

# DatacenterDynamics

# FOCUS

The International Data Center Design and Management Magazine

Volume 3, Issue 5  
August/September 2009  
[www.datacenterdynamics.com](http://www.datacenterdynamics.com)

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Schneider Electric



**RANDERY**  
Colt



**WARRIOR**  
Cisco

**ON HOW THE INDUSTRY IS CHANGING**

# DRILLING DOWN INTO ENERGY MANAGEMENT

Interview: Neil Rasmussen, senior vice president of engineering at APC by Schneider Electric, talked to DatacenterDynamics FOCUS about the problems of integrating data center and building management systems, the issues with IT efficiency claims, why regulation is good and the current shortcomings with metrics

Schneider Electric is an energy management company. The French-owned global firm is undergoing an integration of its many separate businesses. One of its largest and most high-profile acquisitions in the data center market was that of APC.

**DatacenterDynamics FOCUS:**  
How does APC work within Schneider Electric?

**Neil Rasmussen:** A lot of the problems we see in data centers are connected to their relationship with the building. The vast majority of data centers are located in multiple-use buildings, so the systems are shared. It makes it hard to measure data center efficiency when operations occur inside a multi-purpose building.

You cannot solve the data center efficiency problem without integrating with the building systems. This has to be done logically or you will lose out on efficiency.

We soon discovered that it did not make sense for the different parts of Schneider Electric to work separately on integrating with the building – data center and building problems need to be fixed at the same time to gain maximum efficiency. And so the process was a much more involved one than we first anticipated.

We needed a much bigger plan and we needed to think harder about how we were going to put it all together. We realised that we couldn't work with all the building system suppliers at the same time, but we didn't have an idea of how to integrate with them all, either.

The building's automation and controls have been mired in a complicated set of incompatible standards for many years, and the IT side of things was light-years ahead. Our acquisition opened a bridge from the building automation to the IT.

We decided to take a lot of the technologies used in software management of the IT systems and get that thinking into the building automation side.

**DCDF:** What about the energy saving developments within IT?

**NR:** You buy a watt from the utility company and only half of that makes it to the IT equipment, so already we have 50% of the

energy use problem to solve. It is difficult to ascertain whether the improvement of efficiency of IT devices translates to a plateau or a decrease in the total installed wattage of IT because there is a lot of elasticity in that business.

The increased efficiency will be captured by more use; storage is ramping up use, as is video communications. There is huge growth. If IT demand is flat, power use would reduce. But if IT service demand is rising as efficiency is increasing, what does that say about the future of IT power?

The first time I used AutoCAD to design products was on a 4MHz PC. Now I use the program on 2GHz machine. However, in that change all I got in performance terms was an improvement by a factor of two – and the speed of my Windows boot is still the same as it was 20 years ago. So it is hard to say.

Certainly improvements have been made to technology over the years, but we must take manufacturers' energy reduction claims with a pinch of salt.

Dramatic improvements are needed in energy management in devices such as servers, but these will take time. There are currently no huge technology shifts that are radically decreasing the energy consumption of these devices, it is all incremental work and we should all be very glad they are being worked on.

There are no fast solutions to cutting energy use but the commitment apparent now was not there 10 years ago, and this will make the difference. Commitment is there from every vendor on the hardware and software side and it is welcome. The question is will this be enough to drive down the total wattage use of data centers? Only if the demand for computer capacity remains flat – and we don't think that is going to happen.

So it is just a question of balance. There are many older data centers where demand for wattage remains the same, but with ongoing consolidation will reduce use. So not all wattage is distributed where it once was. There is a lot of change needed to build better data centers and to improve the efficiency of those that have life left in them.

**DCDF:** How can you address the over-provisioning and over-specification of data centers?



**Rasmussen:** Wants metrics to be more useful

**NR:** We wrote white papers on this six years ago. Over-specified data centers are all wasting energy – they were commissioned correctly to meet the needs of five to six years from now, and are over-provisioned for the present as a result. So why did we build all at once – why not build to track the need? There may have been value in capital and cost at the time, but from an energy perspective it didn't make sense.

Historically, the goal was to build everything big designed for a 3MW level of operation, say, and hope that you will simply grow into it in time. It is embarrassing how many stories there are where that didn't happen and many data centers are running at a fraction of their capacity – you don't see those ones written about.

When people talk about wanting efficient data centers they must be built on a modular, scalable basis. We have been saying that for years. We even put our engineering resources forward to bring that to the data center sector.

**DCDF:** What about the suspicion towards Pods and the modular approach?

**NR:** There was a level of caution. This is a business where reliability is the most important thing, so anything that is new is a risk. What is interesting about this, though, is the type of company adopting these architectures the fastest.

Is it the smaller firms experimenting and trying these Pod-based approaches? Although we have a lot of activity at the low end, for example local community hospitals or schools, it is actually the largest suppliers of IT who are leading with pod-based architectures.

