



One of the World's Largest
Manufacturers
of Discrete Semiconductors and Passive Components

ESTA Power Capacitors



for
Heavy Duty Applications





Company profile



Main applications



Reference by utilities



Market prospect

ESTA AT A GLANCE

Year of Foundation

1950



- Total 650
- Landshut 82
- Blatna CZ 508
- Loni India 60

Headquarters Landshut



VISHAY ESTA PRODUCTION SITES BLATNA / CZ



Blatna II - IV

VISHAY ESTA BUILDINGS LONI / INDIA

Departments

- Marketing/Sales
- Purchasing
- Planning
- Quality Control
- Product Development
- Production

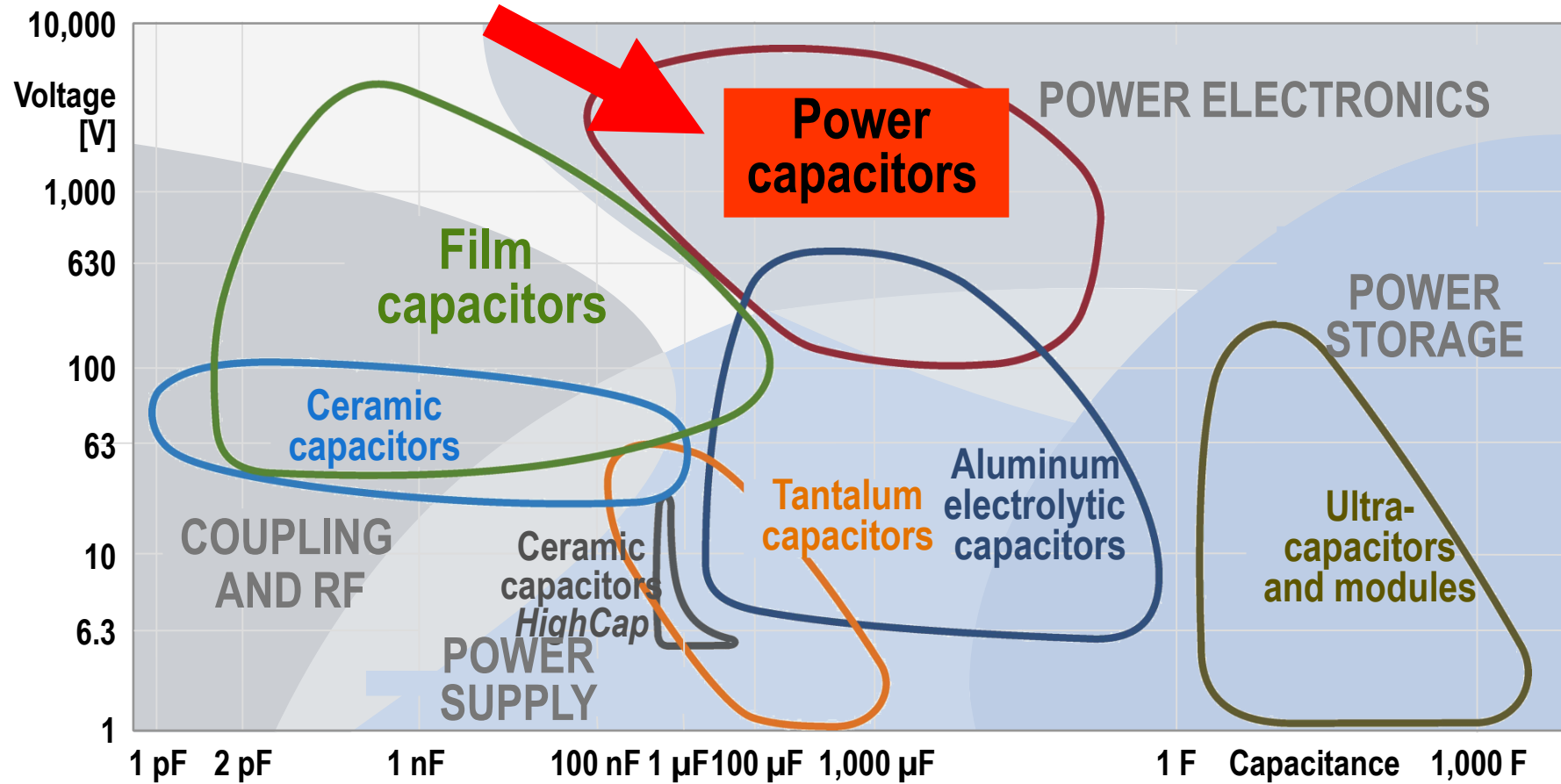


Total Headcount: 60

- Engineers: 8
- Technicians: 16
- Skilled Staff: 36

Capacitor Technologies Voltage/Capacitance

Power Electronic Capacitors



Overview ESTA Capacitors Division

Products:

- ✓ Power Electronic Capacitors,
- ✓ Low Voltage Power Capacitors,
- ✓ High Voltage Power Capacitors and
- ✓ Furnace Capacitors



PEC - CAPACITORS FOR POWER ELECTRONICS

Features

- All rectangular capacitors are designed to customers specification
- Shock and vibration proof
- Lowest losses and low inductance

Range

- DC capacitors - dry technology max. rating 10 kVDC
- DC capacitors - oil-filled max. rating 100 kV
- AC capacitors - oil-filled max. rating 24 kV

