The HCLTech Trends and Insights podcast.

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Hello, everyone, and thank you for tuning into the HCLTech Trends and Insights weekly podcast, where we'll be discussing the latest key technology stories and events that are impacting and disrupting business and society. I'm Nick Ismail, the head of brand journalism at HCLTech. And today I'm happy to be joined by Annit Lalla, Business Development Head at Schneider Electric, the global leader in energy management and automation solutions, and has over 16 years of experience in critical environments, including in the data center and telecom industry.

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He helps customers in Greenfield design and build, as well as an important thing existing data center resiliency and efficiency. Annit, how are you today? Hello Nick. It's been a pleasure. Thank you so much for having me. Doing very well. Thank you. That's great. And thank you so much for joining us today. And you're very well placed to discuss the topic, which is driving sustainability in the enterprise with green data centers.

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So just to kick off, what is the current landscape when it comes to data center energy consumption? Is it a problem that needs to be addressed? Yes, you know, in fact, as per the IEA data, scientists today account for anywhere between 1 to 1.5% of global electricity use and the last ten years, the demand for data centers has increased by over 550%, creating a huge demand for equipment for I.T. processing and support infrastructure, all of which are increasingly becoming more and more energy intensive.

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Let us look at some of the digital trends and statistics that are making the data center industry to grow and subsequently consume energy resources of planet Earth. By 2030, it is estimated that 90% of the world population that is 8.6 billion will be Internet users and that there will be 500 billion IoT devices in use as compared to 20 billion uses today.

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And the projected A.I. will add about 16 trillion to the global economy by 20. These figures represent a huge amount of data being generated which passes through and is stored in data centers, leading to a substantial increase in the installed capacity of the data centers in the coming years. And data centers are the backbone of our world. They support nearly every function of the society, and we can't imagine a single day without depending on data centers.

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And we know that data center market will only continue to grow. And this has heightened the need for data centers of the future to be more resilient, efficient, secure, and sustainable. Now, traditionally, the power or the power usage effectiveness is now well accepted metric in the data center industry, and this has been used by data center managers all around to measure themselves in terms of energy efficiency.

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This was introduced by the green trade in 2007 and helps data cent operators monitor facilities, energy efficiency over time. We all know that which is calculated by dividing the total facility power by the power consumption of the IT as per the uptime. Uptime Institute's latest annual data center survey in 2023 that collected responses from over 850 data center owners and operators, the average global p e levels have remained flat for the last four years, with 2023 averages around 1.58.

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Our industry averages around 2007. When the metric was introduced, it was about 2.5 and then reduced to 1.98 in 2011 and 1.65 in 2014. But since then, this have been around the same level. Thanks on it. And obviously there have been rapid improvements in energy efficiency. But as you mentioned, the increase in population, the increase in use and demand for digital services is causing data center emissions to rise.

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And this has given rise to what the industry calls green data centers or the need for green data center. So, can you just explain what a green data center is and highlight any challenges that are hindering the rise of them? Or in fact, before we get excited about the topic for a sustainable green and a low PUC data center, we need to acknowledge that there are always multiple stakeholders that are involved in any data center bombing.

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First and foremost, obviously being the I.T team and they are the users or the ones that provide the I.T systems for production or data processing of applications to serve the business function or their customers. I.t needs to protect their expensive IT equipment that requires electrical protection, temperature and humidity conditioning keep their server’s storage and network functioning and may have request or low temperature anemometers to supplement the i.t object.

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We have the engineering team will design a robust infrastructure to support it needs. The engineer would like to choose the worst-case scenario to design the data center in order to meet the availability and resiliency requirements and on the other hand, hoping that the facility design can meet the required efficiency and low CPU target. And there is also the facility team taking care of day-to-day operations of the facility, which supports the entire system, The facility team targets for a trouble free and zero downtime operation to maintain the SLA committed to the I.T as the state of failure is high and everyone job is on the line.

