

# HIGH VOLTAGE CIRCUIT BREAKER (CBR) 800KV CIRCUIT BREAKERS

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# HIGH VOLTAGE CIRCUIT BREAKER

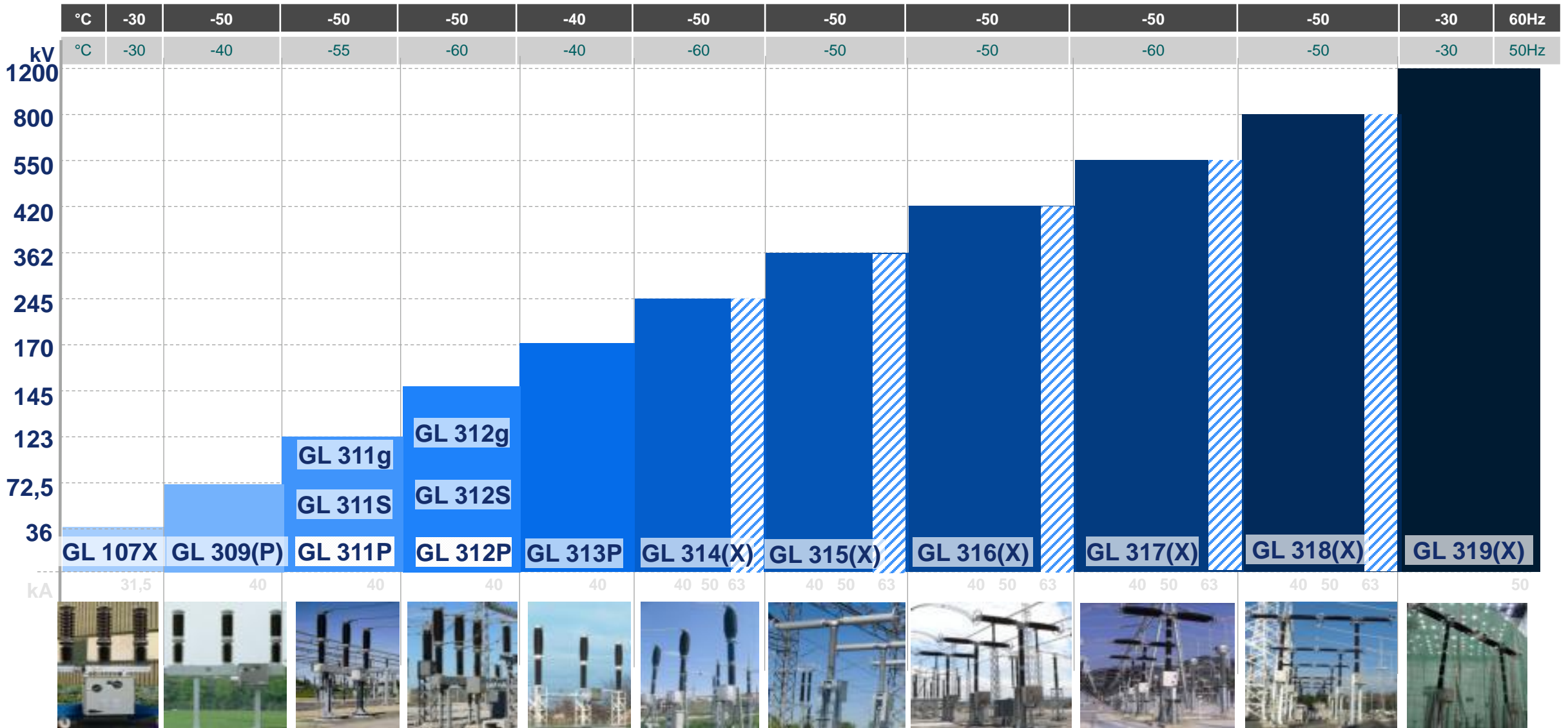
## 800KV LIVE TANK

# DEAD TANK CIRCUIT BREAKERS



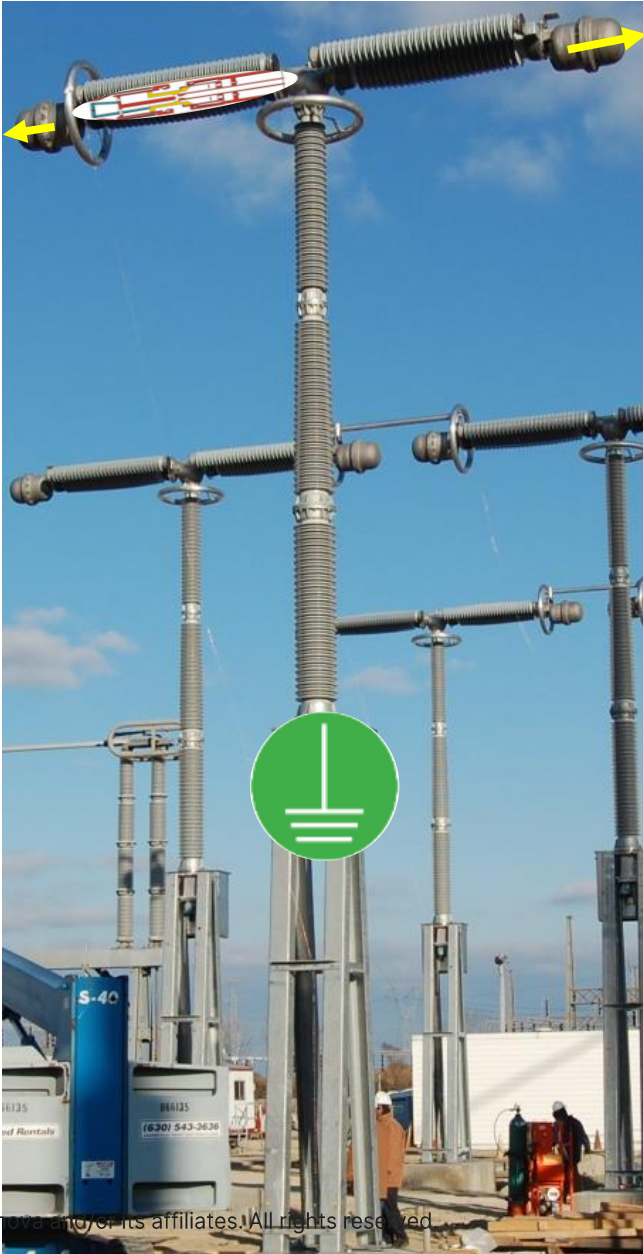
kV	38/72.5	123/145	170	245	362	550	800
25 kA	DT1-38FK-40-F1 DT1-72.5FK-40-F1 DT1-72.5FK-40-F3	DT1-145FK-40-F1 DT1-145FK-40-F3	DT1-170FK-40-F1 DT1-170FK-40-F3	DT1-245P-40-F1 DT1-245P-40-F3	DT1-362-63-F3 DT1-362R-63-F3	DT2-550-63-F3 DT2-550-63-H3 DT2-550R-63-F3 DT2-550R-63-H3	FUTURE
31.5 kA		DT1-145R-40-F1					
40 kA		DT1-72.5-63-F1 DT1-145-63-F1		DT1-245P-63-F1 DT1-245P-63-F3			
50 kA	DT1-72.5-63-F1 DT1-145-63-F1		DT1-245P-63-F1 DT1-245P-63-F3		FUTURE		
63 kA	DT1-72.5-63-F1 DT1-145-63-F1		DT1-245P-63-F1 DT1-245P-63-F3				
80 kA		DT1-245P-80-H1			FUTURE		

# LIVE TANK CIRCUIT BREAKERS



# “Live Tank” and “Dead Tank”

LIVE  
TANK



DEAD  
TANK

# “Live Tank” and “Dead Tank”

## LIVE TANK

### Pros

- Less SF6 (500~600lbs)
- Weight w/o CTs (35,000~45,000lbs)

### Cons

- Seismic performance
- CTs
- Maintenance

## DEAD TANK

### Pros

- Integral CTs
- Seismic Performance
- Maintenance

### Cons

- SF6 Weight (2,500~3,000lbs)
- Weight w/CTs (85,000~100,000lbs)

# Circuit Breakers – Portfolio – GL318

Type		GL 318
Rated voltage	[kV]	800
Rated frequency	[Hz]	50/60
Rated power-frequency withstand voltage	[kV]	830 (1)
Rated lightning impulse withstand voltage	[kV]	2100 (1)
Rated switching impulse withstand voltage	[kV]	1550 (1)
Rated normal current	[A]	4000
Rated short-circuit breaking current	[kA]	50
Rated short-circuit making current	[kA]	130
Rated duration of short-circuit	[s]	3
Operation	-	Single phase operated
FK type		FK3-2

Available in ceramic and composite.

