

Powered for REDEVELOPMENT AND REVITALISATION

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Flick a switch and the electric light comes on, or the radio or vacuum cleaner. Imagine life without electricity - no television, no air-conditioner, no computer. We would literally be plunged back into the Dark Ages.

Electricity touches practically every aspect of our lives - from the moment we wake up and turn on the coffee maker, to the instant we turn off the bedside lamps. Yet, we take it for granted and only appreciate it when the supply is interrupted. Then it becomes obvious how totally dependent we are on this vital service.

First things first

Electricity is also one of the first things architects and engineers need when they begin work on a new development area such as Tanjong Rhu, or a historic area undergoing renewal such as Chinatown. Besides providing for the needs of the eventual uses that will take place in these areas, electricity is also essential for the construction process.

URA plays a key role in co-ordinating with the relevant departments to bring in vital services such as electricity to the development areas. From the start, when our plans are being formulated, we bring these critical departments onboard to discuss the service provisions and requirements for the development areas.

Adequate provision of services like electricity are absolute essential or there will be no Boat Quay like we know it today. The next time you go to Boat Quay, take a walk down the backlanes and count the number of air-conditioning units. You will then get a pretty good idea how much electricity demand has increased in the area, clearly much more than the old days when Boat Quay was a godown!

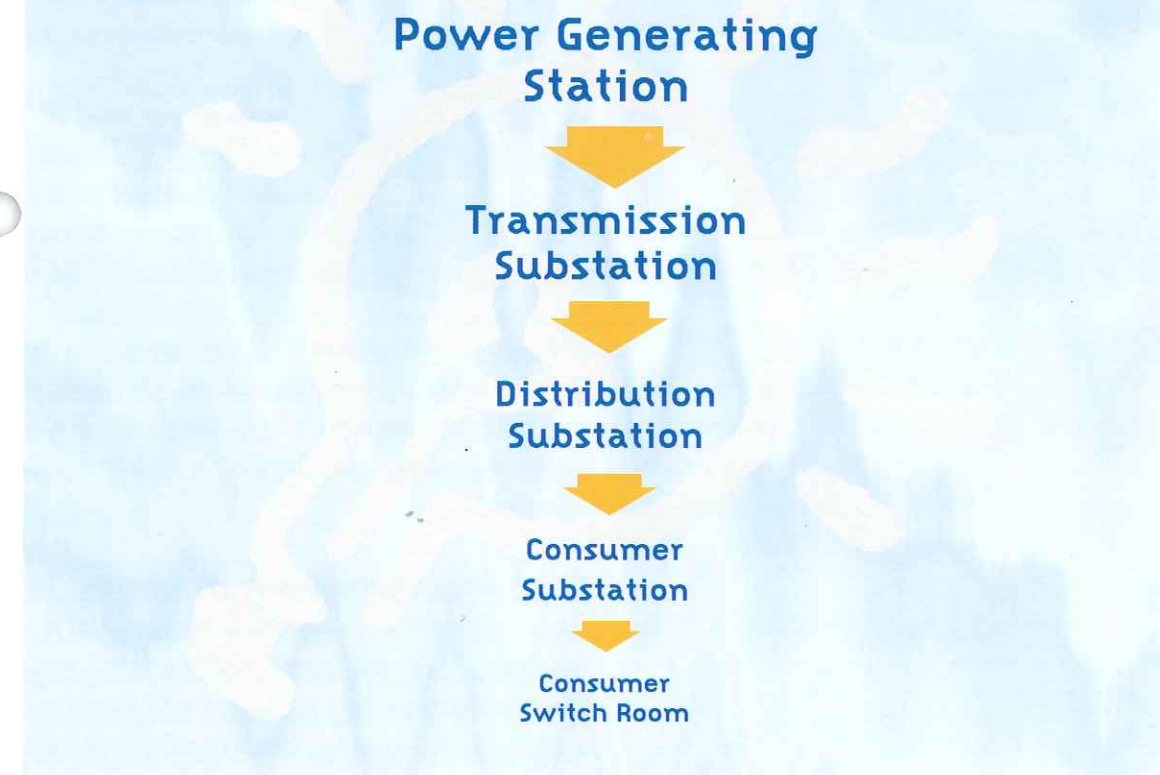
Besides planning the routes and locations of the substations with PowerGrid, URA also constructs some of these substations to facilitate the development of certain areas and the revitalisation of historic districts.