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It's common that the safest and the most conservative approach is the easiest way out for everyone. But these mentalities must change. Otherwise, we will not have a better and sustainable future for our next generation. Apart from the three main stakeholders mentioned, we also need to expand the ownership of other key supporting units in the lifecycle of the data center, such as requirement and the sustainability teams with the complexity of organizing organization.

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The key to unlocking the potential of sustainability actions is the integration of every stakeholder in the lifecycle of the data. Once everyone takes the ownership of the common goal, it is possible to implement this highly efficient, sustainable, and low peak data center. Another hurdle in improving energy efficiency is the fact that it is rather difficult to upgrade the legacy data center without needing a shutdown, which is almost always not possible.

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Data center owners and operators have to decide whether to continue as is until the natural end of life of the Internet or planned retrofits to take benefits of the latest in energy efficient architectures. And this is a very difficult decision that requires technical expertise, planning and very careful project execution. Given the live environment in which data center always are, and this is very few organizations want to attempt.

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And finally, the last challenge that we look at is successful. We create a business case of balancing the investment with the energy efficiency gains and attractive payback period, which again, most enterprises struggle with due to lack of expertise in electrical, mechanical and I.T. systems. All today's Thank you so much, though in order to break down those organizations silos and present a valid business case and, you know, overcome the challenge of legacy, how can organizations effectively and responsibly manage their data center energy consumption with things like hardware advancements and software solutions?

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So, from the physical infra perspective, there are three key methods to manage data center energy consumption effective. One of the ways is obviously to improve its utilization and operations. This refers to the push for better utilization of I.T spaces and software by software power management, Energy Aware workload allocations, energy aware networking, etc. The operations of the I.T is in the reference to the I.T server rack temperatures as well as humidity, which most are agreeable to follow the ashtray.

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Recommended temperatures band for data processing. It also data center designers refer to the ashtray as benchmark for data processing equipment and on rack temperatures anywhere between 18 to 27 degrees Celsius. What we need is to look at pushing the limit of these on rack temperatures to 25, 27 or even beyond these special levels. We also see that ICT manufacturers playing a key role in ensuring that the ICT hardware are hardened to sustain high operating temperatures.

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I.T servers nowadays can operate at much higher temperatures which extend even beyond ashtray recommended temperature ranges. And this brings us more confidence that the robust I.T can sustain higher temperatures to optimize the cooling system that is supporting data center. The second area is to look at to reduce electrical distribution losses and this is purely looking at how to deploy high efficiency electrical equipment such as UPS's isolation, transformers, medium voltage, or low voltage transformers to maximize the operating loading of each critical electrical system to ensure higher efficiency and higher loading.

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Higher loading is obviously achieved nowadays with distributed redundant designs. The third area is to look at high efficiency cooling and this is to reflect on the current logical advancements in cooling technology and to look at ambient condition, capitalize on the possibility of free cooling potentials and add effect of ADI about it. Cooling other way. That industry is moving, and we see quite a bit of buzz around.

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This is liquid cooling. This is the technology has been there in the market for a few years now, although the traction is slow due to its specific application requirement, such as higher water temperature, which is not being used by most data centers, cooling systems, perhaps a hybrid type of chilled water plant can be explored to fully embrace this technology.

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Thank you so much. And now I want to talk about the recent partnership that was announced between HCLTech and Schneider Electric, where it was announced that they'll jointly explore innovations in sustainability to deliver converged i.t and OT solutions to help clients meet regulatory compliance and accelerate decarbonization programs in the APAC region. So, can you comment on some of the carbon efficient solutions that HCLTech and Schneider Electric all developing?

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And why is the initial focus on the APAC region? Sure. So, both let me share you with you some of the solutions that that Schneider Electric is bringing on the electrical and mechanical side. Firstly, in fact, the point of distribution from the main source of power to the cell rack, we generally deploy high efficiency isolation, transformers or eliminating, in fact, the use of isolation altogether to minimize the cascading effect of efficiency losses.

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Secondly, today you PCs are operating on what we call as version mode, which can take the efficiency to as high as 99%. And this is a big advancement in the efficiency of UCS systems, which were earlier limited at the range of 95 to 96%. A conversion is actually a patented Schneider technology. It provides the highest protection level for critical loads with us one or you will subdivide and a three times reduction in UCS electricity consumption with 99% efficiency.