- (1) Other values on demand
- (2) Closing resistor tank to be added at chamber insulator extremity → GL318 **D**



# Circuit Breakers – Portfolio – GL318

Circuit Breaker Type **GL318XD**  
Two Poles per Phase

Gas Insulated ←

Live Tank Design ←

Third Generation  
Interrupter ←

Rated Voltage ←

Interrupting Rating  
63kA ←

Closing Resistor ←





# Circuit Breakers – Portfolio – GL318

Closing Resistor

Arcing Chamber

Corona Rings

Line to Ground Capacitor

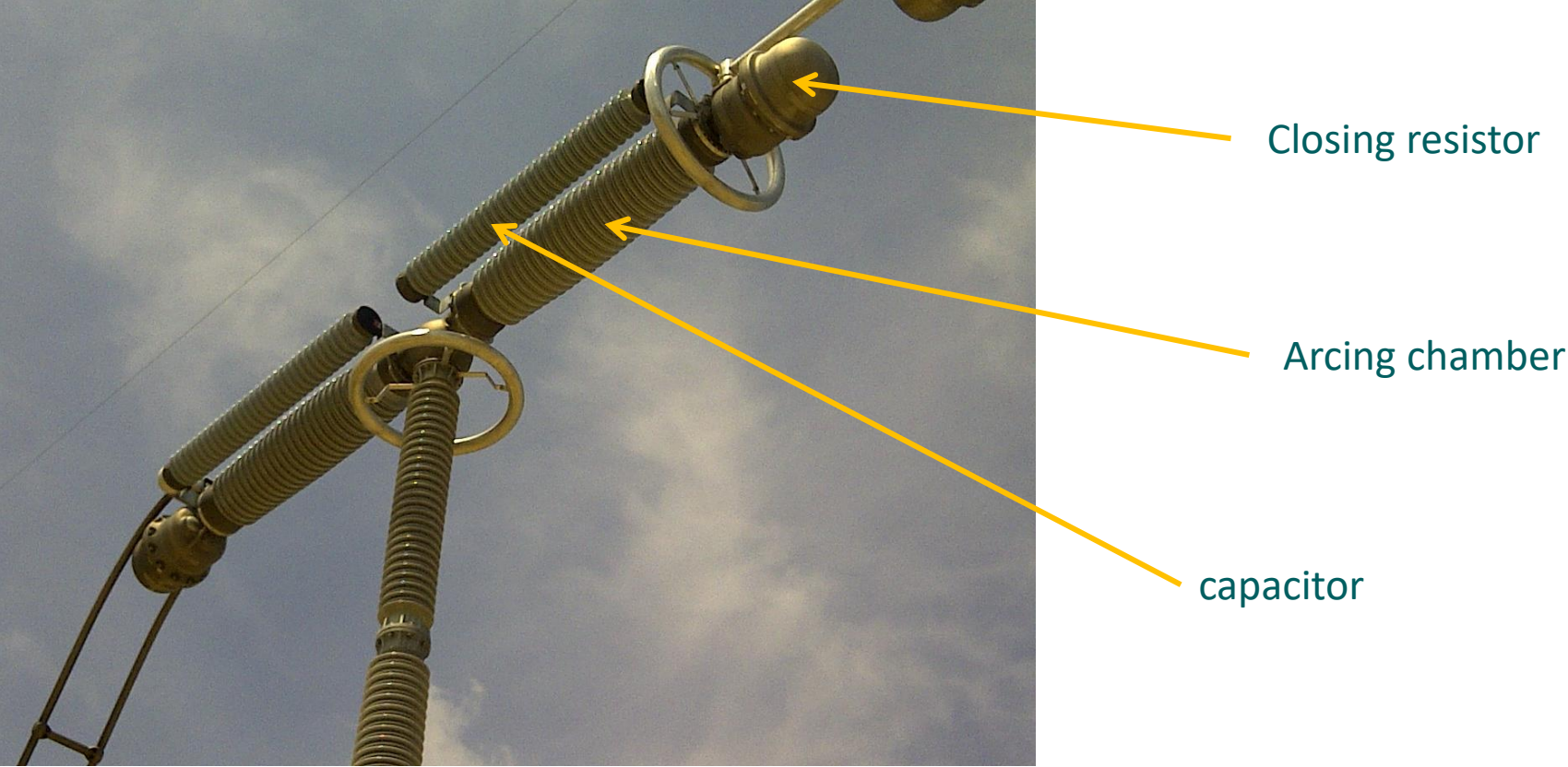
Spring Drive Cabinets

Main Control Cabinet

Ground Fault CT

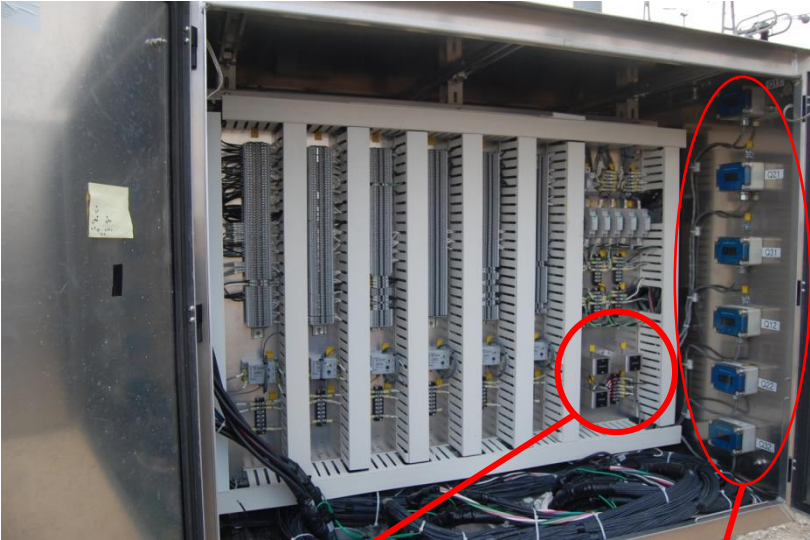


# Circuit Breakers – Portfolio – GL318



# Circuit Breakers – Portfolio – GL318

## Control Cabinet



Circuit Breaker  
Mechanical Counters

Digital SF6 indicators

Double Doors  
On  
Both sides of cabinet





# 800KV HIGH VOLTAGE CIRCUIT BREAKER FACTORIES AND EXPERIENCE

# GE's Grid Solutions Manufacturing Footprint - HVCB



**Charleroi, PA DTCB Competence Center**

**Villeurbanne, France LTCB Competence Center**

# CENTER OF EXCELLENCE FOR LIVE TANK CIRCUIT BREAKERS & GENERATOR CIRCUIT BREAKERS

 **VILLEURBANNE, FRANCE**



- Research and development (R&D) for circuit breakers and generator circuit breakers
- Manufacturing of live tank circuit breakers from 245 kV up to 1,100 kV
- Manufacturing of generator circuit breakers for 50 MW to 2,000 MW power plants
- Certified to ISO 9001, ISO 14001 and OHSAS 18001
