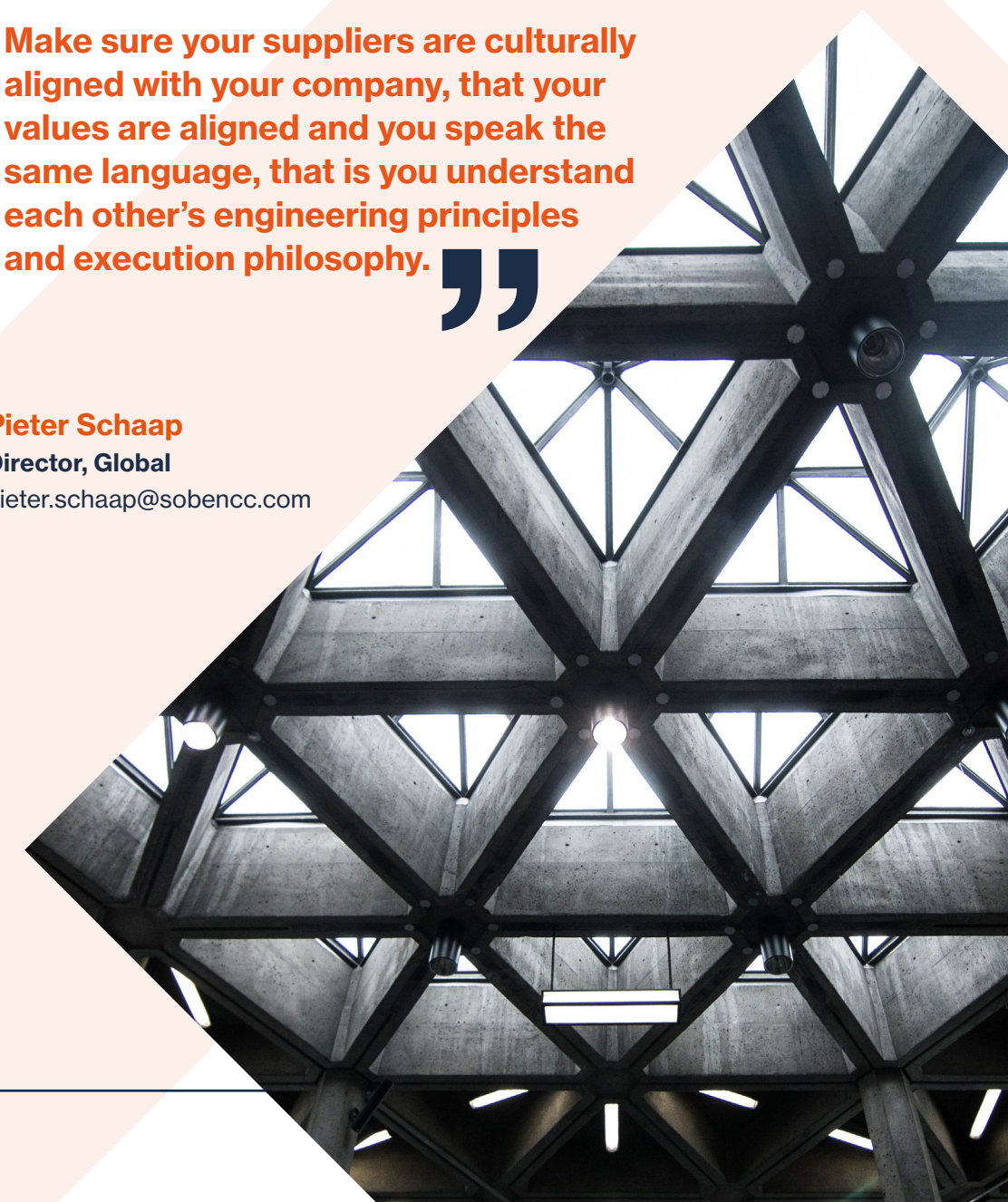
Relative power costs and power availability will reshape development plans this year, with some of the world's traditional data centre heartlands losing out to new and secondary markets.

In Virginia, the hyperscaler capital of the US and of the world[2] the increased demand of the last few years has put power in short supply and supply chain disruption means that it could be 12 months before new cables can be run in. One leading hyperscaler has already announced plans to invest $1 billion-plus in four data centres in North Carolina and has since begun to acquire land[3].

In Europe, the dominant locations of Frankfurt, London, Amsterdam and Paris (FLAP) are being challenged by new locations such as Madrid and Barcelona.

