Timely Provision of Electricity Supply

BCA Academy

Presented by : ***SP Powergrid***
Distribution Planning

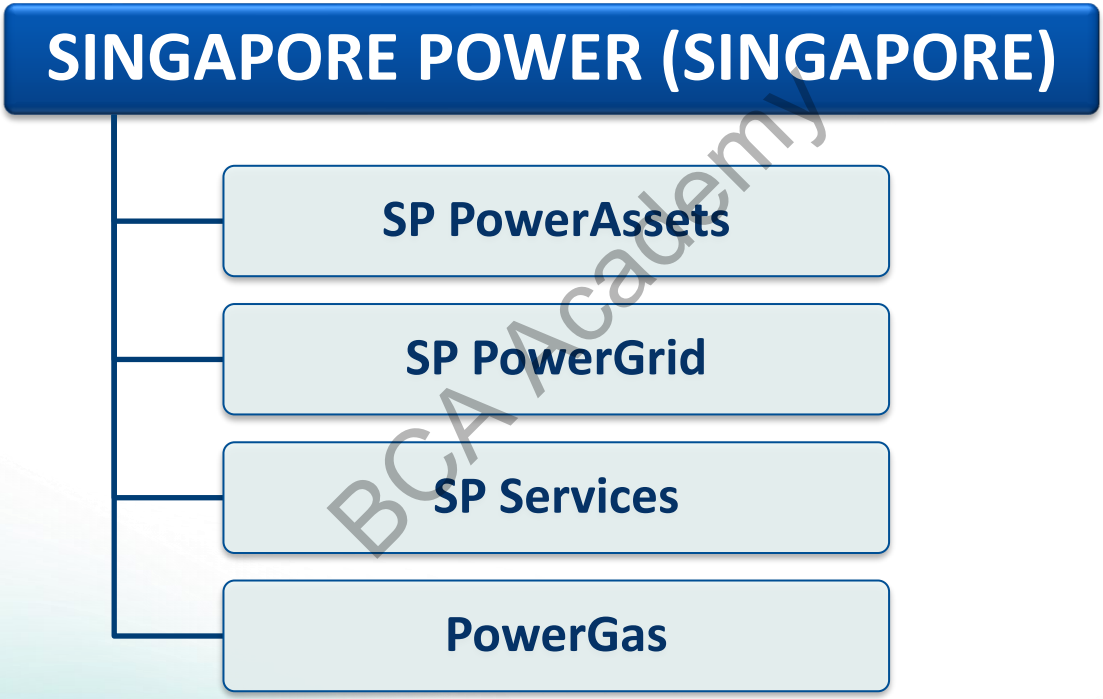
Introduction

- Types of connections and application procedure
- Standard connection charges
- Connection to Grid for PV
- Substation requirements

BCA Academy

SPgroup

Corporate Profile



BCA Academy

SP PowerGrid is an Agent for SP PowerAssets

Undertakes the Planning of the Network for :

Transmission Voltages :

- 400kV
- 230kV
- 66kV

Distribution Voltages:

