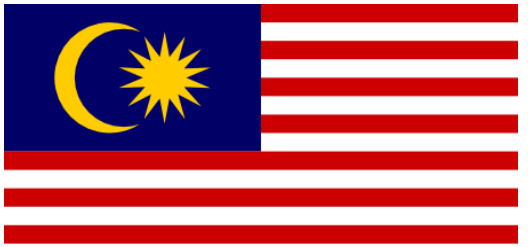
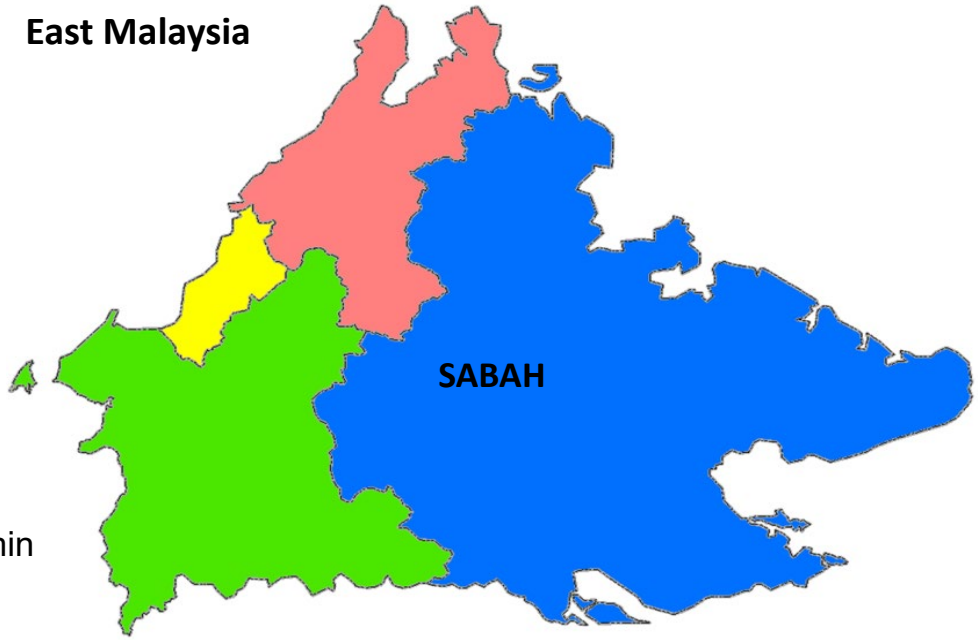


The Electric Power System

East Malaysia - Sabah

Basic facts

- Area: 73,619 km²
  (*Source : http://www.sabah.com.my/borneotrade*)
- Population: 3,900,000 (2019)
  (*Source : The source of Malaysia official statistics*)
- 625,720 consumers
  (source: SESB)
- Peak load (2019): 1000.8 MW
  (source: SESB)
- Average interruption of electricity (2019): 13.407 min
  (Without Major incident (source: SESB))