Technology

- Standard - IEC 61071, IEC 61881
- Customer Specifications
- Dielectric - Metallised polypropylene
- Allfim
- Dry and oil-impregnated
- Protection - Over pressure switch
- Element fuse
- Self healing
- Tear-off fuse



LVAC - CAPACITORS

Features

- Biologically degradable
- Alternatively gas-filled or oil-filled
- Burstproof confirmed by UL and ULc
- Inrush current up to 300 x rated current
- Life expectancy >130,000 operating hours

Range

- Voltage range up to 1000 V; 50/60Hz,
- Output up to 56.2 kvar for can types, up to 500 kvar for rectangular types

Technology

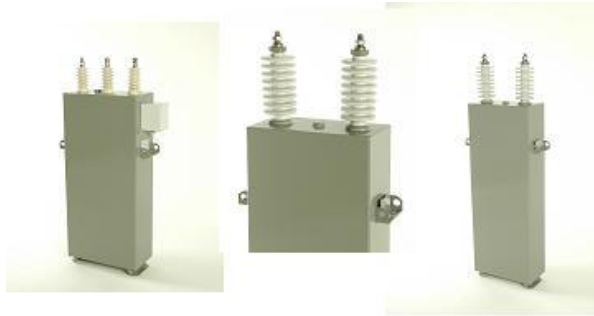
- Standard
 - IEC 60831/1+2
 - EN60831/1+2 and UL
- Connection
 - Single phase, Star and Delta
- Dielectric
 - Metallised polypropylene
 - Oil-impregnated or dry
- Protection
 - Self healing
 - Tear-off fuse



HVAC - CAPACITORS

Features

- Voltage and output rating can be matched precisely to client's specifications
- Element fuses for high operating reliability
- Flexible bank design with ESTA rack construction
- ESTA unbalance protection



Technology

- Dielectric
 - Allfilm Polypropylene
- Impregnation
 - Jarylec, **dry upon request**
- Protection
 - Internally fused,
 - Overpressure switch
 - Unbalance relay for banks

Description

- Individual capacitors from 1 kV to 24 kV up to 1000 kvar
- Bank installations up to 800 kV, any output
- Standards IEC 60871-1, IEC 143, ANSI, AS

CAPACITORS FOR INDUCTIVE HEATING

Features

- Compact design, high energy density
- Design to customer's spec.
- Operation under extreme conditions

Description

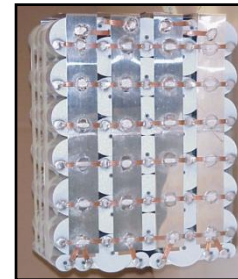
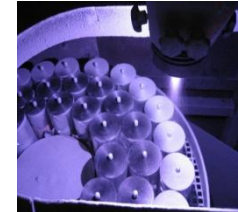
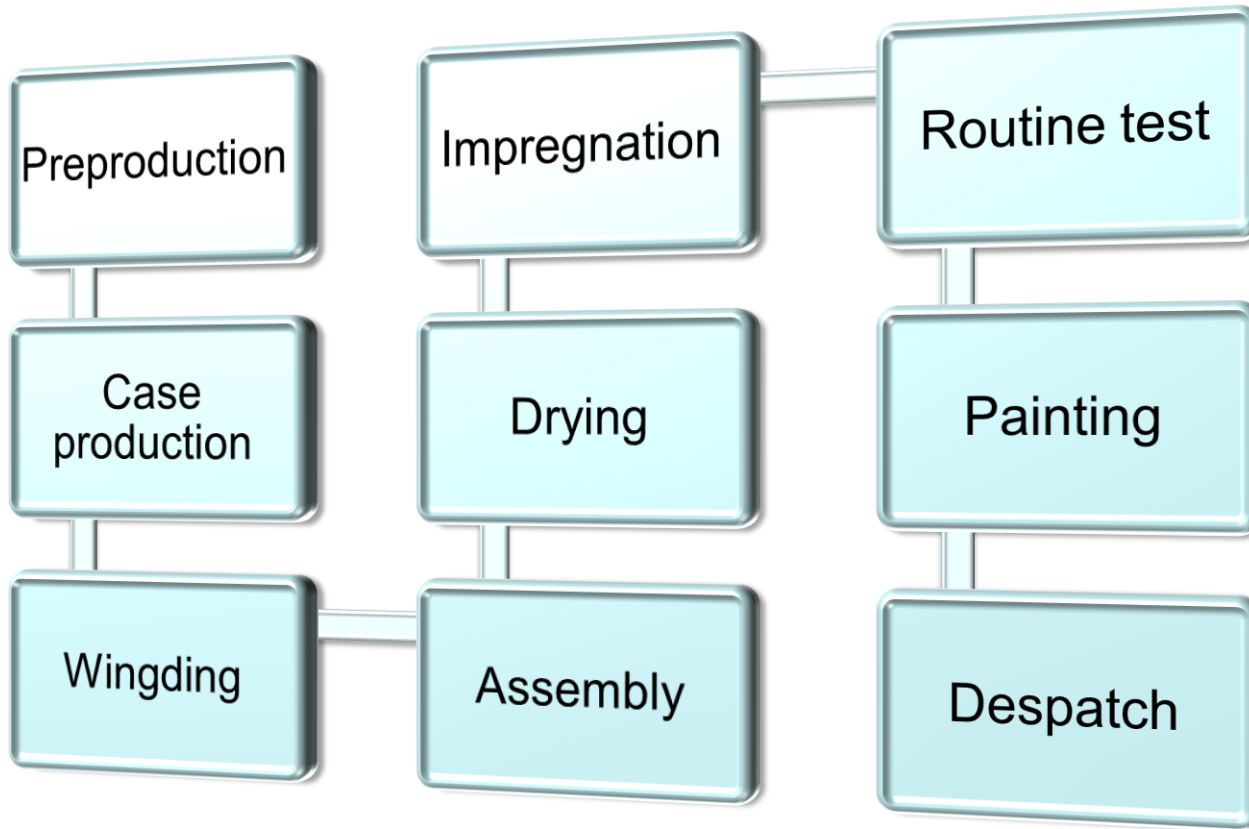
- Mains frequency (50Hz) 220-3000 V, up to 1000 kvar per unit
- Medium frequency (<200kHz) 50-3000 V, up to 10.000 kvar per unit
- Water cooled or natural or forced air cooling