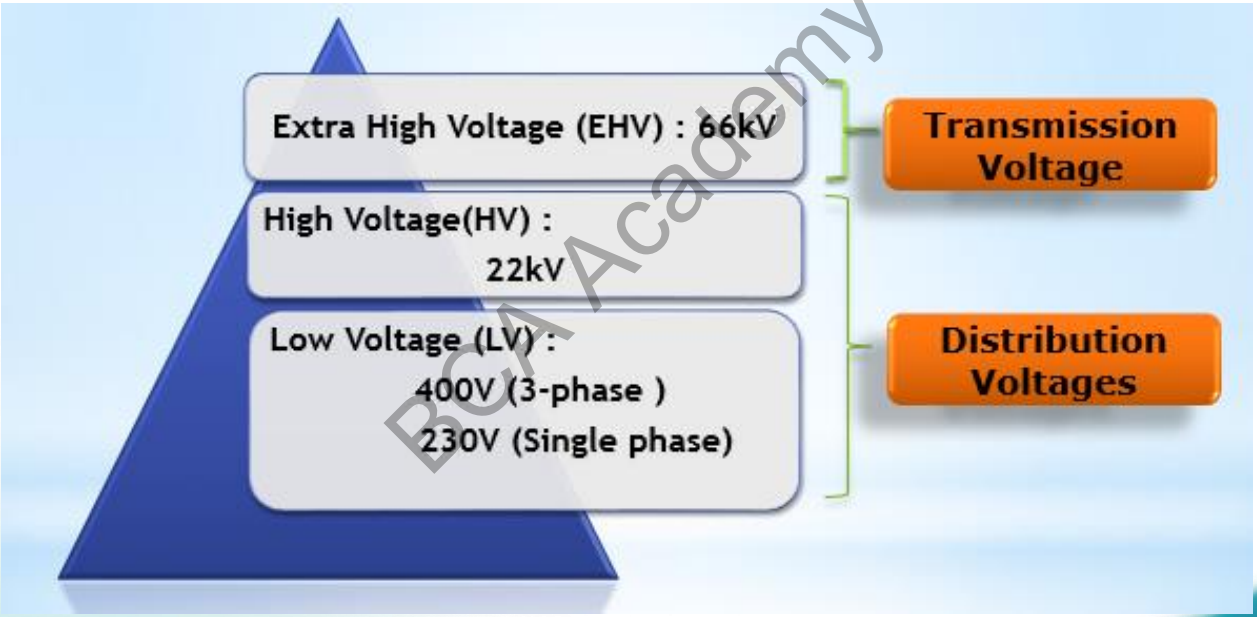
- 22kV
- 6.6kV
- 400V & 230V



BCA Academy

Majority of Grid's Consumers are Connected to the Distribution Network

Voltage Levels Available for Connection :



BCA Academy

6.6kV Network is No Longer Available for New & Upgrading Connection

Types of Connection & Application Procedure :