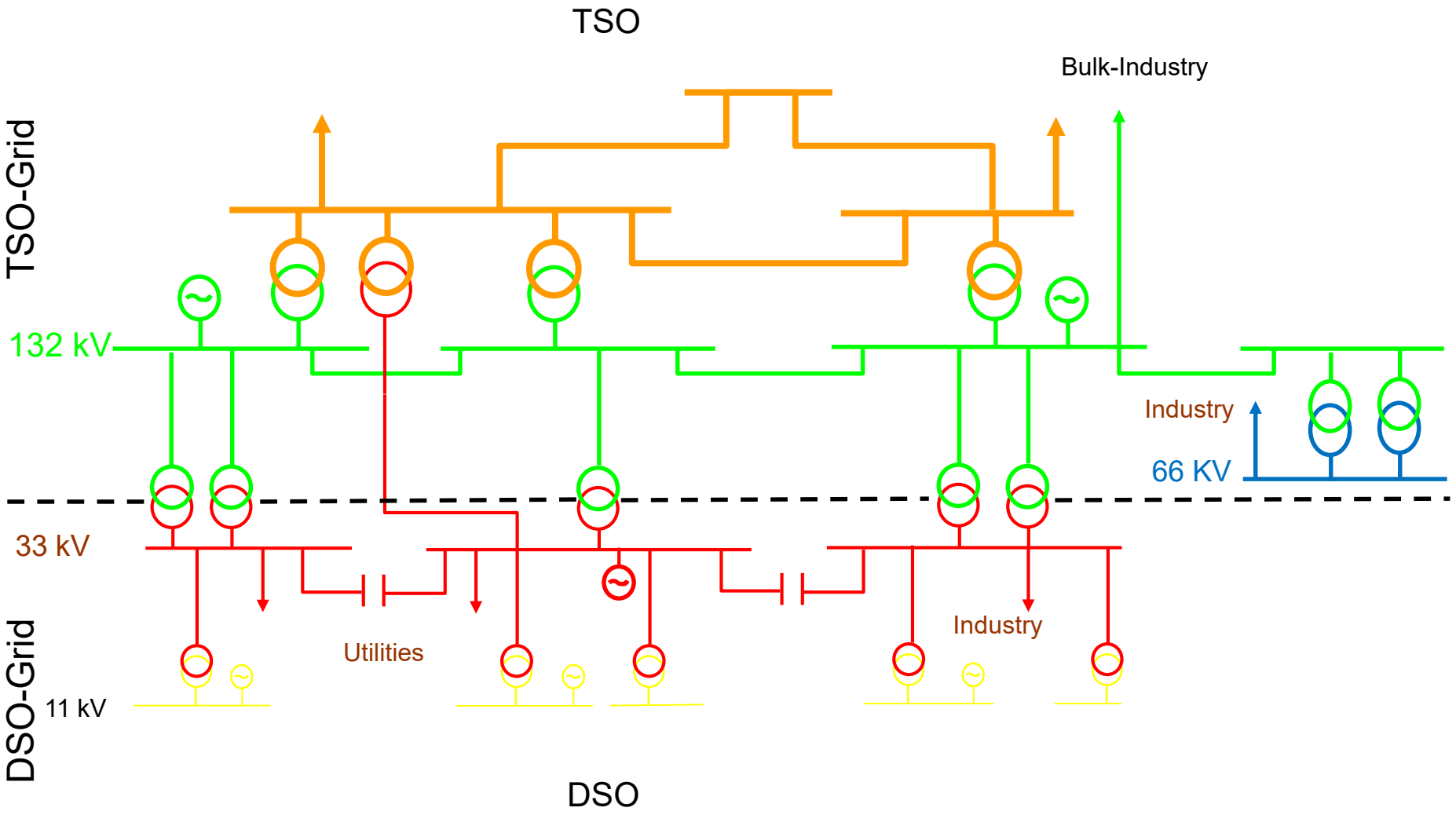
Grid facts and characteristics

- The electricity grid in Sabah is sub-divided into transmission grids (high voltage) and distribution grids (medium and low voltage)