Technology

- Standard - IEC 61071, IEC 61881
- Customer specifications
- Dielectric - Metallised polypropylene
- Allfim
- Dry and oil-impregnated
- Protection - Over pressure switch
- Thermostate
- Self healing



Process flow



Main Applications

PEC

- ✓ DC-Link and DC-Filter in traction and industrial converters
- ✓ Snubber and Clamping for IGBT's
- ✓ Harmonic Filter in UPS
- ✓ Impulse Test for cable defect detection, welding and magnetizing equipment

LVAC

- ✓ Automatic PFC
- ✓ Harmonic filter
- ✓ Wind turbines
- ✓ Solar converter

HVAC

- ✓ Power transmission (HVDC classic)
- ✓ Power Factor Correction (PFC)
- ✓ Static Var Compensation (SVC)
- ✓ Flexible AC Transmission Systems (FACTS) Power Quality

Major presence in all domains of application

offshore



wind



transport



distribution



oil & gaz



steel



paper



mines



navy



solar



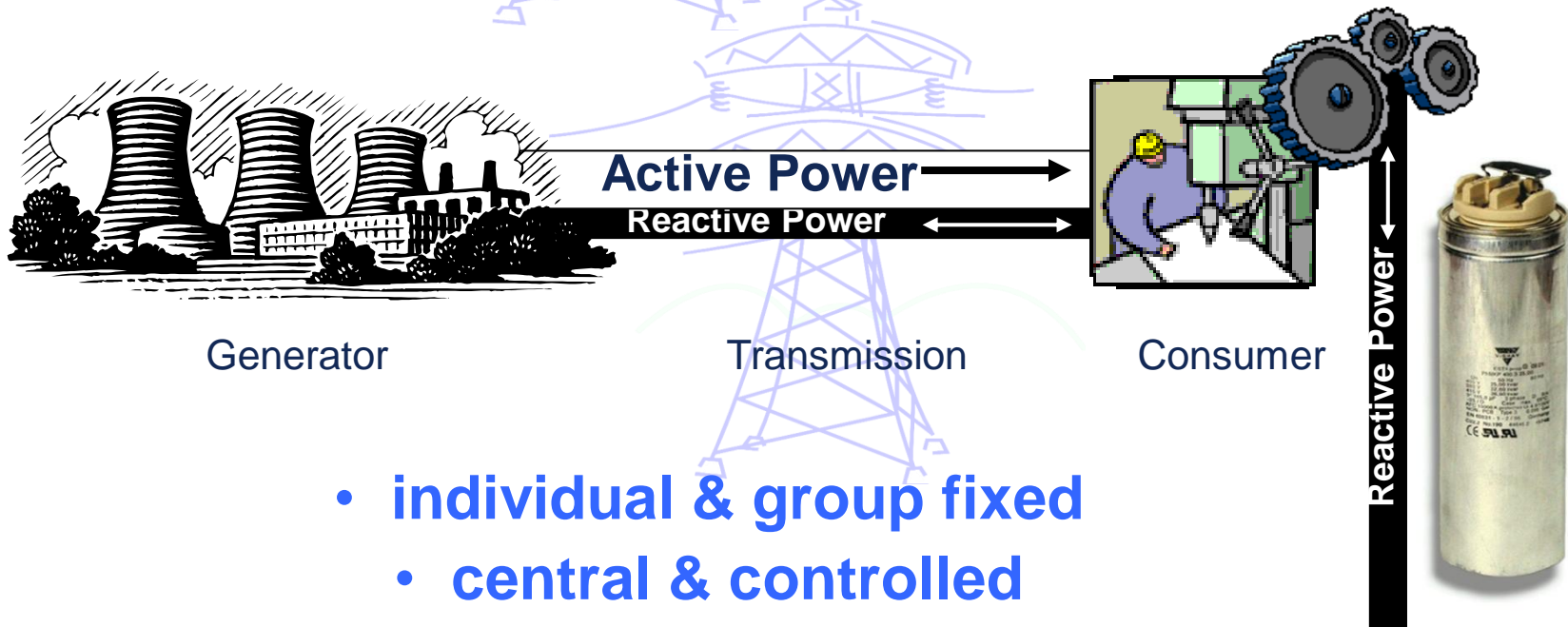
cement



traction



Application Industrial PFC / Power Saving

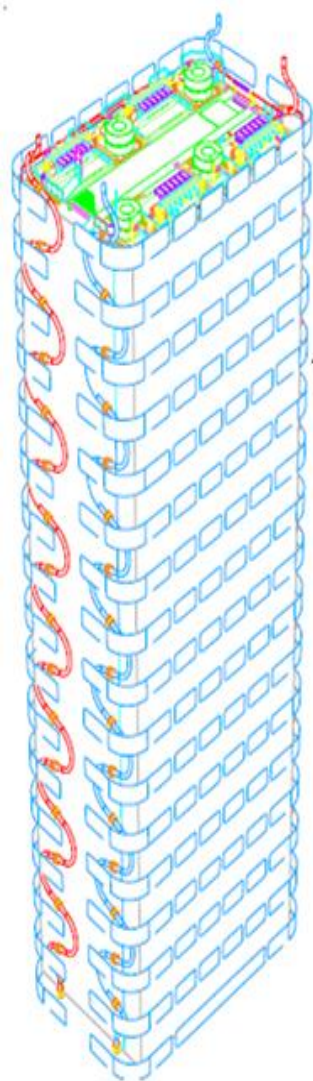


- individual & group fixed
- central & controlled
- (de-) tuned filter circuits for networks containing harmonics

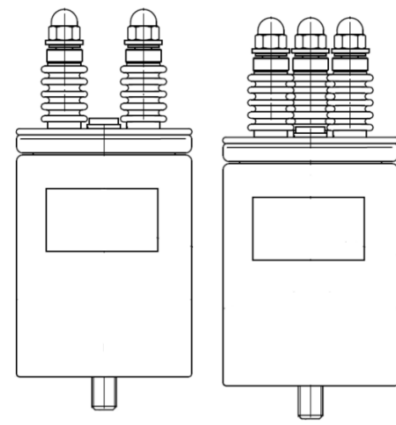
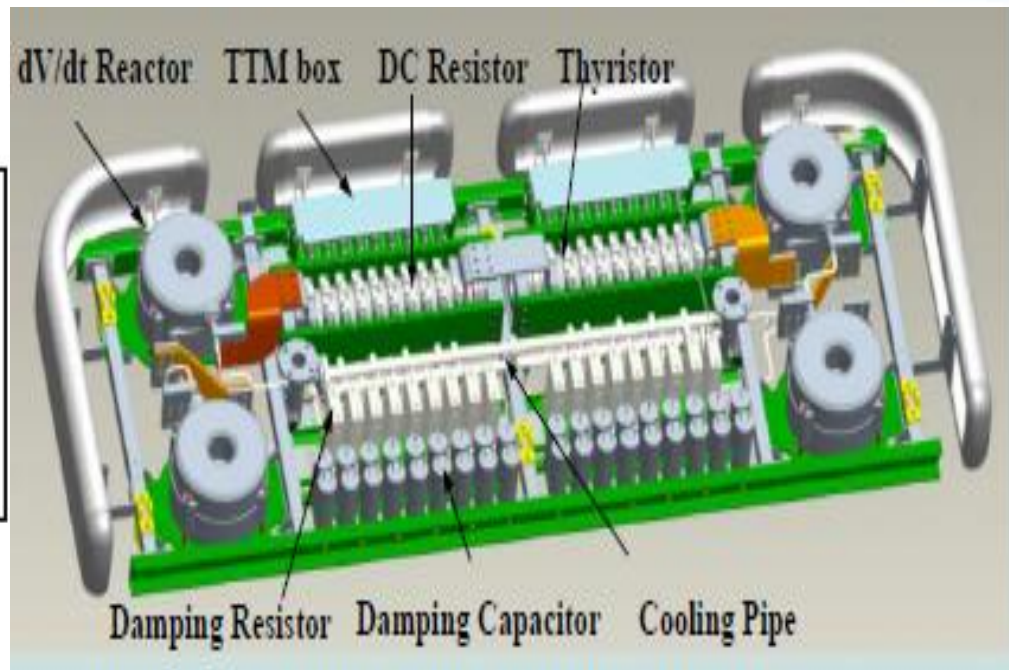
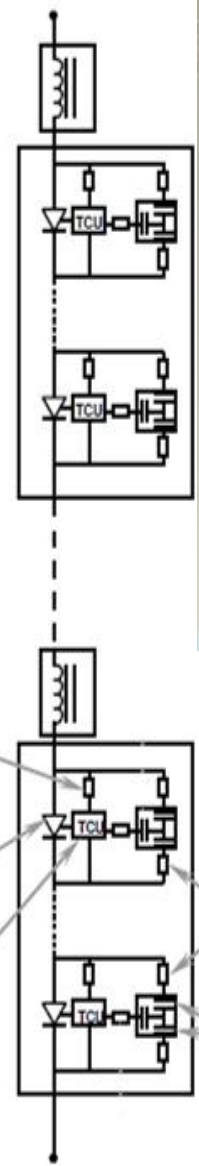
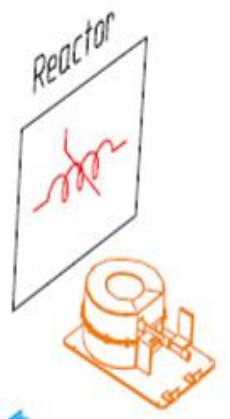
Application Pole Mounted PFC



