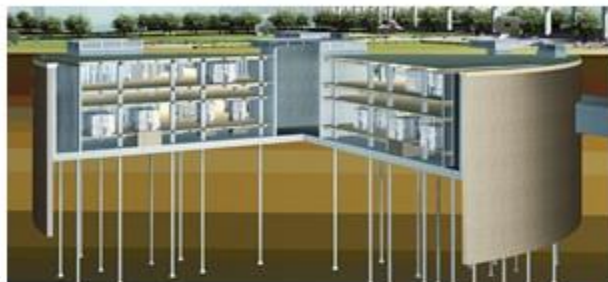




# Copper Substitution Market Study

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## OBJECTIVES

- Copper is facing substitution threat, especially aluminum that is more cost effective. In 2021, the copper price has risen to near all-time high over 70,000 RMB/ton. It stirs alarm over the substitution concern. This study should deep investigate historical copper substitution evolution and forecast future substitution trend, including substitution volume, application and specific components

## PROCESS

- Methodology
  - ▶ Identify copper usage change and how substitution impacts
  - ▶ Determine main copper components and substitution evolution in targeted end-use industries
  - ▶ Analyze copper substitution difference between China and targeted regions
- Sample Size
  - ▶ ~120: Power; Home appliance; Construction; Transportation; Machinery
- Project Time
  - ▶ 12 weeks

## DELIVERABLES

- Determine the key component by applications in various industries with high copper substitution relevance
  - ▶ Power
  - ▶ Construction
  - ▶ White goods
  - ▶ Others (transportation, machinery, infrastructure)
- Analyze the characteristics, advantages vs. disadvantages of copper substitute materials in each key component
  - ▶ Aluminum
  - ▶ Steel
  - ▶ Titanium
  - ▶ Others (plastic, optical fiber etc.)

# Copper Substitution Data Package

Class I	Class II	Class III	Parameters	Unit
Power	Generation			
	Offshore wind		Cu consumption	10k t
	Solar power		Cu consumption	10k t
	others		Cu consumption	10k t
	Transmission		Cu consumption	10k t
	Distribution	10kv	Cu consumption	10k t
		35kv	Cu consumption	10k t

## Home appliance

AC			Cu consumption	10k t
Fridge				
Small home appliance				
Others				

## Construction

Residential				
Commercial				
Factory				

## Transportation

NEV				
Others				

Industry-Sector	Class I	Class II	Class III	Parameters	Unit
Power-Generation					
				Total CUC	t/MW
				Total new power generation capacity	MW
				Total Cu consumption	10 kt
				New power generation capacity	MW
				Cu consumption	10 kt
				CUC	t/MW
				Change of CUC (relatively to 2010)	t/MW
				Minimization	t/MW
			Generator	CUC	t/MW
				≤100MW generator proportion	%
				100-199MW generator proportion	%
				200-299MW generator proportion	%
				300-399MW generator proportion	%
				≥500MW generator proportion	%
				≤100MW generator CUC	t/MW
				100-199MW generator CUC	t/MW
				200-299MW generator CUC	t/MW
				300-399MW generator CUC	t/MW
				≥500MW generator CUC	t/MW
			Major loop	CUC	t/MW
				<300MW CUC	t/MW
				>300MW CUC	t/MW
			Main transformer	CUC	t/MW
				Pressure voltage	kV
			Plant power cable	CUC	t/MW
			Other equipment	CUC	t/MW
				Proportion of CUC	%

Thermal Power CUC		
Generator power grade	CUC (t/unit)	t/MW
≤100MW	8	0.0800
100-199MW	9.2	0.0613
200-299MW	9.7	0.0388
300-399MW	10.6	0.0303
600MW	16	0.0267
1000MW	20	0.0200

Hydro Power CUC		
Generator power grade	CUC (t/unit)	t/MW
≤40MW	20	0.5000
40-99MW	27	0.3600
100-199MW	39.6	0.2640
		0.1940
		0.1714
		0.2143

Nuclear Power CUC		
	unit)	t/MW
		0.0222
		0.0250
		0.0250

Offshore wind power CUC		
	unit)	t/MW
		3.0000
		2.1000
		1.9833
		1.8771
		1.9178
		1.0250
		3.0000
		2.0800

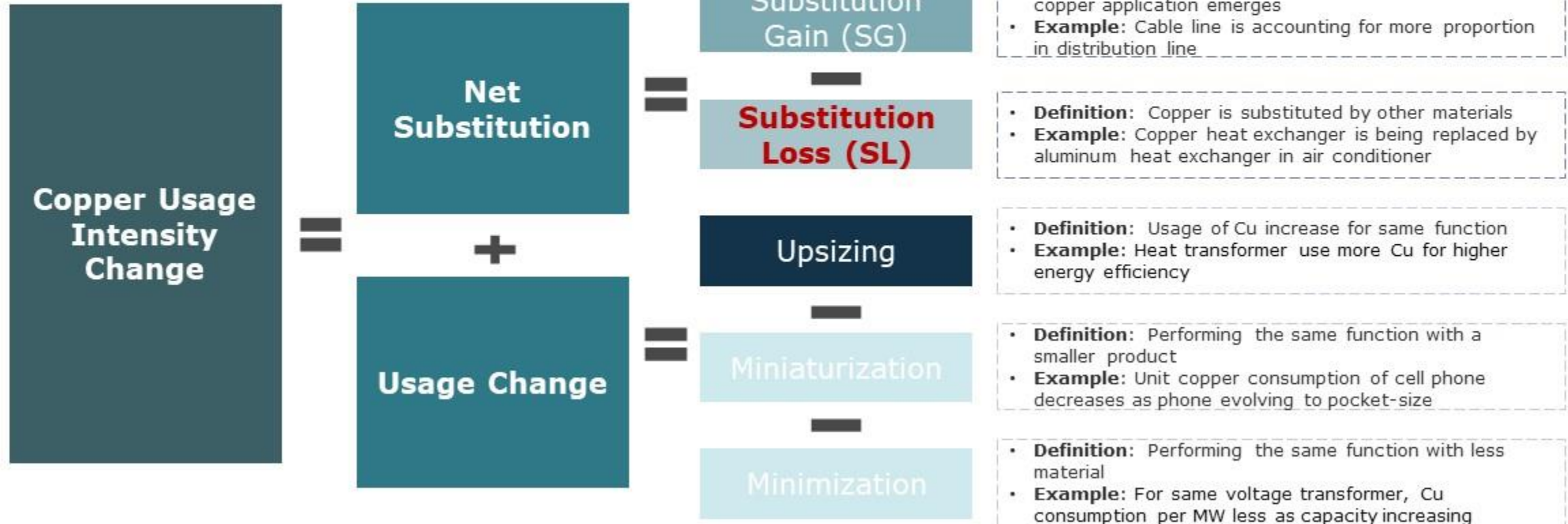


# Concept Definition

**Cu SL Index**

**Volume of SL in Target Year**  $\div$  **Volume of SL in 2010**

**CUC in 2010**



Copper Unit Consumption (CUC)