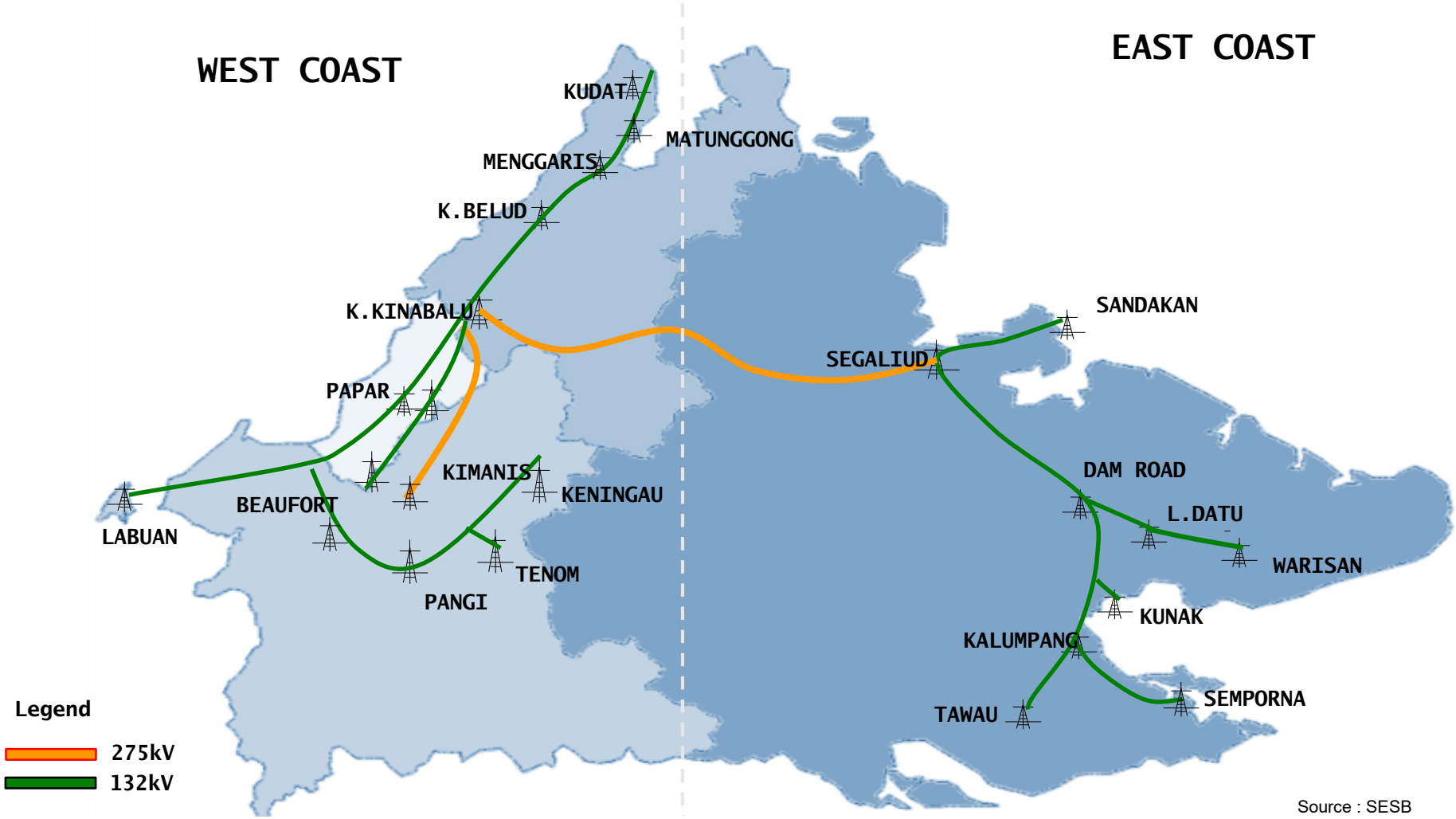
	Voltage Level	Total length (approx.)
High Voltage	275 kV	299.005 km
High Voltage	132 kV	1,332.51 km
High Voltage	66 kV	59.701 km
Medium Voltage	33 kV	1,512.11 km
Low Voltage	11 kV	9,819.72 km