Application in UHVDC Valve

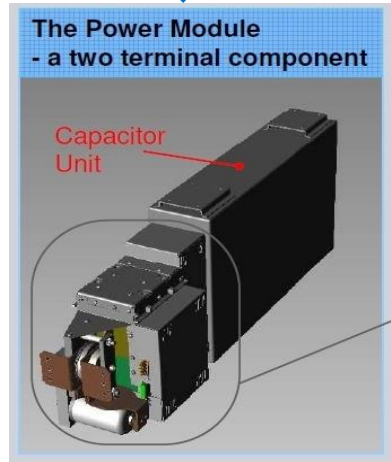
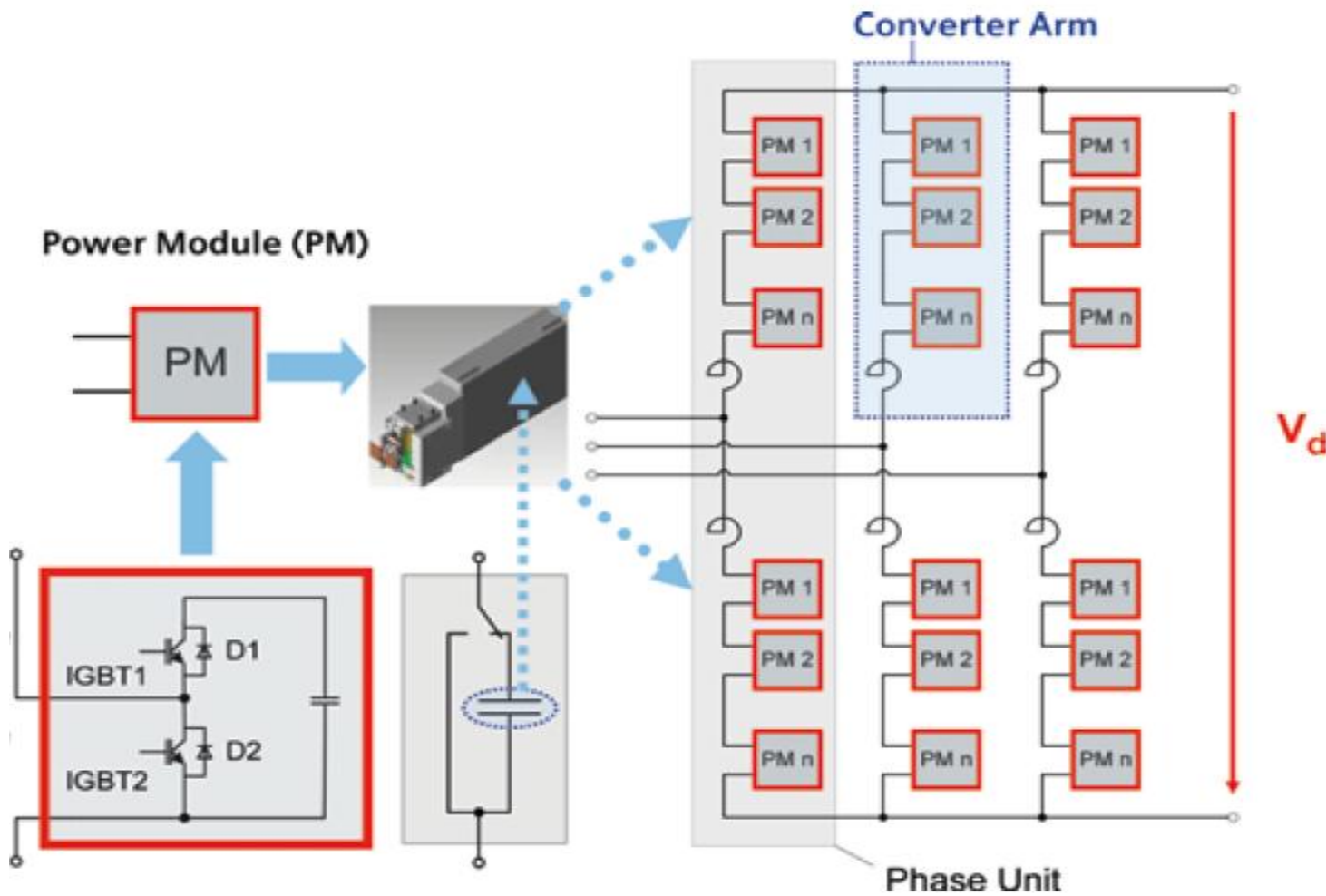


Thyristor module
KAKAKAKAKA



ACMKP Series for Damping Capacitor

Power Transmission HVDC Light

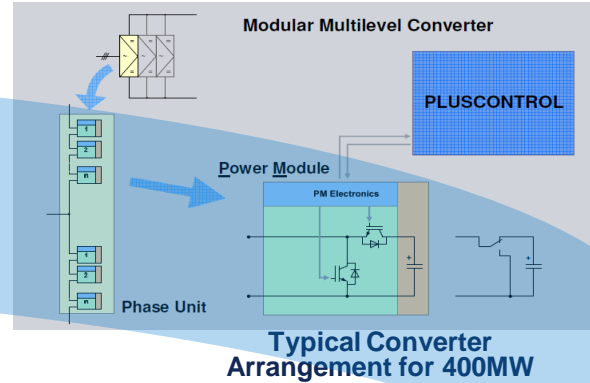
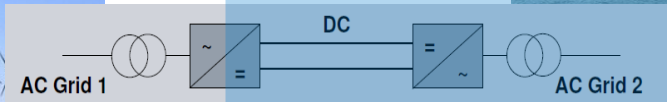