- Supply Not Involving Substation
- Supply Involving Substation

BCA Academy

Supply Not Involving Substation



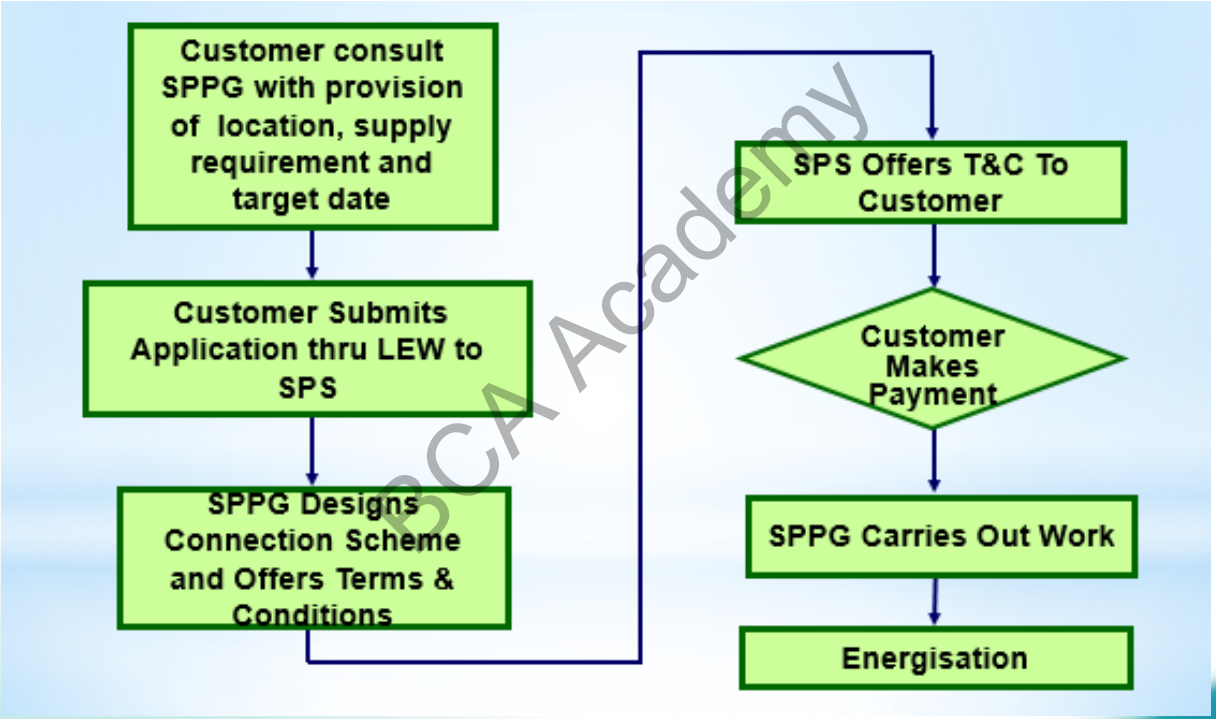
BSA Academy

Supply Not Involving Substation



EDA Academy

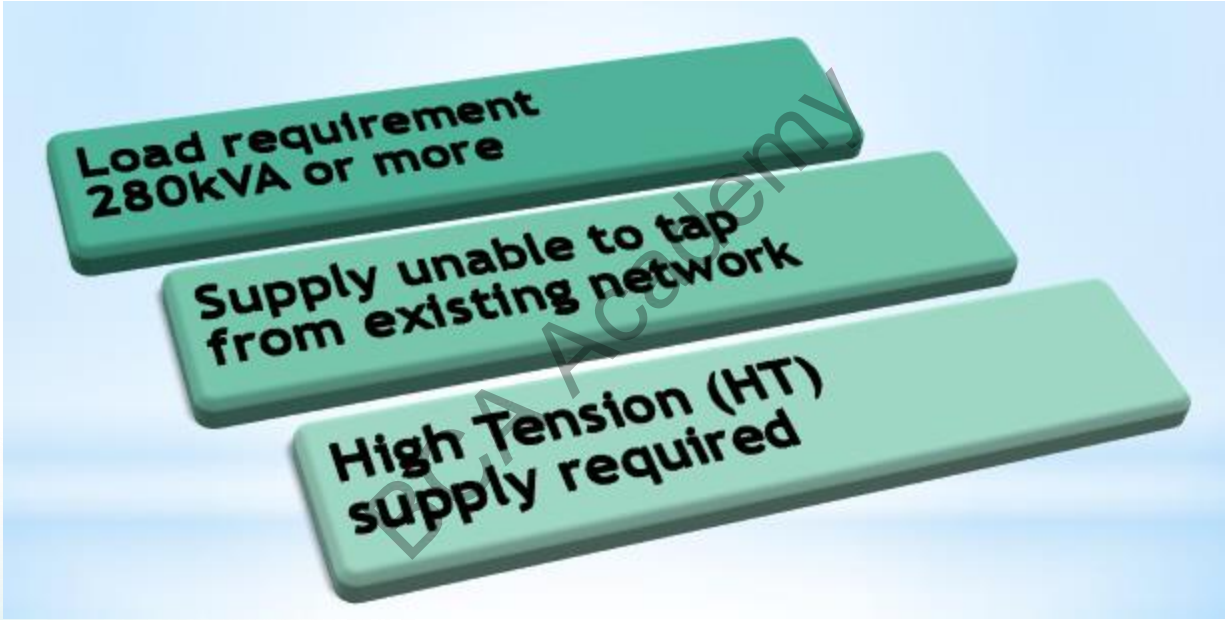
Application Procedure
(Direct Connection)