Source :SESB (2019)

Structure of electrical power supply

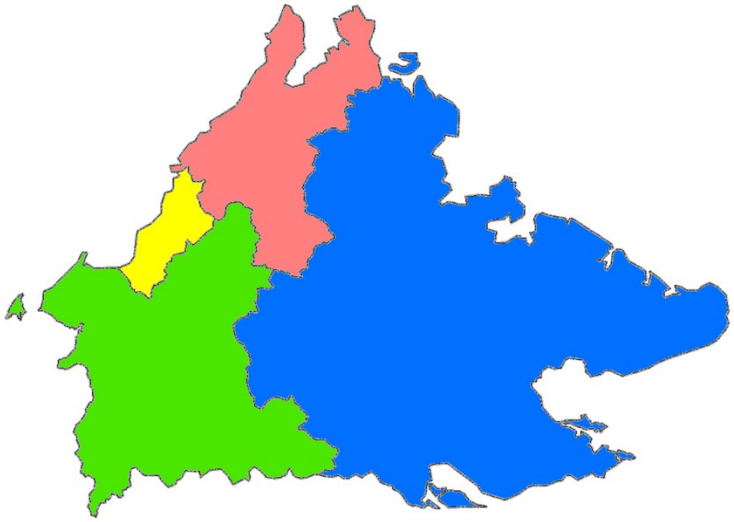


High Voltage Grid



Source : SESB

The Transmission Grid in Sabah



	Eastern	Southern	Northern
Network length in cct/km (275kV)	167.68	105.36	325.06
Network length in cct/km (132 kV)	897.83	874.592	444.51
Served area [km²]	43,110	20,357	10,152
Share load [%]	37.5 (East)		67.5 (West)

Source : i) SESB (2019)
ii) http://www.sabah.com.my/borneotrade

Cooperation of TSO and DSO: Cascade in Generation Dispatching of Renewables

In case of (n-1)- security violations in the HV-grid due to high dispersed generation TSO and DSO collaborate to lower the infeed of renewable generation in DSOs grid. TSO initiates and DSOs operate these measures according following cascade:

Transmission grid (132&275kV)

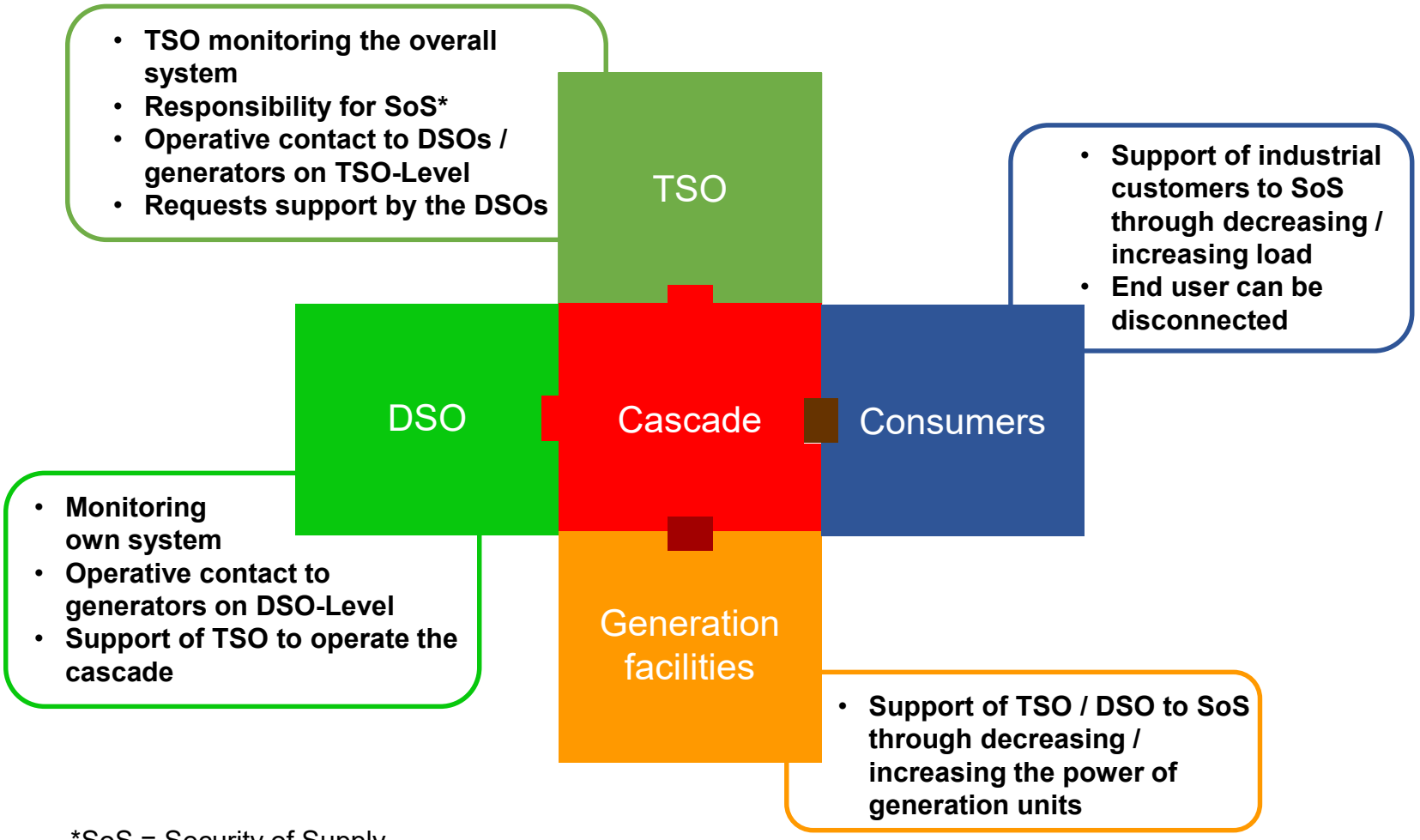
Distribution grid 1(33kV)