It is companies such as Microsoft. The largest colocation providers, are keeping quiet about their forays into the modular approach – they see it as a strategic advantage. And it is catching on fast. There now isn't a single customer of any size who isn't putting it in their Request for Proposals. And the supply chain is responding.

**DCDF:** What about the regulatory environment? What is going to have the greatest impact on the data center?

**NR:** You always get nervous when a lot of regulatory activity takes place for fear of it becoming counter-productive. I don't see that going on. I have been pleased with the intelligence and thought that has been put into a lot of the proposed regulations for buildings. It is not complete and not perfect, but the biggest risk we have is if a diverse set of regulations that are incompatible or inconsistent are developed across geographies.

It is already evident that building regulations are the highest priority in many countries, and specific regulations for data centers could be just around the corner for the sector.

If there are inconsistent regulations it makes our job much more difficult, and our ability to take the technology forward is severely hampered. It takes a lot of work for us to develop and improve these products and if we can develop that on a global scale it will be better for the customer and the economic system as a whole.

We are interested in trying to ensure that regulations are harmonised. In general, there are a growing number of well thought-out developments, including labelling and measuring data center efficiency.

Most of the regulations are proceeding in an intelligent way, there are the parallel developments of Energy Star, the Code of Conduct in the EC, the similarly related programmes in Japan. There is a lot of overlap here and it would be great if we could bring all these developments under one regulatory roof.

I don't think it will happen just yet because

everyone is still experimenting. But when it does happen it will release a lot of good competition and focus in on the problems of compatibility.

As we have said many times, there is a lot of inefficiency in data centers and buildings as a whole and we are ready to help solve the problems.

**DCDF:** What, if any, impact are regulations having now?

**NR:** You can see it in every line of business – be it ours, an oil business or an energy business. Everyone is beginning to think the same thing: “How am I going to tell my story in terms of this?”

Most businesses are wondering how to produce their offering in line with the regulatory terms. Businesses must rid their portfolios of anything that makes them inefficient and make their products the most efficient in class.

Many firms have built in energy management features in everything they sell. This makes them ready for the future and makes it easier to manage going forward. Regulations have their place and even just the threat of regulation is making good things happen.

**DCDF:** What is your view on metrics and measurement?

**NR:** We are very concerned about this. The problem is even worse on the IT side. On the facilities side we have DCiE and PUE and we are comfortable that those are very useful for the sector. The problem is that those metrics are not defined.

Unfortunately, it is unclear what to do if, for example, my business is located in a shared environment and shares a cooling tower. How do I take that load and integrate it into my PUE? Am I allowed to do that? Can I estimate the cost? Do I allocate it and partition the cost of that tower? The rules must be clarified.

We make assessments and help people instrument for DCiE, but every case we have encountered has some nasty problems that were not thought of when the metric was first developed. And we can't just make up the answers as we go along, there must be rules for what we do.

One data center has a water pump, it pumps it from a well. Another gets its water from a utility company. Should we count the well energy as facility energy or – because the other data center (if we are to benchmark against it) does not have a well – ignore it?

Should we assume the water that came out of the first data center's pipe had an energy

cost and allocate it to its PUE?

No one has answered these questions. What do we do with a Network Operations Centre? Is that an IT load or is it a facilities load? Where do we put these things?

These ambiguities are irrelevant if all a company is trying to do is manage its own energy. But as soon as I talk about benchmarking it falls apart. And that is why there is so much chaos out there about benchmarking.

We have seen people claim efficiency and PUE of 0.9 – that's a DCiE of 110%. They have assumed that if they put a photovoltaic panel on their roof they can count it as a negative facility loss. Who said that was in the rulebook? We don't consider that to be a rational way to go about benchmarking.

What if my data center provides lighting for car parking lots – are they a facilities load or do I ignore them? If you try to conduct benchmarking without answering these questions, you will become tangled up in a material way.

This is why we see a lot of controversy in published numbers, where figures are disputed as untrue. Or the reverse occurs when data center's don't publish their figures because they are a poor reflection compared to their competitors. This occurs when data centers are not sure that everyone is measuring in the same way.

**DCDF:** How can these numbers be made useful?

**NR:** Measurements of PUE or DCiE are not very useful to be honest. The only way to make these measurements mean something is if you drill into them to understand what gave rise to them and what you can do about that. That is the work we are doing. Simply adding on a few meters and measuring these things and then claiming you are managing energy is not good practice. You have to be able to drill in and model it.

You need something that will allow you to take the measurements you have and explain what they mean and where the weaknesses are in your subsystems. You need to know where your opportunities are to improve and what would be the ROIs on those opportunities. That information does not come out of a basic measurement and publication of a single number.

Getting those numbers is a start. There is a lot more that needs to be done and that is the focus of our development activity. There are companies that claim they are doing energy management when they publish a PUE. But that is not energy management. ■