BCA Academy

Not Exceeding 280kVA

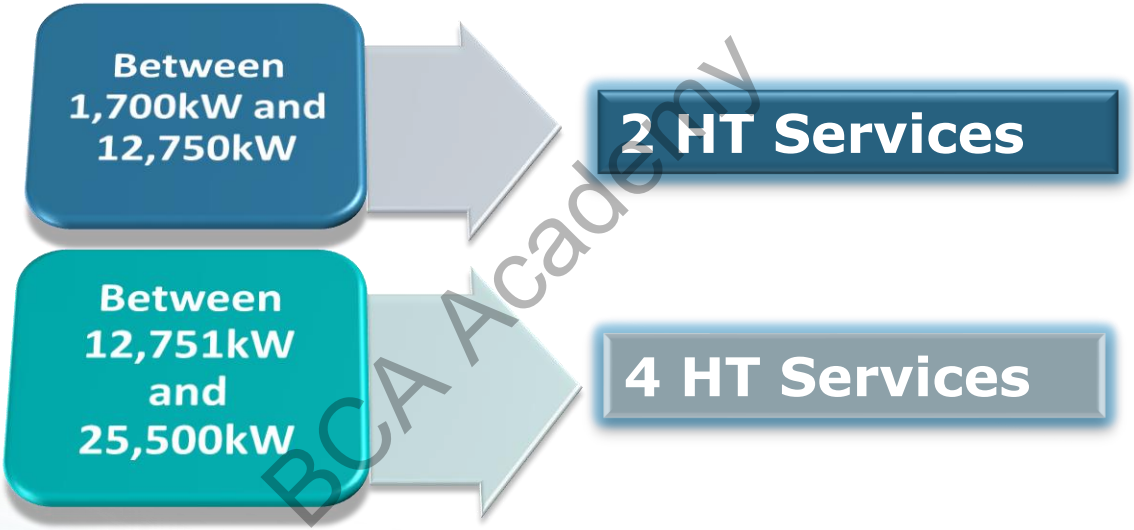
Supply Involving Substation



D'A Academy

Provision of Substation is to Cater Mainly for the Consumer Own Development

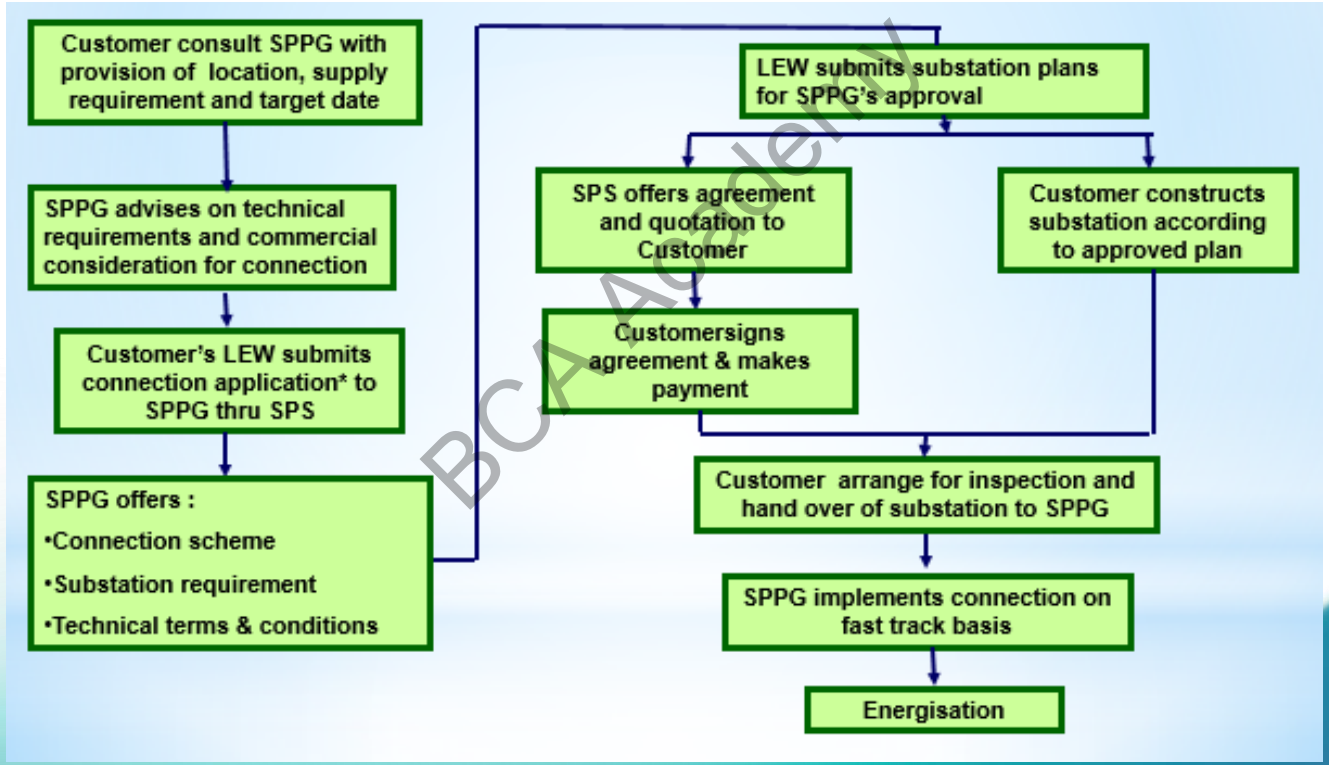
22kV Connection



BCA Academy

66kV Connection is More Cost Effective for Applied Load >25.5MW

Application Procedure
(Substation Required)



BCA Academy

Application For Connection To Transmission System

As from 4th January 2016 , SPPG launch the "eBusiness Portal"

The new "eBusiness Portal" will allow online submissions of:

- Application Form for Connection to the Transmission System (Form CS/1);
- Consultation for Connection to the Transmission System (Form CS/2);
- Application for Inspection of Electrical Installation (Form CS/5);
- Application for Revision of Contracted Capacity (ROCC);
- Submission of CT & VT Test Reports and Request for HT Meter Installation; and
- Application for Elect Diversion and Substation Redevelopment Works.