Not least among the reasons for the change is Spain's high, and growing proportion of renewable energy supplies[4].

In Latin America, Mexico's Querétaro does not have enough power to meet the growing demand there, whereas São Paulo, Santiago are benefitting from more renewable energy sources.

In Asia, power is shifting markets too. In Singapore, the region's strongest market, there has been a moratorium on data centre construction in due to power supply constraints, which was only lifted in September 2022.

"Johor and Batam are seen as overspills for Singapore. But they might not be ove spills, they might be disruptors," says Smith. "We may well see people transitioning to those markets based on the cost of power."

02 Power shortages disrupt

"Traditionally strong regions, that were abundant with power, are now running low on capacity. Consider following the lead of the big players to diversify into other regions, considering the pros and cons of possible locations.

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03 Green power grows

The availability of green power will lead to new data centre strategies. For instance, an Icelandic operator and a London one have joined forces so that high intensity workloads can be located in Iceland with its plentiful green energy while latency and connectivity for the London market is delivered by the local one[9].

Net zero goals, government regulation and rising power prices will accelerate the transition to greener data centres, with renewable energy being a key part of that play. Expect more news of established renewable energy sources such as solar[5] and wind[6] as well as forays into emerging technologies such as hydrogen.

"The relationship between data centres and power will change over time and bring opportunities," warns Stijn Grove, managing director of the Dutch Data Center Association. "Some data centres are able to integrate more with the power grid and become part of the power grid."

Hyperscalers are already doing just that, with one notable commercial installation in Dublin[7]. There, lithium-ion batteries, which act as a backup for the data centre, will be connected to the grid to supply storage for energy generated through wind or solar power. Meanwhile, in Eindoven, the world's first data centre with hydrogen battery back-up is under construction, expected to be operational by the second half of 2023[8].

In Asia, developers are looking for in-country renewables, explains Smith. "Cross-border PPAs (power purchasing agreements) have not taken off in Asia yet, so cross-border transmission is still a challenge." Malaysia and Thailand are leading the way with localised renewables, says Smith, with Vietnam looking promising too.

> **Since the global focus on net zero carbon and rising energy costs will force the hand of many data centre developers and operators to take action, it makes sense to start optioneering renewable and lower carbon energy now.**

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04 District ≲≲≲ Heating hots up

More homes than ever will be heated by waste heat from data centres as district heating schemes across the world get plumbed in. From $750m in 2018, the data centre heating market is forecast to grow to over $2.5 billion by 2025.

Many hyperscalers and some colocation specialists have either started making connections to district heating systems, or plan to do so this year, in Ireland, Denmark and Finland[10].

In the Netherlands, there is a huge push to connect up more houses, says Grove: "We have 10 projects live and another 10 ongoing at the moment, with over 5,000 apartments live and another 45,000 underway in projects. That is moving towards 10% of all homes connected to a heat network in the Netherlands."

The advantages of such systems, which use direct liquid cooling, to transfer heat from servers to people's homes are multiple: lower energy prices for citizens, lower carbon footprints for the data centres and a boost to the image of the sector.

> "Carrying out initial carbon calculations as part of the site selection process helps developers to factor district heating or other renewable energy sources into the site selection process."

Dr. Bonahis Oko
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05 New formats

Rising land prices mean that two-storey data centres are the norm rather than a novelty in many parts of the world. Even in the US where land has been in plentiful supply, two-storey facilities, and occasionally three or four storeys, are becoming commonplace in Northern Virginia, California, Oregon, Arizona and Georgia.

There are other changes afoot too. Hyperscalers are reviewing what AI could mean for data centre designs with its higher demand for computing power which will likely require cooling to be delivered directly to racks.

Engineering departments are being charged heavily to be more cost efficient. Back-up generator models will be coming under scrutiny, perhaps reduced or even removed altogether, depending on the location and data centre use.

Some designers are already looking to the future, with designs that can be repurposed, for example converting higher-rise data centres into residential buildings. "I think that's the way forward," says Grove. "We don't know what a data centre will look like in 30 or 40 years' time.

> " Work with your design teams to consider a change of form, especially in markets where the cost of land, the cost of power and the available labour resource are creating constraints. "

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06 More standardisation

There are many reasons why standardised components and prefabricated elements will become common tools of the data centre developer this year. They can help overcome local labour shortages, reduce time on site, reduce building footprints, deliver economies of scale and allow for movement of items between projects within a development programme.

