

## Introduction of High Temperature Low Sag Conductor - Projects installed in Vietnam

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## Quick View Sumitomo Electric Group

Name	Sumitomo Electric Industries, Ltd.		
Established	April 1897		
Capital Stock	831 Million US Dollars		
President	Masayoshi Matsumoto		
Employees	206,323		
Subsidiaries& Affiliates	353 (Domestic 115, Overseas 238)		
Consolidated Business Results	Net Sales 18,000 Million USD Operating Income 640 Million USD		

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## Smart Energy System Proposed by the Sumitomo Electric Group



# Smart Energy System Proposed by the Sumitomo Electric Group





# 2. J-Power Systems Aluminum Conductors for OHTL







#### **JPS Special Value-Added Conductors**

Description	Code	Remarks
Low electrical power-loss	LL-ACSR/AS LL-TACSR/AS	Shaped Aluminum wires with extra high strength AS core * Reduce 15- 25% Power Loss
High strength & heat resistant	KTACSR KTACSR/AS KTACSR/ESt	Lowering tower height Suitable for Long Span
Less surface Reflection & High Emissivity	D-ACSR	Dull surface
Low aerial noise	LN-ACSR	ACSR with "spiral protrusion"



#### **High Temperature Low Sag Conductor (HTLS)**





**GAP TYPE** 

#### **INVAR CORE TYPE**

Classification	Code	Up-rating ratio
Gap type	GTACSR	1.6 times
	GZTACSR	2 times
Invar core type	TACIR /AS	1.6 times
	ZTACIR /AS	2 times



## 3. J-Power Systems HTLS Conductors - Gap Type Conductor - Invar Conductor



**MITOMO ELECTRIC** Gap Conductor = Unique construction Gap G TACSR / GZTACSR Thermal Resistant **AI-Alloy** Super Thermal Resistant Al-Alloy Gap construction

Invar Conductor = Unique material



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J-Power







#### Middle East & North Africa

GAP Conductor Country : Saudi Arabia, Oman, Kuwait, UAE, Qatar, Iran, Libya Supply Year :1981~ Voltage : 33 kV ~ 400 kV Supply Length : GTACSR 2490 km GZTACSR 10320 km

#### **Invar Conductor**

Country : UAE, Egypt Suppy Year : 1996~ Voltage : 66 kV ~ 220 kV Supply Length : ZTACIR 530 km





#### **Europe**

#### **GAP Conductor**

Country : UK, Ireland, Spain, Russia Supply Year :1997 ~ Voltage : 110 kV ~ 400 kV Supply Length : GTACSR 1070 km GZTACSR 4490 km

#### Invar Conductor Country : Italy, Greece, France Suppy Year : 1994 ~ Voltage : 132kV ~ 150 kV Supply Length : ZTACIR 80 km