Power Transmission HVDC Light

Off-Shore Windpark



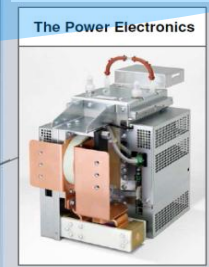
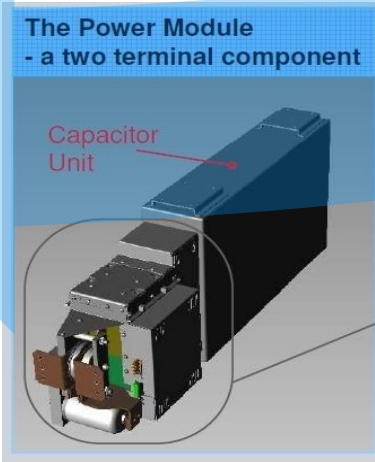
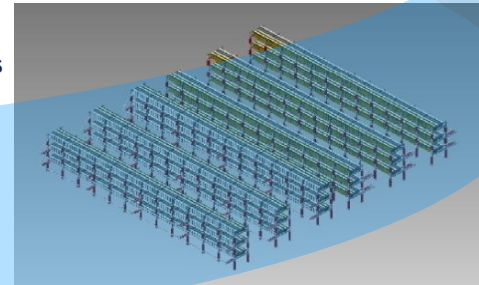
On-Shore Power Converter Station



Vishay ESTA Capacitor
 DCMKP 2.65 / 4.4mF
 $U_N = 2650$ VDC
 $C_N = 4400$ uF
 $L \times W \times H = 340 \times 175 \times 910$ mm
 Weight=70kg



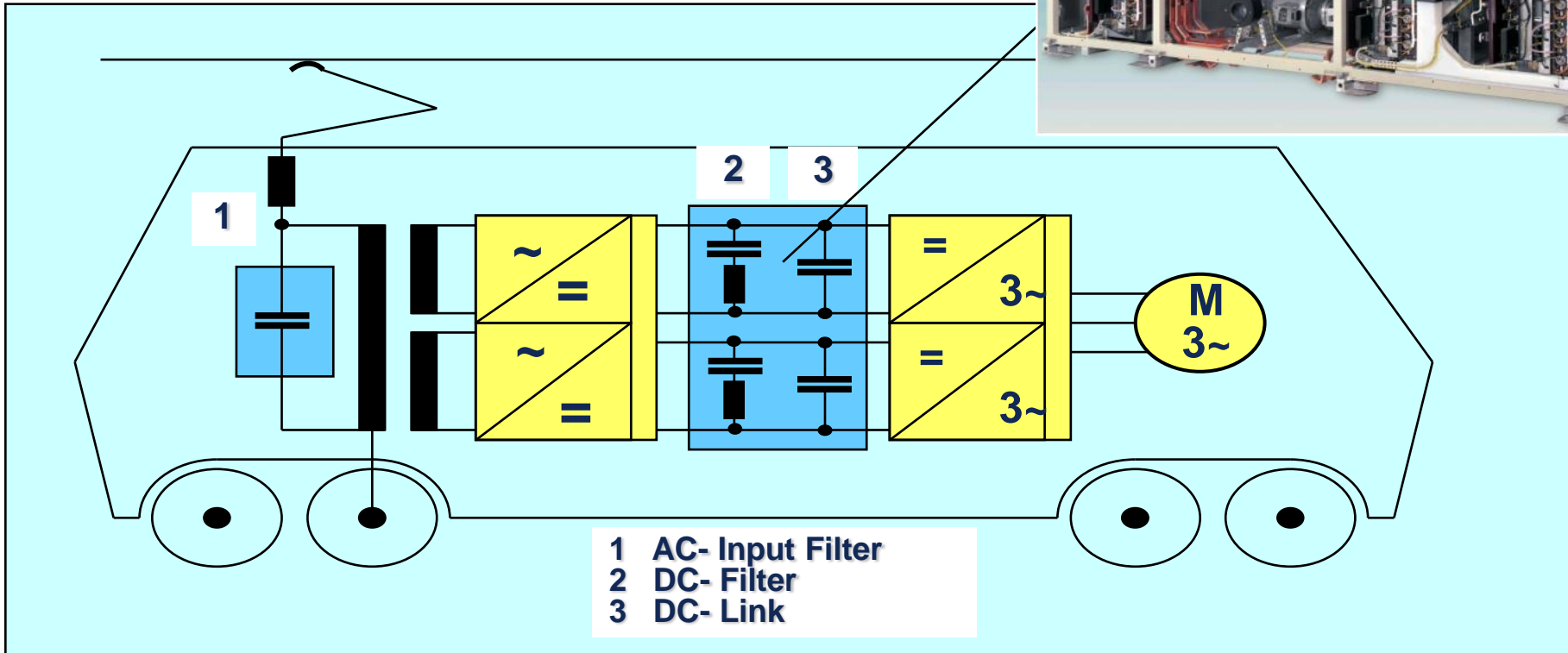
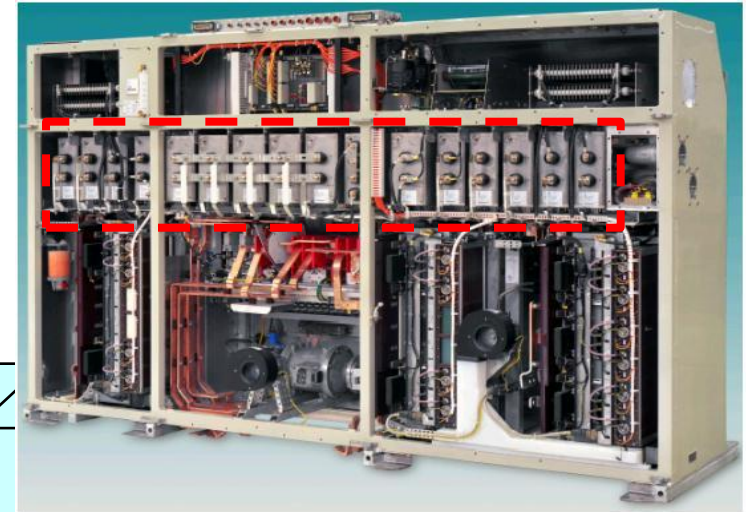
1 leg=216 Power Modules