BCA Academy

To be Submitted by LEW

Standard Service Connection Cables

STANDARD SERVICE CONNECTION CABLES

The type of service connection cables for terminating into a customer's intake point for the applied load connected at the LV and 22kV level and the typical connection schemes are illustrated as follows:

Voltage Level	Applied Load (kVA)	Size of Cables		Type of cables
LV	Up to 15	35mm²	2Core	Cu/XLPE/SWA/PVC
	16 – 45	35mm²	4Core	Cu/XLPE/SWA/PVC
	46 – 75	35mm²	4Core	Cu/XLPE/SWA/PVC
	76 – 140	120mm²	4Core	Al/XLPE/SWA/PVC
	141 – 180	185mm²	4Core	Al/XLPE/SWA/PVC
	181 – 230	300mm²	4Core	Al/XLPE/SWA/PVC
	231 – 280	300mm²	4Core	Cu/XLPE/SWA/PVC
	281 – 460	2x300mm²	4Core	Al/XLPE/SWA/PVC
	461 – 560	2x300mm²	4Core	Cu/XLPE/SWA/PVC
	561 – 1000	7x500mm²	1Core	Cu/XLPE/PVC
	1001 – 1500*	7x1000mm²	1Core	Cu/XLPE/PVC
	1001 – 2000^	2 sets of 7x500mm²	1Core	Cu/XLPE/PVC
	2001 – 3000^	3 sets of 7x500mm²	1Core	Cu/XLPE/PVC
22kV (HV)	Up to 12750kW^	2 sets of 300mm²	3Core	Cu/XLPE/DSTA/PVC
	12751 – 25500kW^	2 sets of 2X300 mm²	3Core	Cu/XLPE/DSTA/PVC
	Pilot cables 1.5 mm²	5 pair		Cu/PE/DSTA/PVC

For development whereby the service connection cables is to be supplied and installed by the customer, the LEW shall, in the event of a non-standard cable installation, seek approval from PG prior to installation.

* applies to upgrading of applied load

^ There must be an electrical and mechanical interlocking bus coupler between each set of cables terminating into the customer's switchboard as shown below :

BCA Academy

SPPG will Provide and Maintain Service Cables Unless Specified by SPPG

Normal Lead Time for Connection

Types	Application, submission of drawings and offering of quotation, Acceptance of agreement	After readiness of intake point / Handover of substation (with Payment made)	Total lead time
Direct connection	**Approx 4 wks**	****Approx 6 wks**	**Approx 3 mths**
Supply involving provision of the substation	***Approx 3 mths**	****Approx 10 wks**	**Approx 6 Mths**

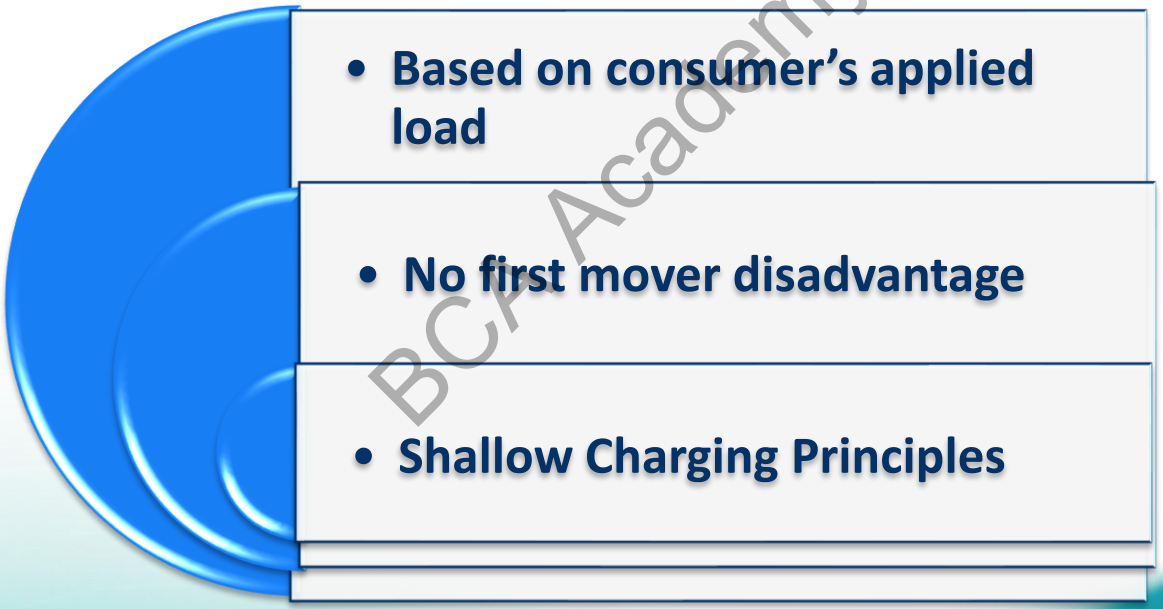
BCA Academy

* Provided that LEW adhere to the schedule and submit the plans promptly.