Grid area Generation Load

Source: SESB

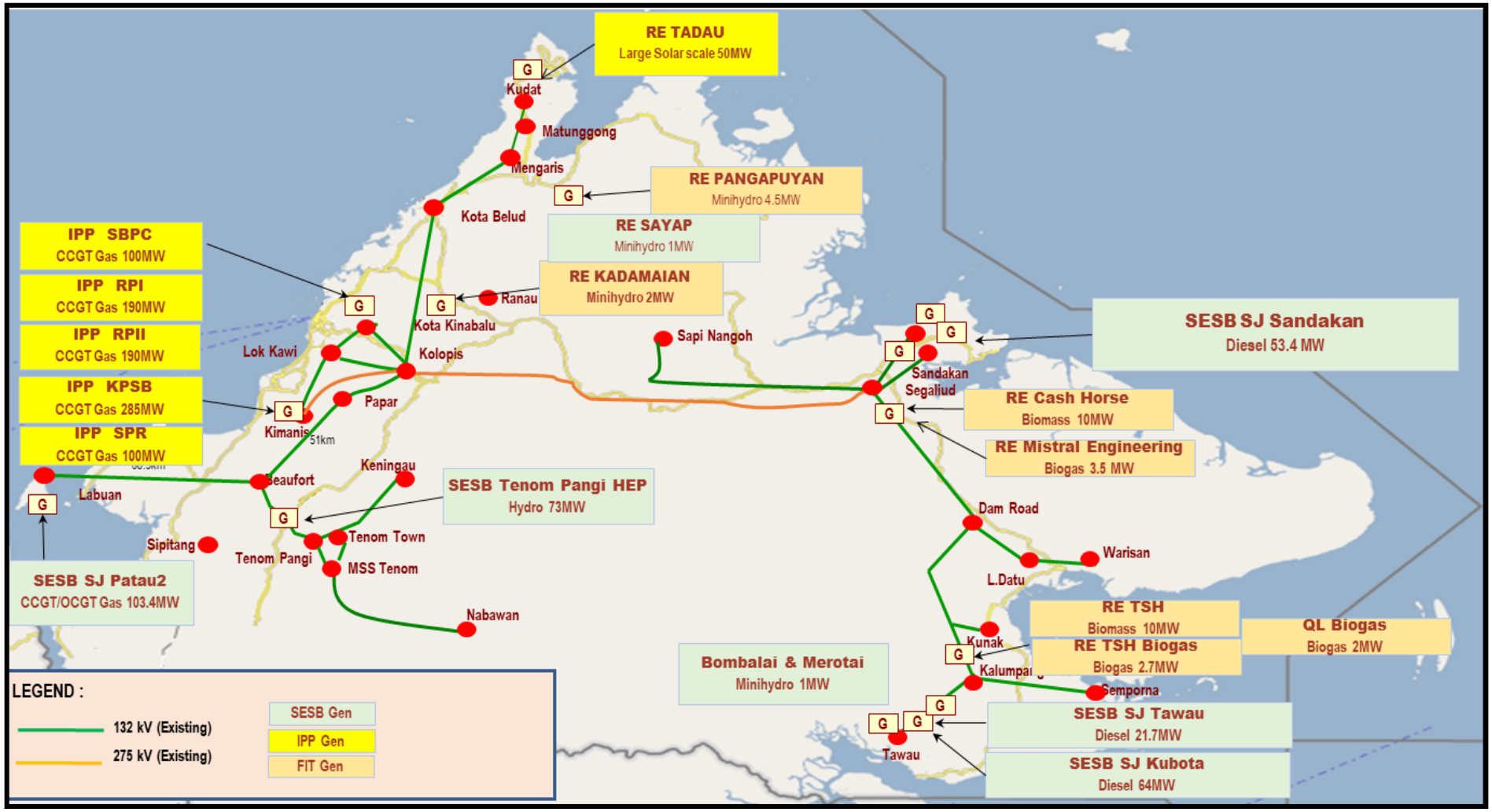
6

Responsibilities within the cascade



*SoS = Security of Supply

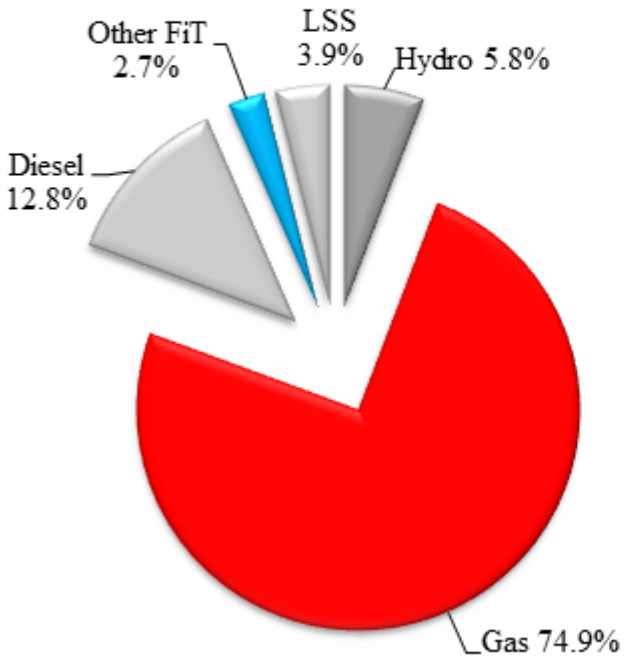
Power structure Sabah



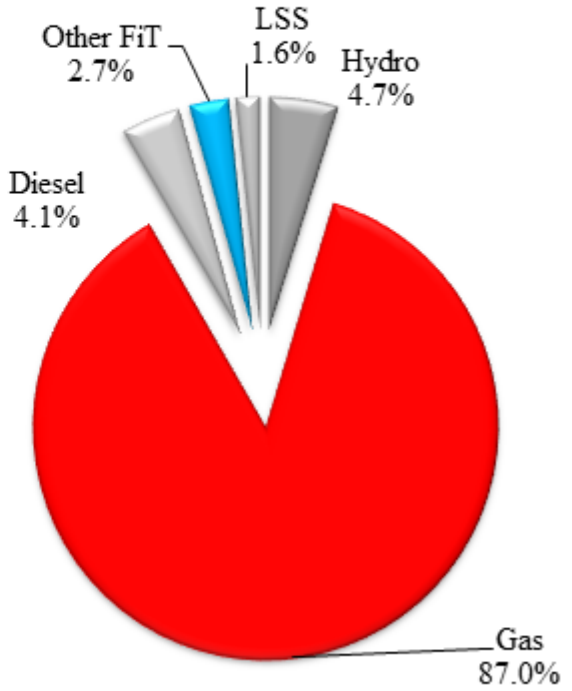
Source : SESB (2019)

Installed capacity with reference to primary resources

Generation Share (Dependable Capacity*)



Generation Mix (By Energy Generated)



Source : SESB (2019)

Renewable Energy Development (IPP)

Type of RE	Capacity, MW				
	2016	2017	2018	2019	On going
Large Scale Solar	50.00	-	-	-	-
Photovoltaics (Commercial)	2.99	0.43	30.45	30.63	-
Photovoltaics (Individual/ community)	5.70	0.62	8.87	9.49	-
Biogas	9.30	-	8.50	8.50	1.00
Biomass	-	-	20.00	20.00	-
Hydro Power	-	68.80	6.50	6.5	34.29
Geothermal	-	-	-	-	-
TOTAL	67.99	69.85	74.32	75.12	35.29
GRAND TOTAL	322.57				