- Value-added services and customer support

**INSTALLED BASE OF 120,000+** live tank circuit breakers  
and **3,000+** generator circuit breakers

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*Villeurbanne site includes R&D activities, switchgear manufacturing, test labs and service activities*



*Live tank circuit breakers assembly complying with latest quality and EHS standards*



*High voltage testing laboratory for internal routine testing according to international standards*



*Circuit breakers are tested fully assembled for SF<sub>6</sub> gas tightness*

# High Voltage Circuit Breakers

## Charleroi, PA (USC) – Site Overview



- Worldwide Center of Excellence for Dead Tank Circuit Breakers
  - Manufacturing, Quality, Customer Care (Worldwide Mobility)
  - Clean room assembly, automated testing, panel shop
  - Capacity 2000~3000 CB per year (DT and LT)
  - Interrupter Assembly: 72.5kV – 550kV
  - Labs - 2R&D, 2FAT
  - ~400 employees
  - ISO 9001, ISO 14001, ASME/NB/U-stamp
  - ISO 17025 A2LA Lab Accreditation



**Dead Tank Circuit Breakers**

# MANUFACTURING SITES

## HV CIRCUIT BREAKERS



Padappai, INDIA



- Padappai site (HVM) includes R&D activities, Engineering, Project Management, Switchgear manufacturing, Erection, Test labs, Service and Training activities.
- Live tank breaker assembly and testing complying with latest quality and EHS standards.

