

# A clean, quiet alternative to diesel that reduces your TCO



CHEM Group have deployed over 300 fuel cells in South Africa and they want to offer the same to the rest of Africa



Hal Koyama, Director, CHEM ENERGY SA

CHEM Group are active globally and have deployed their fuel cell technology in Japan, Indonesia, India and South Africa. The modules use a methanol/water mix to generate hydrogen that provides for a quiet, clean and scalable energy solution. Although not widely deployed yet, fuel cells are a potential replacement for off-grid and unreliable grid applications. They're also deployed at good grid sites where reliability is essential. TowerXchange discusses CHEM Group's solution for cell sites with Harol Koyama.

**Keywords:** CHEM Group, CHEM ENERGY SA, DG Runtime, Energy, Energy Efficiency, Fuel Cell, Hydrogen, Japan, NTT DOCOMO, Off-Grid, Operational Excellence, Opex Reduction, Passive Equipment, South Africa, Unreliable Grid, Vendor Interview, Vodacom, Who's Who

## Read this article to learn:

- CHEM Group's history of deployed units with Vodacom and NTT DOCOMO
- How fuel cells generate electricity efficiently, cleanly and quietly
- Modularity of design for scalability
- How CHEM Group ensure ease of access to a new fuel source
- The formal SLA-type performance guarantees CHEM Group offers

**TowerXchange: Please introduce your company – where does CHEM Group fit in the telecoms infrastructure ecosystem?**

Hal Koyama, Director, CHEM ENERGY SA: CHEM Group is a publicly traded, diversified industrial company based in Taiwan and a market leader in electric machinery there. CHEM Energy SA (CHEM SA) is its subsidiary in South Africa, focused on hydrogen fuel cell generators for backup and off-grid telecom power. CHEM SA fuel cell generators replace diesel generators at cellular base stations.

**TowerXchange: Fuel cells are a proven technology, but are far less commonly deployed than diesel gensets or hybrid systems – for our readers less familiar with fuel cells, please explain to our readers how your solution works and what makes it a good fit for telecoms back-up power.**

Hal Koyama, Director, CHEM ENERGY SA: Fuel cells are a rapidly emerging technology for reliable power generation in challenging situations. Fuel cells require hydrogen to operate, but hydrogen is difficult to obtain and store, so we've perfected a technology that produces hydrogen on demand from a mix of methanol and water (the stuff in your windshield washer fluid). We've integrated these technologies into a robust DC generator specifically designed for telecom applications. In areas with weak or no grid, it tends to be a strong alternative to diesel generators, lowering the total cost of ownership, increasing uptime and reducing

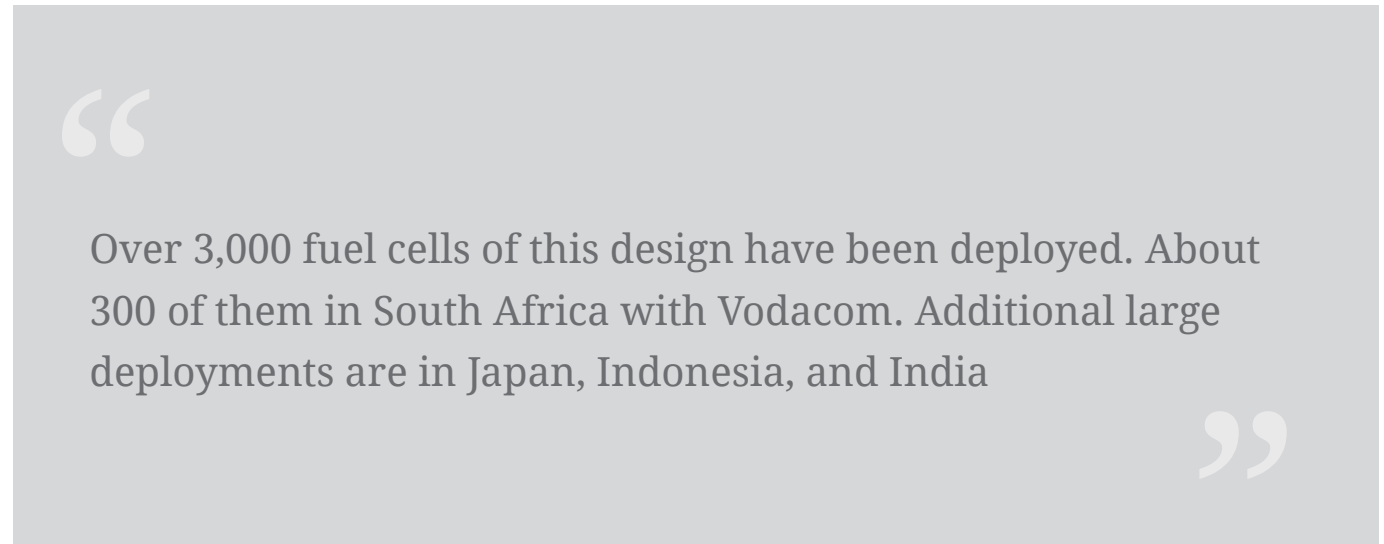
theft and vandalism. CHEM's fuel cell generators are nearly solid state, with very few moving parts to wear out or fail, and they have extensive remote control and monitoring capability, making them ideal for distant sites.