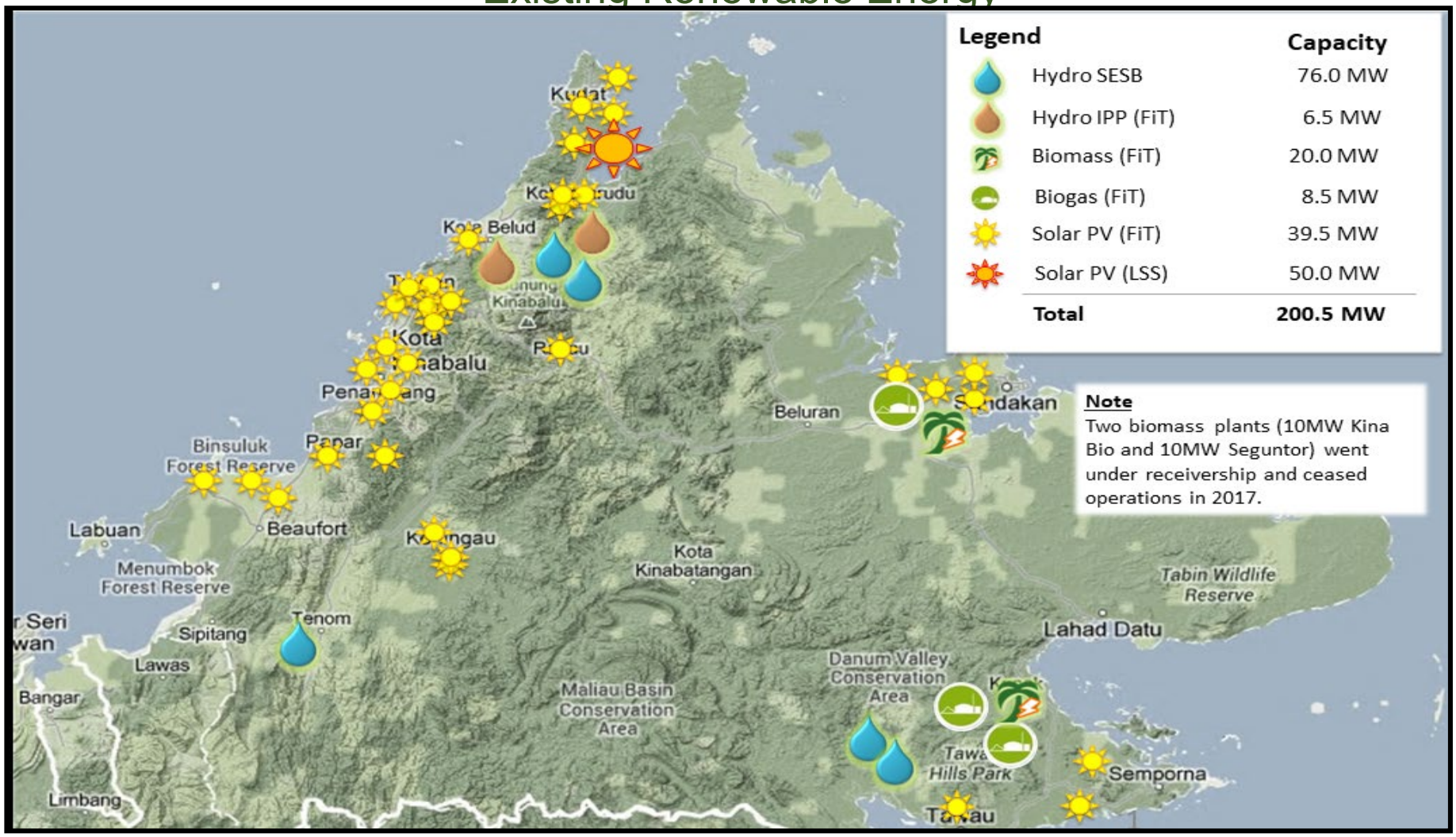
Source : SESB

Yearly Production of Renewable Energy (IPP)

Type of RE	Production, kWh			
	2016	2017	2018	2019
Photovoltaics (Commercial)	-	-	41,483,755	41,495,234
Photovoltaics (Individual/ community)	1,251,371	-	11,184,510	12,091,223
Biogas	-	1,795,963	46,585,756	48,478,798
Biomass	-	-	103,599,160	96,402,080
Hydro Power	-	-	9,019,618	6,627,306
TOTAL	1,251,371	1,795,963	211,872,799	205,094,641