### KEY FACTS & FIGURES

- **16,000+** circuit breakers from 72.5 to 800 kV delivered and export base of over 40 countries
- Value-added services and customer support.
- 40 years of presence in India

#### Management Certificates

ISO 9001	Quality Management
ISO 14001	Environment Mgmt
OHSAS 18001	Health & Safety Mgmt



Factory



Live tank breaker assembly and testing complying with latest quality and EHS standards



Technical Institute



# MANUFACTURING FACILITIES

## HV CIRCUIT BREAKERS



ITAJUBA, BRAZIL



- Itajubá site (AIB) includes Design, Engineering, Project Management, Manufacturing, Testing, Erection, Commissioning, Technical Training and Services.
- Live tank breaker assembly and testing complying with latest quality and EHS standards

### KEY FACTS & FIGURES

- 8,000+ circuit breakers from 72.5 to 550 kV delivered in Brazil and Latina America countries
- Value-added services and customer support
- 40 years' experience and complete portfolio in High Voltage products

#### Management Certificates

ISO 9001	Quality Management
ISO 14001	Environment Mgmt
OHSAS 18001	Health & Safety Mgmt



Factory



Circuit Breaker Assembly and testing

# LT 800kV references



**CANADA - Québec**



**Russia**



**US - ComEd**



**US - AEP**

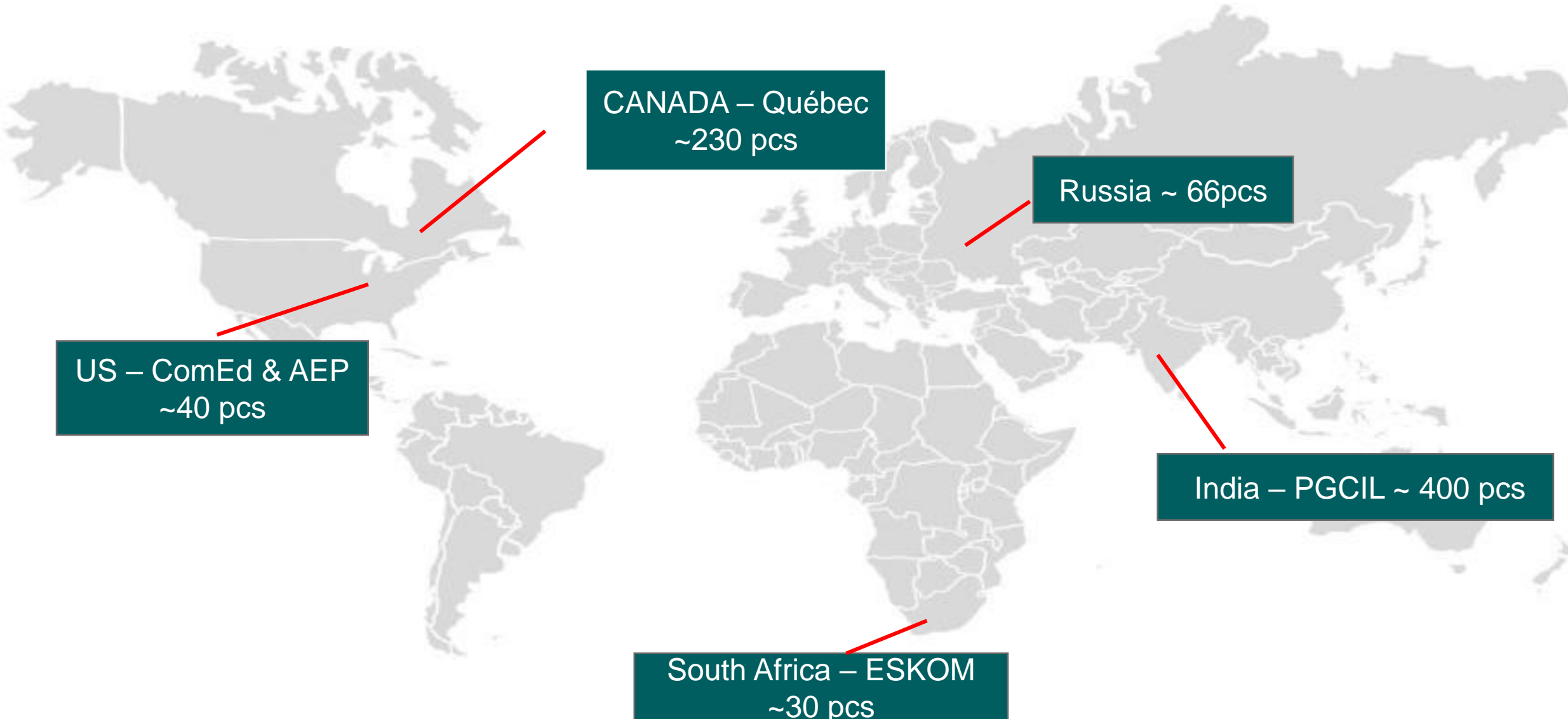


**South Africa - ESKOM**



**India - PGCIL**

# References List



# Questions?





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