**TowerXchange: How many units have been deployed by CHEM Group on cell sites and in other uses?**

Hal Koyama, Director, CHEM ENERGY SA: Over 3,000 fuel cells of this design have been deployed. About 300 of them in South Africa with Vodacom. Additional large deployments are in Japan, Indonesia, and India. While the generators can and have been used in other applications, such as railway and aids to navigation, by far our main market is telecom.

**TowerXchange: What's the sweet spot for your solutions in terms of grid availability and the load your solutions can support?**

Hal Koyama, Director, CHEM ENERGY SA: Most telcos we've talked to think about their diesel generator fleet as an average in terms of cost and reliability. But in fact, there is a wide range and often times the cost data being used is not as accurate as it could be. So we look at a number of factors to see where the CHEM fuel cell can add value. These factors include, outage rate and total power, but also include theft and vandalism, distance to serve, overall reliability of the site, among other things. Telcos are often surprised



Over 3,000 fuel cells of this design have been deployed. About 300 of them in South Africa with Vodacom. Additional large deployments are in Japan, Indonesia, and India

at how much money is being left on the table by just going with the "old" solution. Typically, we see deployments at sites experiencing 5% or more outage rates, and of course sites without access to the grid. The units are 5kWe, 48VDC output and can be bundled to about 15kWe in increments of 2.5kWe.

There are exceptions though. For example, in Japan, we have over 500 systems with NTT DOCOMO that almost never see outages, until there is a big one. So those systems are there because they are seen as the most reliable means of keeping power to critical cellular networks in the worst case disaster scenarios, like Fukushima.

**TowerXchange: How does your solution scale to accommodate increasing power requirements as multiple tenants are added to a site or additional technologies are deployed?**

Hal Koyama, Director, CHEM ENERGY SA: The new G5 system, which is the product that will be produced here in South Africa, has a compact footprint (about 76 cm square) for a 5kWe building block. We can add those in increments of 2.5kWe, e.g. 2.5, 5.0, 7.5, 10.0, et cetera. Because the CHEM fuel cell is nearly solid state, it integrates well with any other generating and energy storage technology, such as solar, wind, etc. making the whole system very flexible as needs and opportunities change.

**TowerXchange: Diesel gensets are popular because there are already extensive diesel distribution networks across Africa – how can maintenance teams keep your fuel cells fuelled?**

Hal Koyama, Director, CHEM ENERGY SA: Our fuel is a mix of water and methanol, called HydroPlus™. Methanol is the second most produced chemical in the world, and we've set up fuel logistics supply

“

These are very situation specific numbers, but depending on the situation, we can see near first cost parity with diesel generators, or breakeven within 18 months and 20% or more O&M savings

”

just about everywhere in the world. Physically, we tend to follow the same routes as diesel, so the transportation cost is essentially the same, but the material cost of HydroPlus™ tends to be lower than diesel. An added benefit of HydroPlus™ is that it has no other commercial value. It is difficult to burn and can't be used as a fuel for engines, so theft is not a problem.

**TowerXchange: One downside of diesel gensets is the cost of refuelling and maintenance – what magnitude of fuel and O&M savings can be realised using your solutions, and how does TCO compare with traditional diesel-oriented energy solutions over an eighteen month, three year and five year scenario?**

**Hal Koyama, Director, CHEM ENERGY SA:** These are very situation specific numbers, but depending on the situation, we can see near first cost parity with diesel generators, or breakeven within 18 months and 20% or more O&M savings. I know everyone wants “a number,” but anyone who has had to deal with diesel generators in these environments knows a real comparison requires some more specifics. CHEM has also been willing demonstrate its value by offering SLA agreements, backstopping the fuel cell performance.

**TowerXchange: Towerco SLAs often demand 99.5% or higher uptime – tell us about the reliability and autonomy of your solution.**

**Hal Koyama, Director, CHEM ENERGY SA:** CHEM fuel cells are completely autonomous. They can be monitored and controlled centrally, or in a distributed manner from a smart phone. The remote monitoring covers a range of functions, from the basic output, fuel status, and on-line stats, to more detailed warnings, alarms and diagnostics. We've designed the remote monitoring so that if there is some kind of problem, it enables us to do some diagnostics before heading to the site, thus saving time and money. CHEM is comfortable with 99.5% SLA's and can offer SLA-type solutions as well as equipment sales and combinations with our local partners.

**TowerXchange: Please sum up how you would differentiate your solution from your competitors'?**

**Hal Koyama, Director, CHEM ENERGY SA:** Our main competitors are diesel generators. For weak or no grid applications, we think the CHEM fuel cell is step change in performance and value. Although we don't talk a lot about it, the CHEM fuel cell is extremely clean and quiet, which places it closer to renewable technologies. We could have a conversation with it running next to us without any problem.

As far as other fuel cell companies, there are very few in this space and none with CHEM's commercial experience and track record. Most are in demonstration or trial phases, while we have been deploying commercial systems since 2010 ■