Many of our substations are so well-integrated with the buildings that people do not realise that they are substations. Look at this substation at Little India, Perok Road for example. Read on to know more about substations constructed by URA on pages 6 & 7.



Power Distribution Network

In Singapore, we generate our electrical power in power stations. This power is then transmitted around the country via high-tension cables to cut down voltage losses along the way, and then stepped down through substations to reach us in the 220V form.



Planning for a substation

As a general guide, a substation is required if the supply to development requires more than 300 A 3 phase. However, if there is no existing power source around the development, then a substation is required even if the load is small.

In a building development, space is usually provided by the developer at the first storey for a substation. Here, PowerGrid will house their transmission equipment and bear all costs of equipment within the substation.

In landed housing developments (such as terrace, bungalow, semi-detached housing), the developer is required to vest the substation site, including the building, to PowerGrid or continue to maintain the

site and building while allowing PowerGrid to house their equipment.

Catchment areas

Voltage losses occur along the length of cables supplying power from the substations to the consumers. The further away the consumer is from the substation, the greater the losses.

Thus, the maximum distance that a cable can distribute electricity without a serious drop in voltage is dependant on the types of cables used. What this means is that a single distribution substation, no matter how big it is, can only serve up to a certain catchment area. If the area is large, then more than one substation will be required.

see pages 6 & 7 for more about substations.

A closer look at the substations



Merchant Road substation serves the needs of developments at Riverside Village.

Merchant Road substation

Singapore River is a prime example of URA's involvement in the redevelopment process. URA worked closely with various departments to bring about the cleaning of the river, encourage new uses and construct new pedestrian promenades.

Critical to the new uses is the new substation built by URA at Riverside Village. This 66kV Merchant Road Substation is located on top of the CTE tunnel, a difficult place to construct a substation! The substation has to sit on predetermined foundation stumps while traffic raced underneath. The absence of two corner stumps along Merchant Road helps explain why the front facade has to curve gently backwards.

The substation was built at a cost of \$6 million, the bulk of which is attributed to the structural cost. The actual cost of the substation, less the structural cost, is actually comparable to conventionally designed substations.

The character of the 5-storey substation is designed to be sympathetic towards the architecture of the warehouses along the River.

Fairfaced brick facades are detailed to echo the traditional brickwork of these warehouses. The facade is designed to proportionally step-down the enormous mass of the building. An urban design requirement

to provide a 3.6m wide covered walkway around the building helped resolve the problem. The facade is detailed with reinterpreted eclectic motifs of the Teochew godowns and layered with horizontal elements.

In addition, the double-volume spaces required for large equipment are clustered in the centre of the building. These are capped with a pitched roof, specially designed to be consistent with warehouse architecture and essential in ensuring that water and electricity do not mix.

Tanjong Rhu substation

Within the Tanjong Rhu area is another substation designed by URA to facilitate the redevelopment process. The building is post modern with a hint of



Tanjong Rhu substation.

industrial aesthetics. It reflects the tabula rasa transformation of Tanjong Rhu from an industrial area to premium waterfront housing.

The building, although large, will be dwarfed by surrounding developments with plot ratios averaging 2.8. Its interplay of masses is a pure expression of its internal functions. The main body of the substation is defined as a solid undifferentiated mass punctuated by glass and louvred openings. Superimposed upon this is a series of vertical elements that express the staircases and access balconies. The top is capped with a curved roof that echoes the curved western facade and strikes a balance with the mass of the building.

Substations in historic districts

However, URA's contribution in terms of building substations is perhaps most critical but ironically least noticeable in the historic districts. Here, it is absolutely necessary for adequate power to be available in order for new uses and businesses to thrive and so that

revitalisation can take place. At the same time, the substations are least noticeable because they are so well-integrated with the conserved buildings. Most people do not even realise that they are substations.

URA has already built some 30 substations in the historic districts of Chinatown, Little India, Kampong Glam at a total cost of \$18 million. The next time you are down there, see if you can spot the substations. 



Substation at Jalan Kledek, Kampong Glam.



Belilios Road substation, Little India.