A survey of 228 data centre operators by Omdia last year showed that over half had already deployed prefabricated modular technologies with 99% saying that they will be part of their future strategies. Prefabricated elements could include racks or rows or modules for IT power and cooling.

Such an approach works well for upgrade or refurbishment projects, perhaps adding higher densities for those AI processing demands or even adding a whole new modular facility to an existing site. With industry leaders moving rapidly towards modularisation, suppliers are watching intently to see which parts of the market will follow their lead, since this could create significant shifts in global supply chains and in construction models.

"Designs have to be compatible or repeatable throughout our portfolio to enable really smart procurement decisions," says Smith. "There are some products that will transcend all data centres, others that might only work in a couple of markets. Efficiency in procurement will bring advantages."

> **Consider moving away from stick build to modularisation and the impact it could have on your operation. The cost may be higher, but in return you can build faster and reduce uncertainty.**

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07 Counting embodied Carb⬡n

CO2

> **It's only a matter of time before carbon reporting is required across the board. Starting now will give smaller companies the chance to upskill and start making progress before it is thrust upon them by legislation or shareholders.**

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As net zero deadlines approach, governments and investors are looking for more in-depth carbon reporting, not just Scopes 1 and 2 – direct energy use – but Scope 3 emissions too. And that means measuring and managing embodied carbon as well as operational carbon.

Some of the large players are already advancing programmes designed to reduce the embodied carbon of their builds. Initial moves have seen companies requesting Environmental Product Declarations (EPD) from manufacturers, tracking embodied carbon emissions through design and construction and working to establish baselines from which savings can be made[11].

Since the largest proportion of a building's embodied carbon footprint comes from its concrete elements, followed by steel, data centre providers are pioneering the use of low carbon forms of these materials[12] , as well as investigating carbon-storing materials[13].
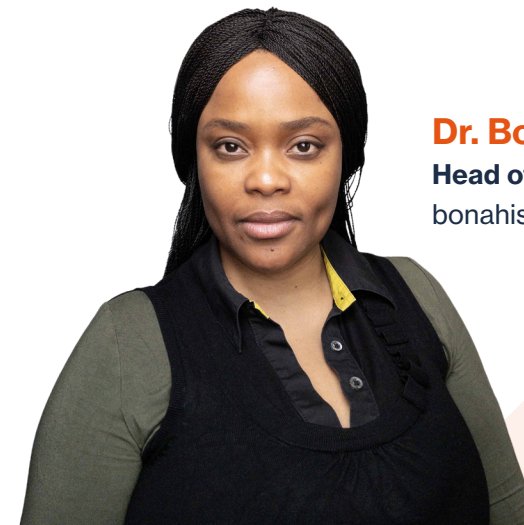
In a small number of cases, design decisions are already being made to reduce embodied carbon. For instance substituting a concrete floor with a wooden one or using 'green' concrete where a large proportion – or even all - of the cement in a mix is replaced with waste products such as slag or fuel ash .

Although for the time being, it is only the most forward-looking players that are investing in measuring and reducing embodied carbon, they are paving the way for the wholesector. As carbon markets mature, and carbon prices rise, reducing embodied carbon will become a must rather than an aspiration.

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08 More governance for inve$tment decisions

Whereas 12 months ago, programme was perhaps the driving force behind investment decisions, the current mood is far more cautious. Rising build costs due to supply chain disruption and materials shortages and the ongoing uncertainties due to energy prices mean that today's watchwords are diligence and governance.

"It is definitely a challenge now," says Smith. "The current macro-economic environment will see the appetite for speculation retract with a desire for more stable investments."

For some developers and operators that will mean focussing on solid markets For others, the hike in opex due to rising electricity bills could mean that the cash for new facilities just isn't there, says Grove: "If you want to invest in new infrastructure, you need money.

If all your money goes on buffering for the uncertainty, for higher energy prices, that's a big challenge."

To safely push those investment decisions through, there needs to be a forensic understanding of costs and their associated risks – and these need to be in place as early as possible.

> **Cost isn't just about a bill of quantities, it requires understanding of construction methods, key interfaces between packages, logistics constraints and supply chain issues.**

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09 A Shift in M&A

The last three years have seen a huge number of mergers and acquisitions in the data centre sector. And it looks like 2023 will be no different – although the pattern of deals will shift somewhat. Platform acquisitions have dominated recently, but the next 12 months could see more selective purchasing, as providers look to increase their global coverage and expand into secondary markets.