Applications



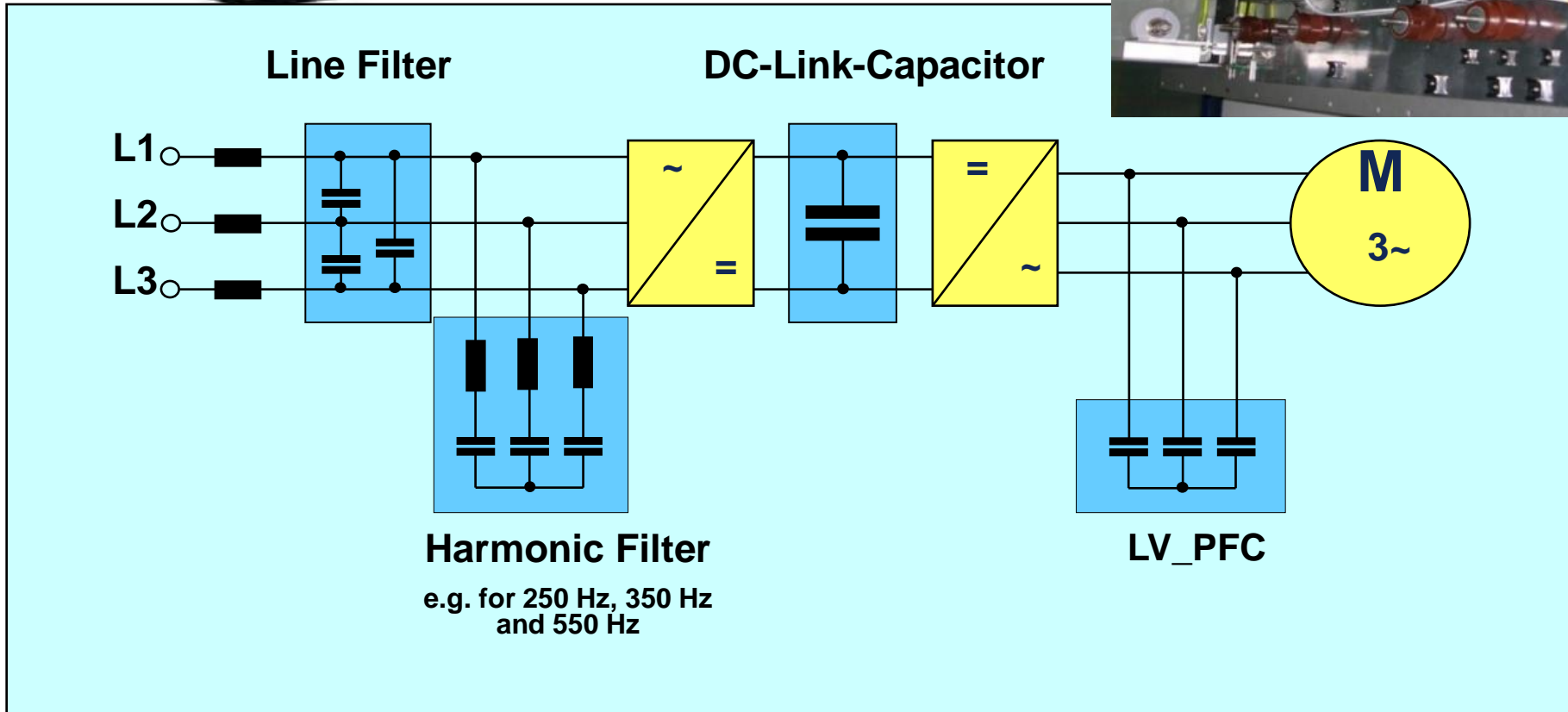
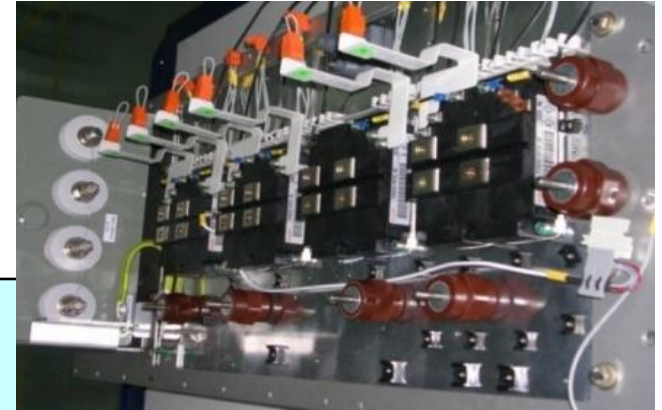
Traction Converter



