KEYNOTE INTERVIEW

# Tackling Europe's energy crunch

*Data centre demand is stretching Europe's power dynamics to breaking point. But there are power and grid solutions that represent exciting investment opportunities, says NTR's Rosheen McGuckian*

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Power demand in Europe is growing significantly for the first time in years due to the electrification of transport and other parts of the economy, as well as the rapid proliferation of data centres. AI data centres in particular are both highly energy intensive and the nature of their demand can be extremely volatile for the grid to manage.

This combination of challenges is creating significant investment opportunities for energy investors. Meanwhile, the emergence of strict regulation around data centre energy impact on both the grid and energy demand across the continent has made it clear that a sustainable path forward is the only viable option, explains Rosheen McGuckian, chief executive officer at clean energy transition investors, NTR.

**Q How realistic are fears about an energy crunch in Europe due to data centre demand?**

Europe is already facing an energy crunch, and the situation is only growing more acute. This is particularly true in the FLAPD markets. In Ireland specifically, data centres are already taking up over 20 percent of the load. Grid constraints are now a serious limiting factor in data centre build-outs, together with the availability of power. As a result of these dynamics, there are already moratoria in place in cities such as Dublin and Amsterdam.

Looking ahead, Europe's energy demand is expected to increase by a further 10 percent over the next five years. That's the equivalent of adding a second energy market the size of Italy onto Europe's grid.

Of course, not all of that demand growth will come from data centres. The electrification of transport, heat

and heavy industry will also play their part. In fact, the growth in energy demand from transport is expected to exceed that of data centres, but demand will be more dispersed. When you have a big cluster of data centres in one area, the resulting energy consumption is highly visible from a social and political perspective, and so data centres are having to respond to those criticisms in a way that other sectors are not.

**Q Will remote PPAs continue to play a key role or will self-supply ultimately be the solution?**

Remote PPAs will remain a major part of the equation, but amid rising political and social scrutiny, the big European data centres are also having to come up with an element of self-supply. They won't be completely isolated from the grid, but in certain markets, policies now require operators to generate a portion of dispatchable power.

That creates a really interesting opportunity for investors to develop energy hubs, for example, combining wind, solar and battery storage connected to heavy energy users such as data centres, via private wires. That will prove very useful for the hyperscalers that can be situated in out-of-town areas. However, it will be a less suitable solution for edge data centres that need to be sited much closer to cities. Those edge data centres may rely more on remote PPAs, while the hyperscalers may use a combination of the two.

**Q With the scale of growth in demand that we're seeing, will the drive for clean power be put on the back burner?**

In the US, you're certainly seeing a surge in demand for natural gas, but it's not so clear cut in Europe, given the overarching requirement for energy independence and continuing drive to reduce greenhouse gases. In Germany, for example, there's already a requirement that 50 percent of data centre power needs to come from renewables. That will increase to 100 percent in 2027.

In Ireland, policy isn't quite as specific, but to connect to the grid, data centre operators need to lay out their plans around renewables. Certainly, the large hyperscalers are very cognisant of the fact that they don't want to be seen as the reason for any reversion to fossil fuel usage. They're very much focused on clean power solutions.

We've calculated that penetration levels of between 75 and 80 percent of a quasi baseload can be achieved by combining the right levels of wind, solar and battery storage at the same levelised cost of electricity as natural gas self supply. Sustainability and data centres are not mutually exclusive. You need a bit of imagination, but a sustainable data centre is achievable.

**Q Which is the bigger issue, having enough power or managing grid volatility?**

I would say that managing grid volatility is the bigger issue right now. There's been very little investment in the grid over recent decades, and the advent of artificial intelligence is exacerbating the situation. AI requires significantly more power than cloud storage.

The bigger challenge with AI, however, is that the demand is highly volatile and instantaneous in nature. At one moment, computation can be extremely high and the next it can suddenly drop. That's a very difficult situation for the grid to deal with.

Even if you were to add your own source of onsite power, such as a natural gas open cycle gas turbine, it wouldn't be able to respond to that level of volatility. There's an opportunity for energy investors, such as ourselves, to provide solutions for the grid operators, including combinations of batteries and energy statcomms (static synchronous compensators) to support the grid. These can help support the impact on the grid from a rapid increase and decrease in computational demand and recover within seconds. That will be a feature of the investment landscape going forward.

**Q Are there steps that can be taken with**

**regards to demand side management?**

Demand-side management has historically been associated with heavy industry players, but now that data centres are going to represent upwards of 7 or 8 percent of many European countries' overall energy consumption, they're going to have to be a part of that equation as well.

There are many aspects of a data centre's power usage that are not instantaneous in nature. Background re-archiving or the training of models, for example, could happen at night when demand from other sectors is reduced. Interestingly, with the use of AI itself monitoring weather patterns and expected load, with proper planning data centres should be able to book power in advance at lower rates as a result.

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**Q How are the cooling needs of data centres evolving and what impact is this having on power usage and planning?**

Cooling is becoming increasingly important, particularly because AI-scale racks are so intense that they're pushing the limits of air cooling and necessitating a shift to liquid cooling. The latter is more efficient but more difficult in terms of planning. Similarly, waste-heat offtake is a big part of the policy equation in Europe today. In Germany, for example, new regulation is coming through that will require a minimum share of waste heat re-use, together with associated reporting obligations. I expect to see more of that type of regulation in the future.

**Q How are European governments and regulators responding, generally, to all these challenges?**

I think it's fair to say that they're playing catch up. There are new policies coming through including those enabling private wires. This has been evident in the US market for a long time. Then there are countries such as Sweden, that are withdrawing tax incentives that used to be in place for electricity consumed by data centres. Other countries like France and Germany, meanwhile, are putting requirements in place around the amount of waste heat that needs to be used. The common thread across European markets is a growing link between permits, grid access and sustainable dispatchable power.

One area needing a lot more work is the formulation of a regulatory framework for grid forming services. The compliance needs of these assets is something that policymakers need to address.

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**Q What is the resulting investment opportunity facing energy investors today?**

There's a lot of excitement underway when it comes to digital infrastructure. But to my mind, real value at the moment can be found in grid services and the clean power that's going to be needed to allow the data centre market to continue growing.

Clean power will have to form a central part of the equation. For energy security reasons, politically and socially, in Europe there's simply no other option. Meanwhile, whether you're delivering power remotely or partially through a private wire, there's going to be the necessity to install the right electrification enabling grid services to manage that grid volatility. Taken together, these dynamics point to a wealth of opportunities for private capital investors. ■