



# The 'Wow!' factor

## At the stunning TCS Siruseri campus, Voltas helps create a fabulous work environment



**30** km south of Chennai, at Siruseri, the new TCS campus sprouts like a mammoth flower crafted from metal tubing, meshwork, glass and masonry. Unearthly in its elegance, its gracious curves and canopies are symmetrically clustered around a central spine, studded with vivid splashes of green vegetation and cool bodies of water. It's about as far as you can get from the 'sweat-shop' image that has somehow stuck to India's IT industry.

Says B V M Sarma, VP-Infrastructure, TCS: "The mandate was to build a world-class facility that would create a 'Wow!' factor in the minds of global visitors." It would highlight TCS' capabilities, provide the finest working environment, and incorporate the most ecologically-aware and energy-saving features.

Set on 70.5 acres of land, it's the largest IT facility in the Asia-Pacific, accommodating 25,000 seats

in 6 engineering buildings which – along with 12 general service areas – are being built in 2 phases. The first was completed in 2008, and the second will see completion very soon this year. There will then follow the auditorium, training center and library in Phase 3, and finally the clubhouse, guest houses, customer care and other facilities for recreation and hospitality.



**B V M Sarma**  
VP-Infrastructure, TCS



L-R: R Palanisamy (Design Manager), M Ramanathan (Project Manager, Phase 1), Kamlendra Singh (Zonal Manager, SZ-EM&RBG, Chennai).

### Hybrid systems for high efficiency

Built to exhibit TCS as a global force in IT, the Siruseri campus is also iconic of Voltas' HVAC prowess. Says Kamlendra Singh (Zonal Manager, SZ-EM&RBG): "When Voltas won the order in 2006 – competing against BlueStar and ETA, among others – the challenge was to meet some extraordinary 'green' expectations." These included the highest energy-efficiency, LEED certifications, zero waste disposal and carbon footprint offset, all in India's single largest HVAC project to date.

The response was hybridization, the integration of different systems and technologies. "It was done to a

degree of complexity never previously attempted by Voltas," says R Palanisamy (Design Manager).

Essentially, the set-up consists of water-cooled centrifugal chillers with a cooling tower, air-cooled brine chillers, and air-cooled screw chillers, coupled with a Thermal Energy Storage (TES) system. With a net capacity of 8850 TR for the two phases combined, along with TES of 11600 TRHr, the combination delivers cooling that rises and falls with the variations in heat load through each day's cycle – from a night-time low of 600 tons to 9800 tons on a hot June afternoon, as studies showed.

Here's how it works. Through the night, when





Chilled water pumps (Phase 2).



Condenser water pumps (phase 2).



Primary chilled water pumps connected with screw chillers in Phase 1.



Centrifugal chillers.

only the data center and hub-rooms are active, all cooling needs are met by 2 air-cooled screw chillers. Meanwhile, 6 brine chillers operate in charging mode, freezing water in the Thermal Energy Storage tank.

First thing in the morning, the system switches to 4 water-cooled centrifugal chillers, totalling 3000 tons

capacity . Consuming 0.65 kw per ton, these handle the daytime 'base load'. As the sun ascends and more warm bodies come in, the load rises, and a set of 6 air-cooled brine chillers comes into play in direct mode, along with as many as 9 air-cooled water screw chillers (depending on the load profile), consuming





99.5% of water is reused for gardening, after state-of-the-art effluent treatment.

1.35 kW per ton. These further cool the water, which proceeds to the Air Handling Units (AHUs). From about 1 pm to 5 pm, when the load is at its peak, even more cooling is needed; that's when the TES tanks discharge their stored capacity.

The ebb and flow of cooling (i.e. volumes of chilled water running through the pipes) is regulated moment-by-moment by a BMS triggered by ambient conditions as monitored by sensors. At any given time, both



An airy atrium shielded from direct sunlight. 24 km of railing enclose the many balconies and external stairs.

“ When we began work on TCS Siruseri four-and-a-half years ago, it was a job of unprecedented value, scope and scale for us. It was both a test of our capabilities and a valuable learning experience. The project challenged our engineering skills in designing so large a Thermal Storage System for energy saving, as well as the large-capacity multi-type air conditioning plant using a Tertiary pumping system. It stretched the team's project management and execution capabilities in the most demanding situations, under tight time schedules. It brought out the need for training our own engineers and the large sub-contract workforce in modern construction technologies, such as mechanized material handling systems, weldless couplings in pipe jointings, and many others.