In 2020, a total deal value of $30bn was a record then, but it was far surpassed with the $49 billion total at the end of 2021. According to industry forecasts[14], it looks like 2022 will be a very similar year to its predecessor with an aggregate value not far shy of $50 billion.

A driving force behind the high volume of deals was private equity buyers who accounted for 65% of the value of mergers and acquisitions, a proportion which was even higher in the first three quarters of 2022. Despite the current headwinds faced by the sector, commentators expect this trend to continue into 2023[15].

With financing challenges arising, and the shadow of recession threatening the tenure of some occupiers, some of the newer data centre providers could find themselves in a weak position. The larger, cash-rich providers will be poised to take advantage of the situation by making strategic acquisitions.

> " New build may not be the best option for some operators looking to move into secondary markets. Acquisitions with refurbishments and upgrades will work better in some locations. "

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10 Better communication

Data centres often get a bad press. "There is a negative perception about data centres that has come from the media, mostly based on wrong facts and assumptions," says Grove. "Everyone wants more digital services but you can't have that without more digital infrastructure, including data centres. We see there's a disconnect between what people want and how they get it. There is a perception that we use all the energy, in the Netherlands all the green energy, a lot of water and a lot of space which is not based on facts."

With the threat of increasing regulation in some markets[16] , industry bodies, as well as large individual players, will work even harder this year to explain what data centres do and the efforts the sector is making to improve energy and water efficiency.

Clear communication linked to individual projects is just as important as wider messaging, with a series of recent stories further fanning the flames of negative perceptions. In the UK, the Greater London Authority rejected applications for housing developments in West London, citing a lack of power due to the proliferation of data centres in that area[17]. And in Ireland, one county council tried to ban future data centre developments due to their power use – a move that was later overturned[18]. Public outcry in the US and the Netherlands has also led to projects failing to win planning permission[19,20].

On a more positive note, public perception of data and data use is changing which could have a knock-on effect for data centres. The UK Government conducted its second survey of attitudes towards data in December last year[21], which showed more supportive attitudes for some data uses. Perhaps 2023 will see a further shift in understanding about the necessity of data and data storage.

> " Data centres are critical infrastructure, supporting almost every aspect of modern life. The entire supply chain needs to think about how they can get that message across. "

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Conclusion

Changing the world

Many of the challenges facing data centre projects and programmes are the same ones facing the built environment sector generally, only for this sector they are intensified: new approaches to supply chains, how to sustainably switch to renewable energy, the fight to conserve water, reducing carbon footprints, labour and skills shortages and working with communities not against them.

The good news is that there is a strong will to change. We are already seeing significant progress by the leading players, as they invest in finding ways to deal with those multiple issues, with the very real possibility that some of the research and development work underway will have a far wider impact on construction and beyond.

As the hyperscalers reassess their strategies on every level, the market is experiencing some uncertainty as we wait for the next moves. How the rest of the market reacts to those moves will have significant impacts on supply chains, risk allocation and financial models.

However, some providers are facing financial constraints in terms of obtaining capital, and paying for rising energy bills, which are likely to prevent them from bringing on new capacity – despite the ever-increasing demand. Investment decisions must be backed up by robust cost estimates that are founded on a realistic perception of supply chain limitations and an understanding of risk appetite and acceptance across different global markets.

The sector has already demonstrated its ability to flex and adapt through the multiple challenges of Covid, the war in Ukraine and changing trade deals. Now that flexibility can be exploited as it faces looks to adapt and thrive. One trend that continues is the dynamism of this sector.

Global Data Centre Specialists

Soben is the industry leader in innovative data centre construction consultancy. Our global data centre specialists provide innovative construction consultancy solutions to the world's leading data centre providers and tenants. Our services range from cost, project and programme management to strategic advice around sustainability, procurement and risk.

To date Soben has delivered $18.2 billion and 1,869MW of projects across six continents. We are currently working with the global leaders in hyperscale and colocation data centre development on some of the world's largest, most complex schemes.

About Soben

Soben offers something different - a combination of the best consultancy practices, with real-life hands-on commercial experience in delivering major construction projects. Our founder Scott Smyth started his career in private practice before moving to work for contractors as a commercial manager. Scott found that he struggled to identify organisations to support him that understood the commercial reality of being a major contractor working on high-risk projects with low-profit margins.

As a result, Scott founded Soben. Since 2011, we've been supporting some of the world's leading organisations, increasing certainty for their construction investments through cost, project, programme, and risk management consultancy and proudly shaping the future with integrity.

Find out more at www.sobencc.com

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