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So, for example, what was earlier provided to the I.T, let's say a 100 kilowatt of it load the ups would consume maybe 150, 110 kilowatts depending upon when it was deployed in the history. But today with E conversion it is possible that the ups itself be used just one kilowatt to provide those 100 kilowatts of power to the i.t and e conversion mode has real world experience as a default protection mode for our upper system since 2020 now and has demonstrated that it is the ideal mode for high efficiency operations.

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With this change, Schneider Electric expects to facilitate the conservation almost 175 gigawatt hours of electricity annually, the equivalent of energy produced by nearly 60,000 rooftop solar installations, helping customers to meet their sustainability goals while reducing their electricity spending. Customers can still choose to use the legacy double conversion modes. But field experience has shown that modern electrical installations do not justify such high fulminant use of electricity.

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Another example is the advanced energy storage systems. Schneider Electric was one of the first UPS suppliers in the market to offer lithium-ion batteries, which take up to 60% less space and have 70% less weight than their lead acid counterparts. Their lifespan is twice as long and they can operate at much higher temperatures, thereby reducing cooling energy consumption.

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Greenhouse gases also will beyond just CO2 from the production of electricity. SRF six, for example, is a greenhouse gas, which is over 23,000 times more potent than carbon dioxide and is found in most existing medium voltage. Switch gears. S6 and other emissions from the site like refrigerants used for cooling are classified a scope one emissions an electric has green as safe six three medium switchgear media voltage switchgear and it offers a safe and a nonmetal friendly solution and reducing greenhouse gas and red with the legacy air delivered via race floor.

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There is also some uncertainty in direct temperatures due to the stratification of air as it moves from or fretted dials up to the top of the racks. And as technologies evolved, only units such as fan wall systems with flooded design architectures and air distribution service space allow us to have more consistent temperature delivery to the silver rack, minimizing air delivery losses.

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Hence, we can increase the cooling start points by keeping the same or indirect temperature within ash free recommended brackets. And this will open the door for an elevated chilled water temperature and have a skating impact. The overall cooling efficiency and bring tremendous value to help lower the heat. Again, adopting liquid cooling, it's always far from specific application. Typically used in a liquid cooled DC can achieve very, very low speeds of even at 1.1 typically liquid cooled.

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It can operate at a higher water temperature as the cooling is directly delivered to the chip or even the server is itself immersed into a dielectric fluid. Other technologies in cooling, such as the turbo cooler, has been well recognized compressor technology and the refrigeration market for many years. And as major success in commercial air conditioning applications due to its very good copy or coefficient of performance in data center space, Schneider Developed chillers with double core centrifugal chillers, which can work at elevated chilled water temperatures.

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The turbo core oil centrifugal compressor works on the principle of magnetic levitation, which reduces the contact friction that and power to drive the compressors. The elimination of OII increases the effectiveness of the heat transfer and thus increases the thermal capacity and system issues. All the benefits, of course, of double core is its very low starting card, which allows transformers and generators supporting the mechanical system to be optimally designed, hence contributing to waste reduction.

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Slide Electric's air-cooled chillers provides the highest energy efficiency, yielding very low partial ease, and these systems are again optimized for use of very low gwp or global warming. Potential refrigerants such as the are one, two, three, 4yf that has a very low gwp of just or as compared to 1430 of its predecessors, which was the odd one three for a gas which is almost 350 times less and has an atmospheric life of just 11 days as compared to 13.4 years of the r1348.

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There is also a lot of interest in the industry in leveraging on ambient cooling to give us free cooling, although there is skepticism on how we can utilize this technology in some hot and tropical climate countries, especially in the Asia Pacific, we are nevertheless positive that this is feasible to deploy. To a certain extent. We cannot have maybe 100% free cooling, but we can work towards leveraging this as much as we can with a mixed or hybrid system to minimize the heavy compressor running, especially if you can consider to operate the cooling system at elevated on rack temperatures or adopting liquid cooling, etc. solutions which usually operate at high water temperatures with the added impact

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Adiabatic cooling made possible our adiabatic systems for some of our Chilean ranges. This also ensures that we provide high efficiency overall for the cooling. And lastly, using cooling optimization software based on AML technologies can monitor temperatures at the rock level, providing thousands of data points and feedback to the cooling units to operate at the lower speeds and thereby provide optimization in terms of energy consumption for cooling.