In short, the project gave us the grounding and confidence with which we then undertook numerous other high-value large-scale jobs. The subsequent award of TCS projects to us on a continuous basis is a recognition of the work done at their star facility in Siruseri. ”

**M Gopi Krishna, EVP & COO – EM&RBG**





cooling and power consumption are no more or less than strictly required.

Other 'green' features are the use of plate-type heat exchangers, differentiated pumping systems (primary, secondary and tertiary), Variable Frequency Drives in AHUs, and – for the first time in India – Variable Air Volume in tandem with Treated Fresh Air for handling so large a capacity.

New technologies and methodologies even extended to executional details, including the use of pre-insulated pipes, *in situ* PUF injection for higher-diameter pipes, 3D modelling of the plant rooms, and advanced project management techniques.

Says R Palanisamy: "During commissioning of Phase 1, our various assumptions about the load profile were tested as far as possible. The testing continued over the next 6-8 months; even with a full human load in place, all our assumptions were proven correct, and we were able to correlate various inputs with various results."

In fact, thanks to the demonstrable success of the Siruseri model, TCS will use a similar hybrid system at their upcoming Pune campus, complete with Thermal Energy Storage.

## Special zone – and other special hurdles

The Siruseri campus was one of India's very first projects in an SEZ (Special Economic Zone). As such, it called for compliance with innumerable regulations on the part of TCS and all its contractors. Only thus could they avail of the exemption from various levies like customs, excise and VAT.

Not an easy task, given the massive imports required, from the smallest fixtures to the heaviest equipment. The Voltas team had to educate every vendor, sub-vendor and sub-contractor on the complicated documentation requirements. None of them was used to working this way, least of all the dispatching vendors and principals overseas.

"They made errors in one out of three documents," says Kamalendra Singh. "All our costing had been done without factoring in the taxes and duties, which would



A triumph of world-class 'green' development, from architecture to air conditioning.

have to be paid unless every error was rectified. And we had to act very fast, even before the consignment arrived, to avoid demurrage and storage charges. We had to convince various officials, and win their cooperation. This became even more of a problem when the paperwork from Singapore or Malaysia or China reached only after the consignment had landed."

The stunningly surreal architecture created its own executional difficulties. "There is not a single straight line anywhere in the complex," says M Ramanathan. Every surface and every edge is curved to some degree, so the translation from drawing to installation was far from straightforward. Piping and ducting, for example, had to follow curved paths; often 6m pipe sections were halved and rejoined accordingly. Even the equipment on the terraces had to be arranged along an arc.

Then there were the unseasonable rains, for three years in a row. Being a low-lying area, Siruseri is a catchment for rainwater from miles around, and workers had to battle against floods and mud.

Siruseri is also somewhat isolated. It's a good 30 km from Chennai, and transportation was initially poor. Local workers were not keen to join the site force, so a team had to be assembled from all over India. Keeping them consistently deployed at the site was yet another tricky task.

Finally, there was the problem that tends to plague all extended projects: frequent fluctuations in prices of equipment and materials, including a steep increase in base metals pricing, and changing exchange rates.



## Excellence by design

B V M Sarma beams with pride when speaking of the Siruseri campus. He recalls how the entire architectural and structural design was delivered by the renowned Carlos Ott of Uruguay, whose dazzling portfolio includes the Millennium Residence in Kuala Lumpur, Henan Art Centre in Zhengzhou, and the National Bank of Dubai. In over 15000 drawings, he laid out an end-to-end solution in which the final utility of every space was determined in advance, from conference halls to workstations.

“When we looked at the project,” says B V M Sarma, “we found we required the best in terms of engineers, contractors, workmanship – and the ability to coordinate all the aspects of the project.” Rising to those demands, Voltas took its place in a noteworthy team that included Potential Service Consultants (MEP consultancy), Tata Consulting Engineers (PMC & Clients’ Consultants), ABB (substations), elevators (Mitsubishi) and Sterling Wilson (DG sets and electricals).

“It is a boutique project, a designer project,” says B V M Sarma. “There is nothing standard or off-the-shelf about it. Every detail had to be customized, and imported from China, Malaysia, Indonesia, Singapore, USA, Latin America. For example, we needed 24 km of handrails, for the balconies and exterior stairs you see all over the buildings. Who can fabricate that quantity? We finally identified a company in Singapore, who supplied our requirement.”

HVAC is critical at Siruseri, and indeed at all IT facilities; it accounts for 60% of power consumption. According to B V M Sarma, TCS has carried out years of research in optimizing the costs. As its



325m long and 45m high, the intricate 8500-ton central spine is designed for relaxation; it was first tested as a bamboo model for stability in strong winds.

preferred HVAC provider for large projects, Voltas has been closely involved, with its entire design team placed at TCS’ disposal for developing hybrid systems.