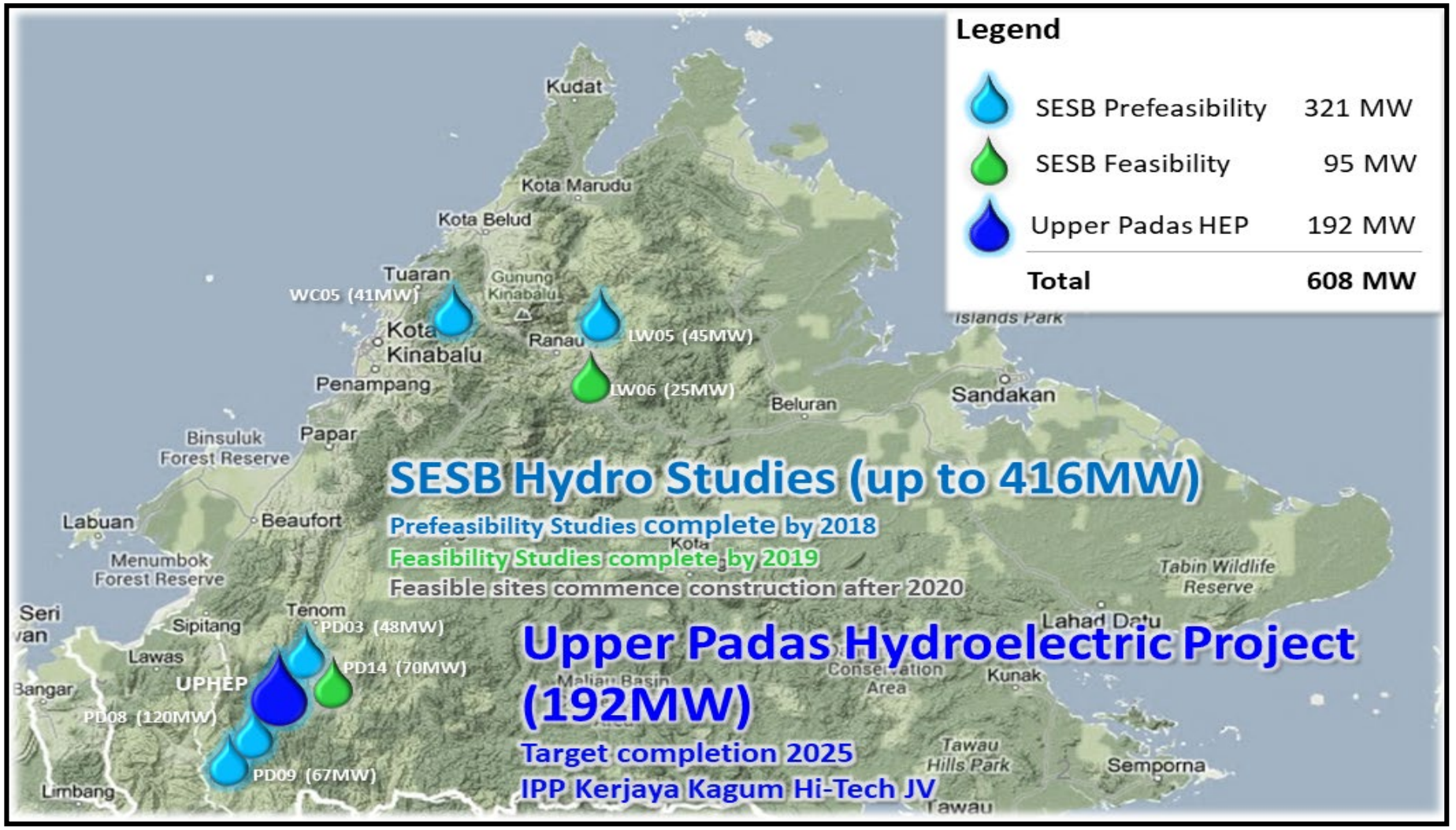
Source : SESB

Existing Renewable Energy



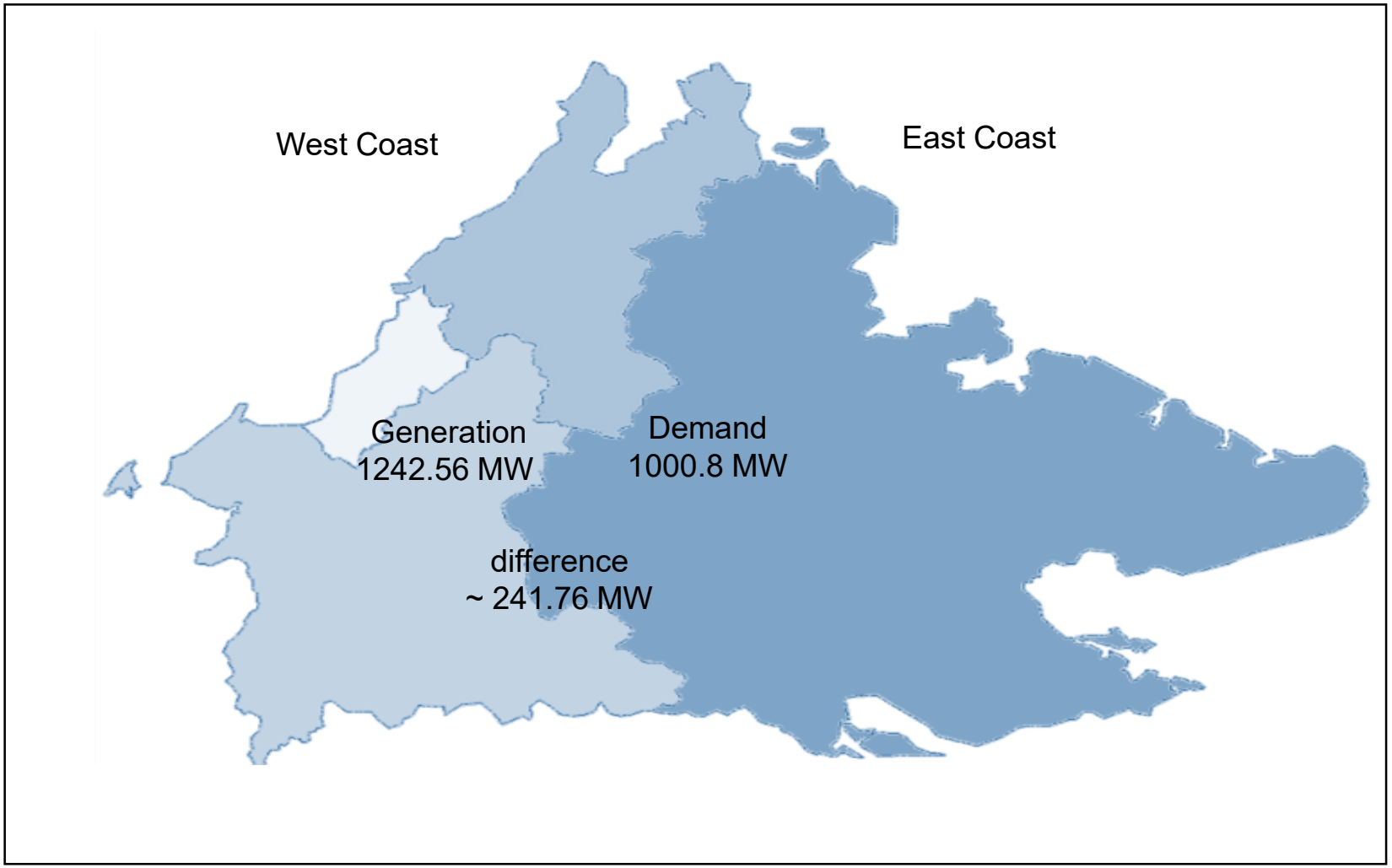
Source : SESB (2019)