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Thank you for explaining all these solutions. And now finally, we touched on this earlier, but it was about aligning the business case to sustainability goals and whether it makes sense in a business context. I think we could confidently say that sustainability is now firmly on the business agenda. It's firmly a business goal. So, looking ahead. How can organizations enable an effective analyst sustainability strategy, which includes green data centers?

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Right? So, in 2021, Schneider commissioned a Forester research study to do a survey for multi-tenant data centers and combining the subject on sustainability. What this study Forester surveyed about 2000 colocation data center providers around. It was interesting to note that almost 83% of the operators or the respondents said that they use sustainability to attract new business. 75% of them said that they lost business and or investments due to not having sustainability programs in place.

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But again, most of them about 72%, said that they would just in the beginning of this journey of sustainability and 70% of them said that they did not have the budget as they needed for their sustainability initiatives. So, it's clear that among respondents, sustainability can make the difference between winning and losing the business. Yet even so, large majorities of those surveyed reported that they still at the beginning of this journey and that they do not have the necessary funding allocated to sustainability initiatives.

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Those that solve these problems and rise above the pack and use sustainability as a real differentiator to grow their business. So, we think holistically. So, we need to look at the data center sustainability strategy more holistically and we need to come up with a new strategy to meet the needs of today without compromising on the needs of the future generations.

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And Schneider Electric believes that the combination of five different tenets creates a holistic environmental sustainability strategy. These are the first one setting up a bold and actionable strategy, establishing a holistic, data driven sustainability strategy to minimize direct and indirect environmental impacts, including scope one, two and three emissions, biodiversity, raw materials, land and water leveraging on circular economy principles.

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They think measurable targets to build concrete, actionable programs and establish transparent external reporting is all that encompasses around setting up this bold and actionable strategy. And once that is done, we move into implement sustainable data center design. Sustainability needs to be prioritized as a key parameter in data center designs by providing longevity, serviceability, and lower embodied carbon. Develop efficient, repeatable global data center design that can be localized anywhere in the world.

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Select any innovative products that are low carbon, environmentally compliant and circular ready. Once data centers have been gone through a sustainable data center design process and we move to driving efficiency in operations, leveraging the power of monitoring and data analytics to drive operational efficiency, optimize system performance and longevity, and reduce OpEx. With today's aging infrastructure to adopt predictable maintenance practices and utilize software tools to identify and manage inefficiencies across the data center Infrastructure.

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The next tenet is all about will energy. So, we tackle our scope to emissions by decarbonizing the energy mix with a comprehensive renewable procurement strategy, meeting long term goals through an evolving mix of government options that can include onsite solutions, offsite solutions, ESG and offsets. Tackling the Scope three Emissions by establishing a comprehensive supply chain decarbonization program inclusive of circular economy models who use emerging technologies and other scope.

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Three Reduction Levers. It's important to identify the size of the supply chain Carbon emissions as well, establishing decarbonization programs and targets and engage with partners to support these initiatives. So, these are the five tenets that bring about a holistic sustainability strategy to see it again, it's setting a bold and actionable strategy, implementing sustainable data center designs, driving efficiency in operations, buying renewable energy and decarbonizing supply chain.

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And Schneider Electric is uniquely positioned to create and execute a holistic, sustainability driven data center strategy, bringing all these five tenets to life on it. That's great. Thank you so much for all your insights on today's podcast. We really appreciate it. Thanks a lot for having me. It's been a real pleasure. Annit, it was great talking to you, and I hope that this podcast would be helpful to all our listeners out there.

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Absolutely. And thank you once again for your insights and to the audience for tuning in. Goodbye.

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Goodbye.