

# Opinion



25<sup>th</sup> May, 2021

## Medium Voltage and Carbon Reduction in large scale data centers



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Every electrical engineer learns about losses. What was less well taught was that transmission losses can result in producing more carbon and other GHGs.

As every large energy using industry grapples with sustainability challenges some big users in across a range of sectors such as manufacturing, defense and energy itself have already grasped the advantages of Medium Voltage (MV).

Those that have find themselves well positioned to cope with sustainability driven changes in generation and distribution.

Within the data center sector MV already provides proven benefits for many US operators in terms of lower voltage losses and the provision of stable, well-conditioned power.

As the data center industry seeks to meet its sustainability challenges and changes, running at MV addresses many of the emerging issues and new conditions faced across the sector.

## **Generation and Transmission**

If we start with the changes happening in the energy generation mix. The shift to renewables is well underway. There is a reduction in traditional fossil-fuelled base load power generation in favour of renewable sources, consisting mostly of Hydro, Solar and Wind. Some have described the renewable market as experiencing a ‘perfect storm.’ Investors – from sovereign wealth funds to individuals, large commercial energy users and national and local regulators are forcing the hand of energy generators and grid operators.

The upstream changes to the power chain have been described as ‘chaotic’ but the move to renewables is constant and accelerating.

Utilities deliver at medium voltage and these changes to the energy mix are putting medium voltage firmly back on the power chain design map – especially for DC operators.

## **Medium voltage**

As Robert Thorogood, head of engineering [CHECK JOB TITLE] at international design engineers Hurley Palmer Flatt, told a recent webinar audience: “The limitations of low voltage systems presents significant issues with large data center project deployments. Today’s preferred design concepts for hyperscale data centers using distributed redundant and isolated redundant formats are still very much available at medium voltage. Higher voltage levels have the potential to reduce overall capex, be more efficient and reduce the complexity at the 400v level. Benefits of operating at medium voltage include access to the grid supply becoming more direct. Having UPS systems at the same voltage level as the generators gives much more stability and integration for dynamic conditions.”

## **MV inside the perimeter**

Closer to and inside the data center perimeter the power chain is changing.

Large data center operators are eyeing micro grid developments with interest. As they seek ways to integrate with micro grids they are evaluating on-site generation through options such as low carbon gas reciprocating engines (which will still require UPS back up) and integrating with multiple MW BESS. Such BESS concepts and deployments in the 5MW-10MW range naturally lend themselves to power at the MV level.

The advantages of MV better enable on site demand response in order to provide benefits such as peak shaving savings while opening up the revenue opportunities as data centers feed power back to the grid. With medium voltage these opportunities can be realised

In the data center world, the weighing of transmission losses against other factors often resulted in LV static UPS option being deployed. However, this resulted in static UPS infrastructure sprawl and its attendant rise in opex costs and maintenance risks. This is no longer sustainable or able to deliver against emerging requirements. It is no longer fit for the future.

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Power conditioning and reliability are being pushed upstream away from the load and by running at MV UPS infrastructure will save costs, while providing greater stabilisation and export capabilities for sustainable power in data centers.

Data centers increasingly want and require dynamic, responsive power at scale. They are also under the spotlight to be seen to be using fewer resources.

The existing advantages of MV in the data center span cost, less copper and cable use, fewer voltage drops and stable power over distance.

However and wherever your existing data centers operate or you are planning for new data centers, whether you consider your data center to be leading edge or traditional, all the power provision and protection dialogue should involve MV.

If you are an engineer or business leader that wants to reduce your carbon footprint and to meet future sustainability challenges it would be detrimental not to revisit and have an honest evaluation of Medium Voltage in the data center.

ENDS

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