“The approach of Voltas management is a good one,” says B V M Sarma. “The attitude is that whatever the client requires, do it first, and worry about the business implications later.”

It’s no surprise that Phases 2 and 3 were awarded to Voltas on a no-bid basis, as has the upcoming facility in Pune, followed by Ahmedabad. TCS already has 50000 tons of HVAC installed at its various locations,

and is targeting a further 75000 tons in the future, for the needs of 25 million sq ft of new construction. It’s fair to say that Voltas is first in line for much of that business – if there is a line at all.

“Voltas always rises to the occasion,” says B V M Sarma. “You see it in procurement, in executing and commissioning complex systems, in attending to emergency situations. That is the beauty of Voltas.”



Umbrella structures and special glass facades shield against heat while letting in light.



“TCS Siruseri IT Park is truly the ‘jewel in the crown’ among all its facilities...”

**S Ramadorai, Vice Chairman – TCS**



**1. What was the thinking behind making such an investment, which goes well beyond the needs of functionality?**

TCS' pioneering role as the leader of the Indian IT services industry has over time taken it to a position among the top ten IT services companies in the world.

Through the TCS Siruseri project we wanted to demonstrate, to our clients all over the world, the impressive engineering capabilities that exist in our country, TCS' ability to manage a project of such large scale, and to provide our employees in Chennai not only with a world-class facility, but also a world-class environment.

We have had a history of creating excellent software development centers for our employees to work in both in India, as well as overseas, often adopting different architectural and innovative styles created by Indian and non-Indian architects. We saw the TCS Siruseri IT Park as a facility catering to 25,000 employees - the first of its kind and scale, for TCS as well as for the Indian IT industry. We also envisioned this unique facility as a 'signature' campus for TCS, at a global level.

The TCS Siruseri IT Park is an iconic cluster of structures comprising many unique architectural features, with complex structural roofing, glass curvatures, a unique tower and so on. It was recently adjudged as the 'Best Office Architecture in the Asia Pacific Region' by International Property Awards, and is also nominated for the global award to be judged and announced in December 2011.

While our investment in creating this architectural marvel has been on the higher side, compared to industry norms for IT development centers, we feel it was money well spent. Our employees find the work environment invigorating and stimulating, which in turn boosts their productivity and creativity. And all our clients that visit this centre are frankly overwhelmed by its unique architecture, its sheer size and scale, and indeed the grandness of its vision.

**2. Is it intended to be the centerpiece of TCS' various facilities – the 'jewel in the crown'? Or is there a plan to build more centres of the iconic quality?**

I would imagine that the TCS Siruseri IT Park is truly the 'jewel in the crown' among all of its facilities.

TCS has been investing in many large IT parks in different metro cities in India. Though they will be best-in-class following all the industry standards, from an architectural and uniqueness perspective TCS Siruseri IT Park will remain its 'signature campus' for some time to come.

**3. What outcomes do you expect from this investment, beyond what TCS would have got from a more modest and conventional property?**

Like I mentioned earlier, with this signature facility we wanted to demonstrate to all our stakeholders, and to the world at large, what we are capable of achieving, what the Tata brand can reflect in architectural terms, and to underscore our leadership position. Considering the response we have received so far, and continue to get, these objectives are being fully met.

One example of this is the Gold certification received by the facility from LEED, for its 'green' compliance, thus demonstrating TCS' - and the Tata Group's - commitment towards energy conservation, sustainability and green initiatives.

**4. What projects, tasks, divisions etc will be deployed here? What special role will it play operationally?**

Speaking broadly, in terms of delivery excellence, all our delivery centres provide the same level of high-quality services that our global customers expect from us.

From TCS Siruseri IT Park we will provide services encompassing IT, Infrastructure and Business Process Outsourcing to our customers. The major industry segments that are serviced from here include Banking and Financial Services, Insurance, Telecom, Manufacturing etc. Through collaboration and creativity, innovative solutions developed here are demonstrated to the many customers and business prospects that visit us at the facility every day.

**5. How would you assess Voltas' performance on this project?**

With a seating capacity of 25,000, TCS Siruseri IT Park must certainly count among the largest projects handled by Voltas in the IT Park sector in the country. A blend of efficient technologies was worked into its creation, and Voltas has contributed by providing good value-engineering in finalizing the design.

In addition, Voltas deployed a competent team to address design, planning, procurement and execution of the project for its successful completion. We found the experience of working with Voltas very professional and highly rate their performance. They were excellent partners in the success that is today TCS Siruseri IT Park.