** Inclusive approx 2 wks of seeking road opening from the relevant authorities before cable work can commence.

Standard Connection Charges

Charging Principles :



BCA Academy

To Adopt Fair & Equitable Charging Methodology

Standard Connection Charges

Capacity Requirement in kVA	Capacity of Final Service Cable	Type of Final LT Service Cable	Development without Substation	Development with Substation*
			Standard Connection Charge	Standard Connection Charge
			$	$
Underground Connection				
Up to 15 (existing premises)	23	35mm^2 2C	1,600	)
Up to 15 (new premises)	23	35mm^2 2C	1,900	)
16 - 23	23	35mm^2 2C	2,800	)
16 - 45	75	35mm^2 4C	5,300	)
46 - 75	75	35mm^2 4C	8,800	6,700
76 - 140	140	120mm^2 4C Al	16,700	)
141 - 180	180	185mm^2 4C Al	22,000	)
181 - 230	230	300mm^2 4C Al	28,700	)
231 - 280	280	300mm^2 4C Cu	34,400	8,500
281 - 460	460	2x300mm^2 4C Al	NA	12,600
461 - 560	560	2x300mm^2 4C Cu	NA	17,700
561 - 1000	1,000	7x500mm^2 1C	NA	26,000

BCA Academy

Applicable for the Low Tension (LT) Consumers

Types of development

Normal Development

- Single intake

Mix Development

- One HT and LT intake

BCA Academy

Proper Demarcation of supply boundary and amalgamate the existing service connection to single intake during upgrading connection. At all time no cross of supply

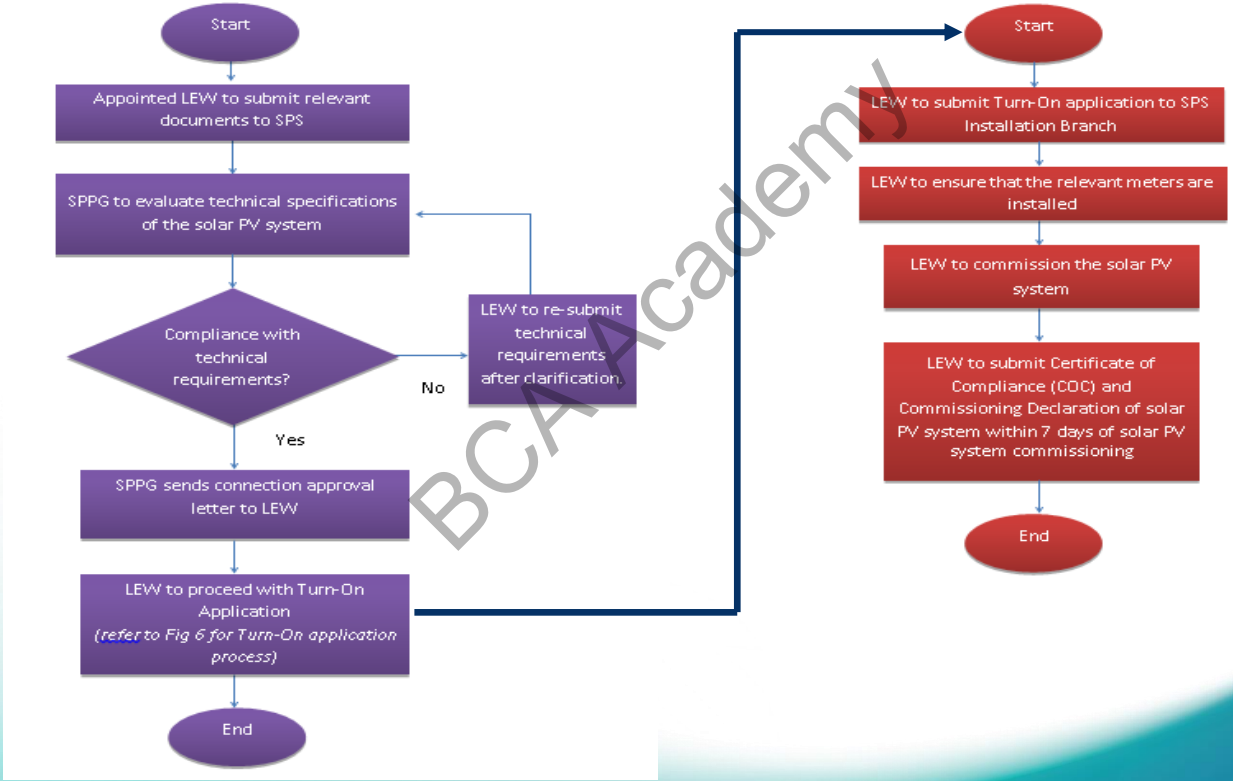
Solar Photovoltaic (PV) Systems Portal

Contents of the portal includes:

- Licensing requirements
- Connection requirements
- Monitoring requirements
- Market participation and settlement information

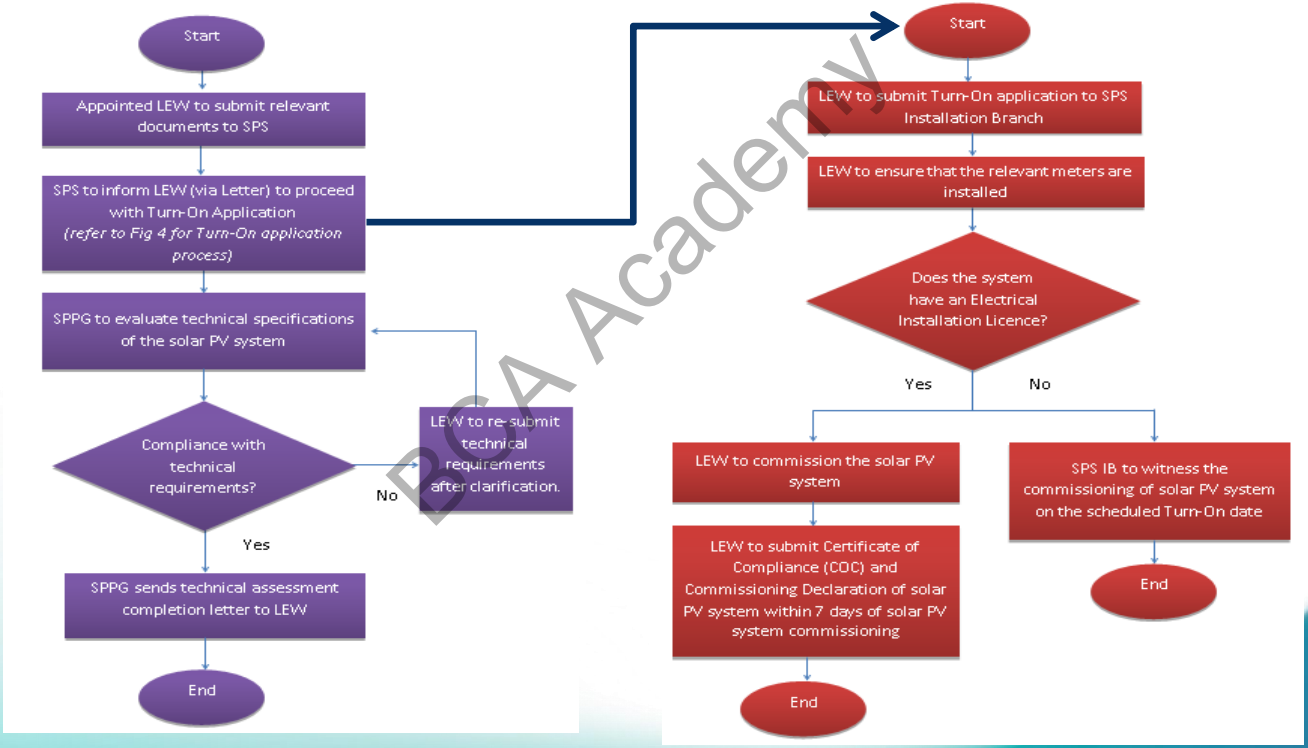
BCA Academy

PV Generation > 1 MVAac



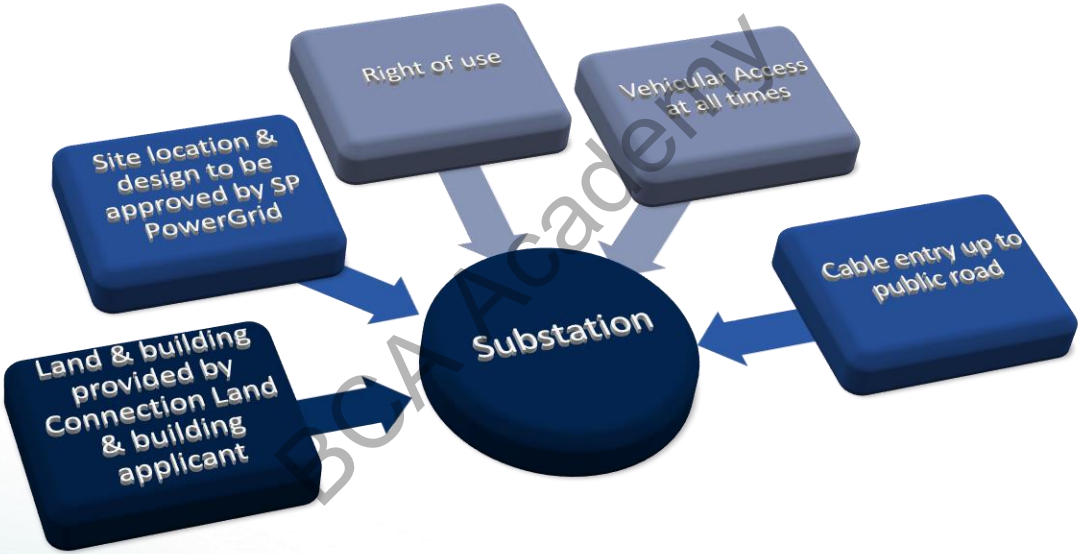
BCA Academy

PV Generation < 1 MVAac



BCA Academy

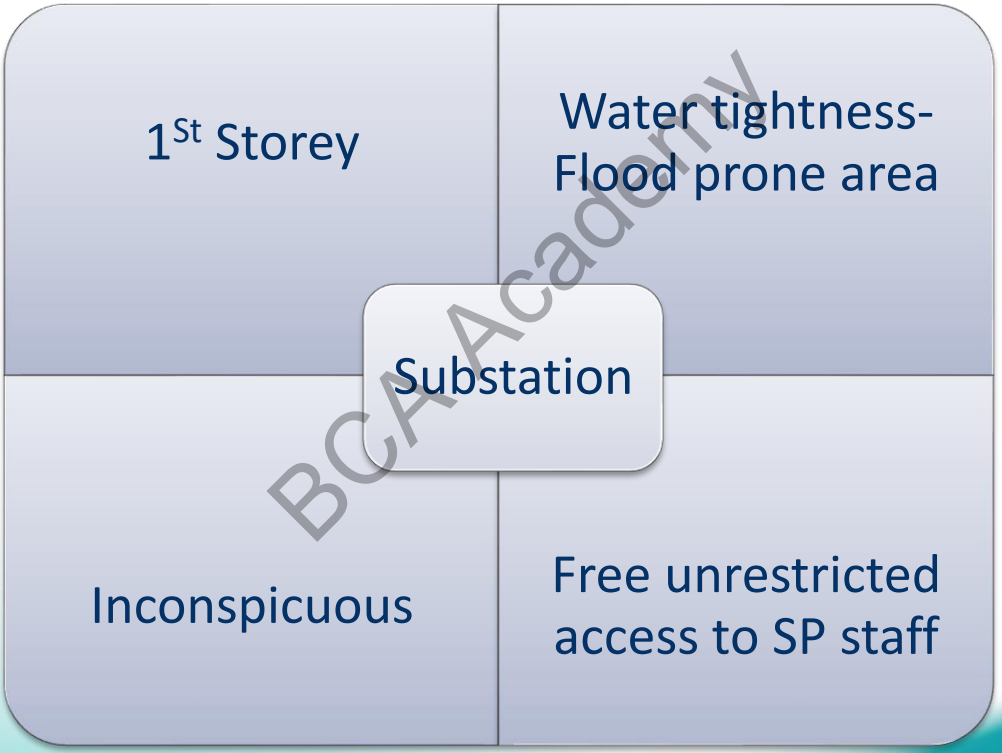
Design Requirements for Substation



BOA Academy

Aesthetically Harmonise the Substation with Development

Requirements for Substation



BCA Academy

Types of Substation

- **22/LV substation**
  - 22kV switchgears
  - Transformers and LT board
  - Auxiliary equipments

- **22kV switching substation (HT consumers)**
  - 22kV switchgears
  - Auxiliary equipment

BCA Academy

Service Cables to Consumer's Switchroom

- **CSR at same level and abutting to substation**
  - SPPG shall install & maintain
  - usually link by piping or trench

- **CSR at higher or lower level as compare to substation floor level**
  - customer to provide, install and maintain
  - usually install on cable ladder/tray

BCA Academy

22kV/LV Substation



Academy

Enhanced Aesthetics

22kV/LV substation



Blend with Surrounding

22kV/LV Substation



22kV switching Substation



SCA Academy

22kV/LV Substation



Multi-Storey type

22kV/LV Substation



Transformer Room at Lower Driveway Level

URL to Supply Application Handbook

https://www.spgroup.com.sg/resources?page=1&category=Electricity%20Works

URL to Solar PV Portal

https://www.spgroup.com.sg/resources?page=1&category=Solar%20Power

URL to ADRE Form & DN Boundary Map

https://www.spgroup.com.sg/resources?page=1&category=Electricity%20Works

BCA Academy



powering the nation

BCA Academy