Potential Hydropower Projects



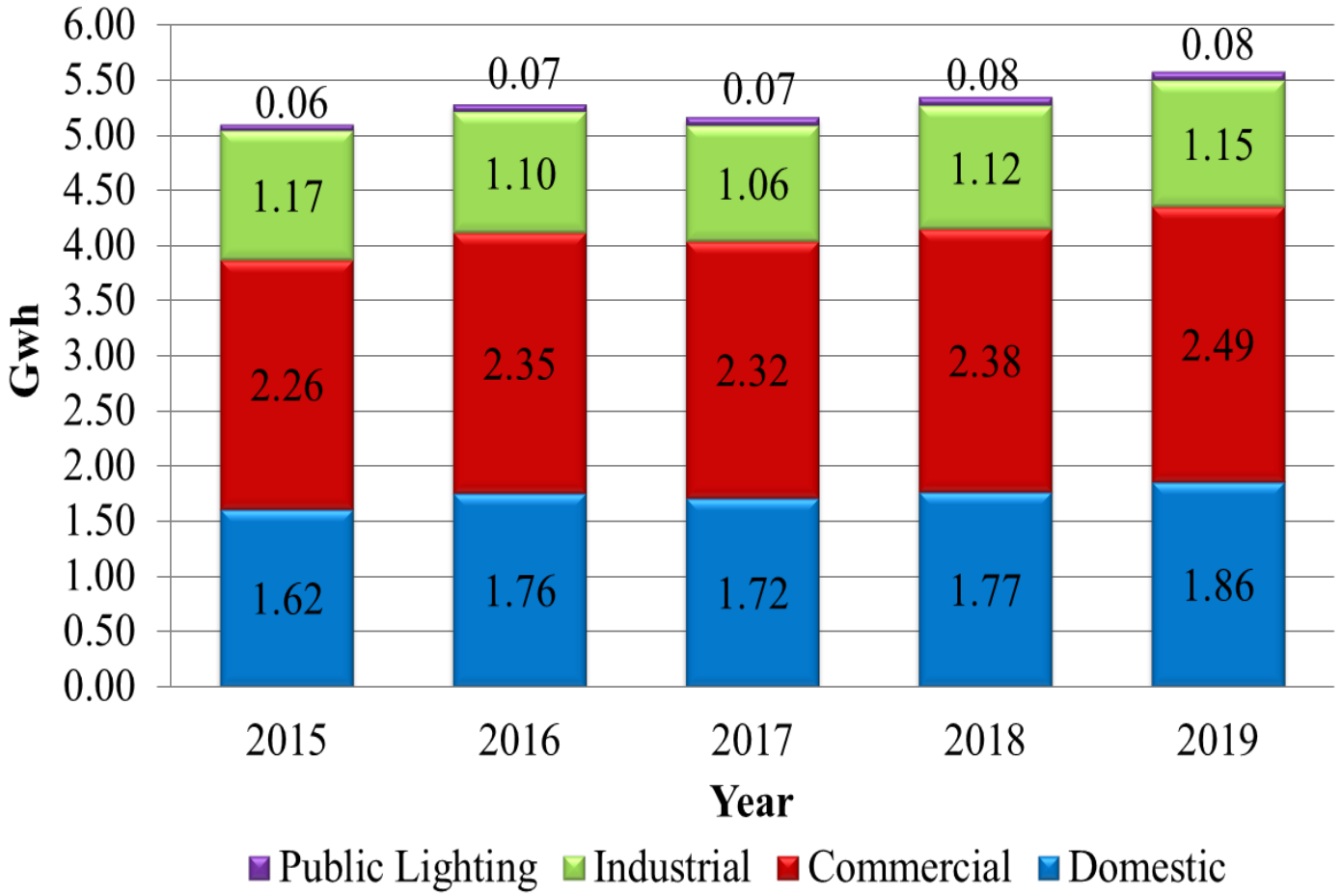
Source : SESB (2019)

SABAH – Power balance 2019



Source : SESB

Sabah Consumer : Yearly consumption



Source : SESB