East, South East, South Asia

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GAP Conductor
Country : China, India, Indonesia,
         Malaysia, Malaysia,
         Vietnam
Supply Year :1997 ~
Voltage : 66 kV \sim 400 kV
Supply Length :
    GTACSR 4740 km
    GZTACSR 2250 km
Invar Conductor
Country : China, Hong Kong, Korea,
         Sri Lanka, Taiwan, Thailand
Suppy Year : 1990~
Voltage : 66 \text{ kV} \sim 161 \text{ kV}
Supply Length :
    ZTACIR 2100 km
```





## 4. Gap Conductor Projects in Vietnam







### **Summary of Vietnam Projects**

	Utilities	No. of projects installed Voltage, Line Name	Supplie d Length (km)	Existing Conductor	Gap Conductor	Delivery of 1 <sup>st</sup> projects (Year/Month
	EVNHANO I	6 projects 110kV Soc Son – Dong Anh, etc.	293.2	ACSR 185/29sqmm	GZTACSR 200sqmm	2009.02
	EVNHANO I	1 project 110kV Ha Dong – Thuong Dinh	25.7	ACSR 150/24sqmm	GZTACSR 150sqmm	2010.02
	EVNHCMC	2 projects 110kV Phu Lam – Cho Lon 1,2, etc.	55.1	ACSR 240sqmm	GTACSR 240sqmm	2010.07
	EVNHCMC	2 projects 110kV Phu Dinh – Hung Vuong, etc.	14.5	ACSR 795MCM	GZTACSR 410sqmm	2010.11
	Dong Nai PC	1 project 110kV Long Binh – Xuan Truong	17.4	ACKP 195sqmm	GTACSR 185sqmm	2011.07
Сору	EVNCPC vright © 2015 J-F	2 projects 110kV Pleiku – Kon Tum etc. Power Systems Corporation, All rights res	121.7 erved.	ACSR 150sqmm	GZTACSR 200sqmm	2011.06



### Why Gap type conductors are required ?

#### Rapid Economic Growth in Vietnam

→ Electric Power Consumption reaches the limitation of T/L's Capacity

#### **Construction of New OHTL**

- > New Right of Way
- Long Period for Construction
- Huge Initial Cost
- Issue for EIA

#### **Replacing by GAP conductor**

- > 1.6 2.0 times current capacity
- No modification on existing towers
- > Need Replacing only

### No ROW issue Short Period & Low Cost

genious Dynamics

I Init<sup>1</sup>

• SUMITOMO ELECTRIC

#### Simulation for beneficial effect by reconductoring with Gap conductor

			orner	
C	Division	Case 1	Case 2	Cases
Materials	Tower	0	2,000	3,000
	Conductor	1,200	800	1,600
	Earthwire	100	100	100
	Insulator	0	350	500
	Fittings	100	250	400
	Sub total	1,400	3,500	5,600
Constructio	Foundation	0	1,000	1,500
n	Tower Erection	0	300	450
	Conductor Stringing	350	300	450
	Sub total	350	1,600	2,400
Dismantle	Conductor, etc.	100	0	150
	Tower	0	0	250
	Foundation	0	0	300
	Scrap (Raw Materials)	▲400	0	▲600
	Sub total	▲300	0	100
Aquisition of	land	0	???	0
	Total	1,450	5,100+a	8,100

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Existing Condition

·Voltage :110kV (2cct)

·Length : 50km

•Conductor : ACSR240sqmm (Single per

phase)

Case 1: Reconductoring with GZTACSR 240sqmm

Case 2: Construct new 110kV T/L

Case 3: Dismantle existing T/L and Construct 110kV T/L with twin bundled ACSR 240sqmm



### **Projects installed in Vietnam (1)**



1. Soc Son – Dong Anh (175 E1 – 173 E19isting conductor: ACSR 185/49ting by: GZTACSR200mm<sup>2</sup>: -3.59tkge class: 110KV (continuous operating temperature 210°C) - End User: EVNHANOI

- Time of installation: Feb. 2009

#### 2. Chem – Ha Dong (171 – 172):

- Existing conductor: ACSR 185/29ting by: GZTACSR200mm<sup>2</sup>: -98/910km voltage class: 110KV (continuous operating temperature 210°C)

- End User: EVNHANOI
- Time of installation: Jan. 2010





## **Projects installed in Vietnam (2)**

- 3. Thu Duc Thanh Da:
- Existing conductor: ACSR 240
- Up-rating by: GTACSR240mm<sup>2</sup>: -
- <sup>2</sup>Voltage<sup>\*</sup> class: 110KV

(continuous operating temperature 150°C)

- End User: EVNHCMC
- Time of installation: September. 2010





- 4. Phu Dinh Hung Vuong:
- Existing conductor: ACSR 795MCM
- Up-rating by: GZTACSR410mm<sup>2</sup>: -
- <sup>1</sup>Voltage class: 110KV
  - (continuous operating temperature 210°C)
- End User: EVNHCMC
- Time of installation: November. 2010

### **Projects installed in Vietnam (3)**



### 6. Kon Tum – Pleikrong:

- Existing conductor: ACKP 150
- Up-rating by: GZTACSR200mm<sup>2</sup>: -19,298km - Voltage class: 110KV

(continuous operating temperature 210°C)

- End User: EVNCPC
- Time of installation: April. 2012

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- 5. Long Binh Xuan Truong:
- Existing conductor: ACKP 185
- Up-rating by: GTACSR185mm<sup>2</sup>: -
- <sup>1</sup>Voltage class: 110KV

(continuous operating temperature 150°C)

Tomo electric

- End User: DONG NAI POWER COMPANY
- Time of installation: July. 2011





### 5. Conclusion

- 27,000 km of Gap Conductor and 8,000 km of Invar conductor to the world for more than 30 years.
- We hope that our products could be more helpful to construct high reliable transmission lines in Asian countries.