Applications



Frequency Converter

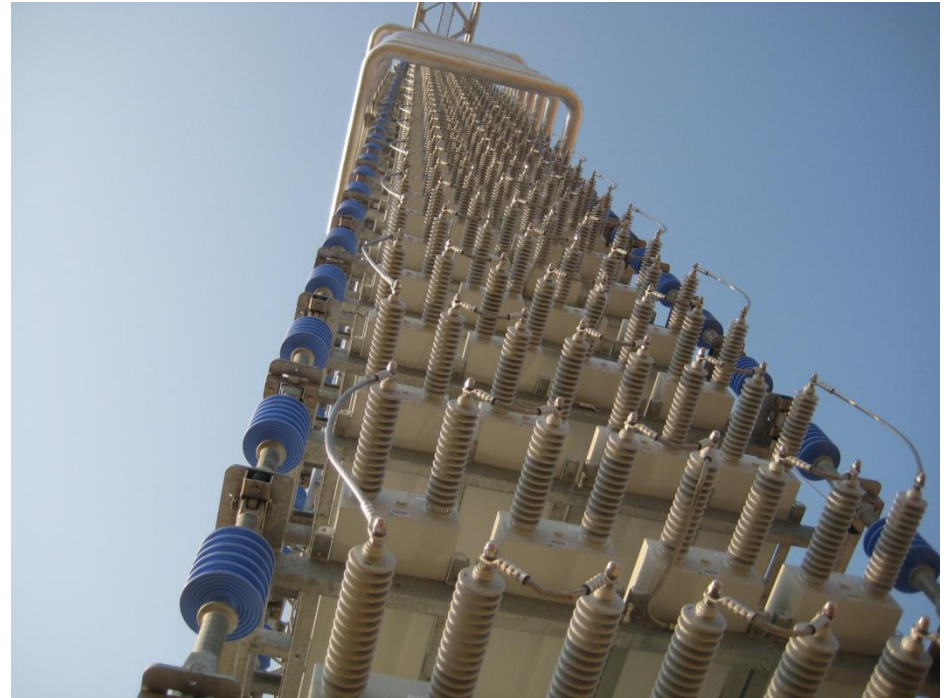


UHVDC DC Filter

India Balia Bhiwadi 500 kV

India Adani 500 kV

China Yunan-Guangdong 800 Kv



References



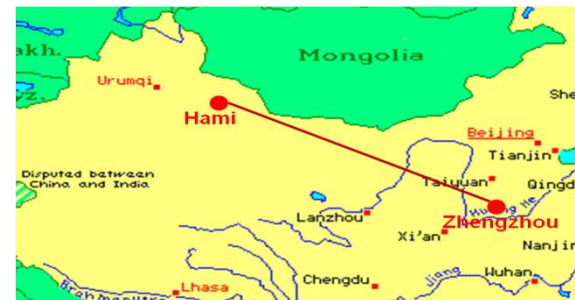
UHVDC application AC damping capacitors

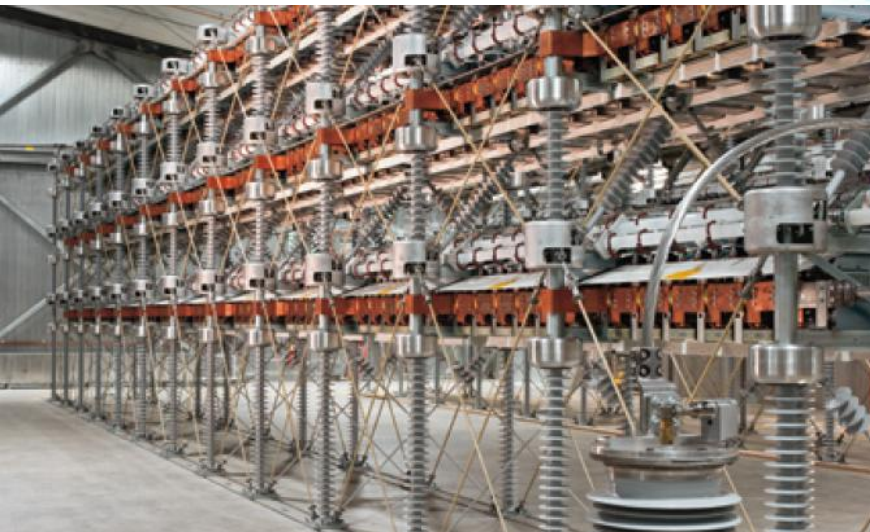
2009

China JinPing-SuNan
 ± 800 kV, 7200 MW, 2100km

2012

China HaMi-ZhengZhou
 ± 800 kV, 8000 MW, 2210km





Converter
Arm Segment



References

HVDC light project DC-link capacitors

2012-2013

China Dalian

± 320 kV, 1000 MW, 50.2km

2012-2013

China ZhouShan

± 200 kV, 1000 MW, 160km

Multiterminal , 5 converter stations

References

China CSR (中国南车)

Dc-link capacitors

AC-filter capacitors



Field trial installations

in Malaysia (Ladang Byram, Nibong Tebal, Penang)

located in corrosive environment
near the seaside.

LVAC capacitor
50kvar, 460V/50Hz



Major OEMs and Distributors of Vishay ESTA

OEM

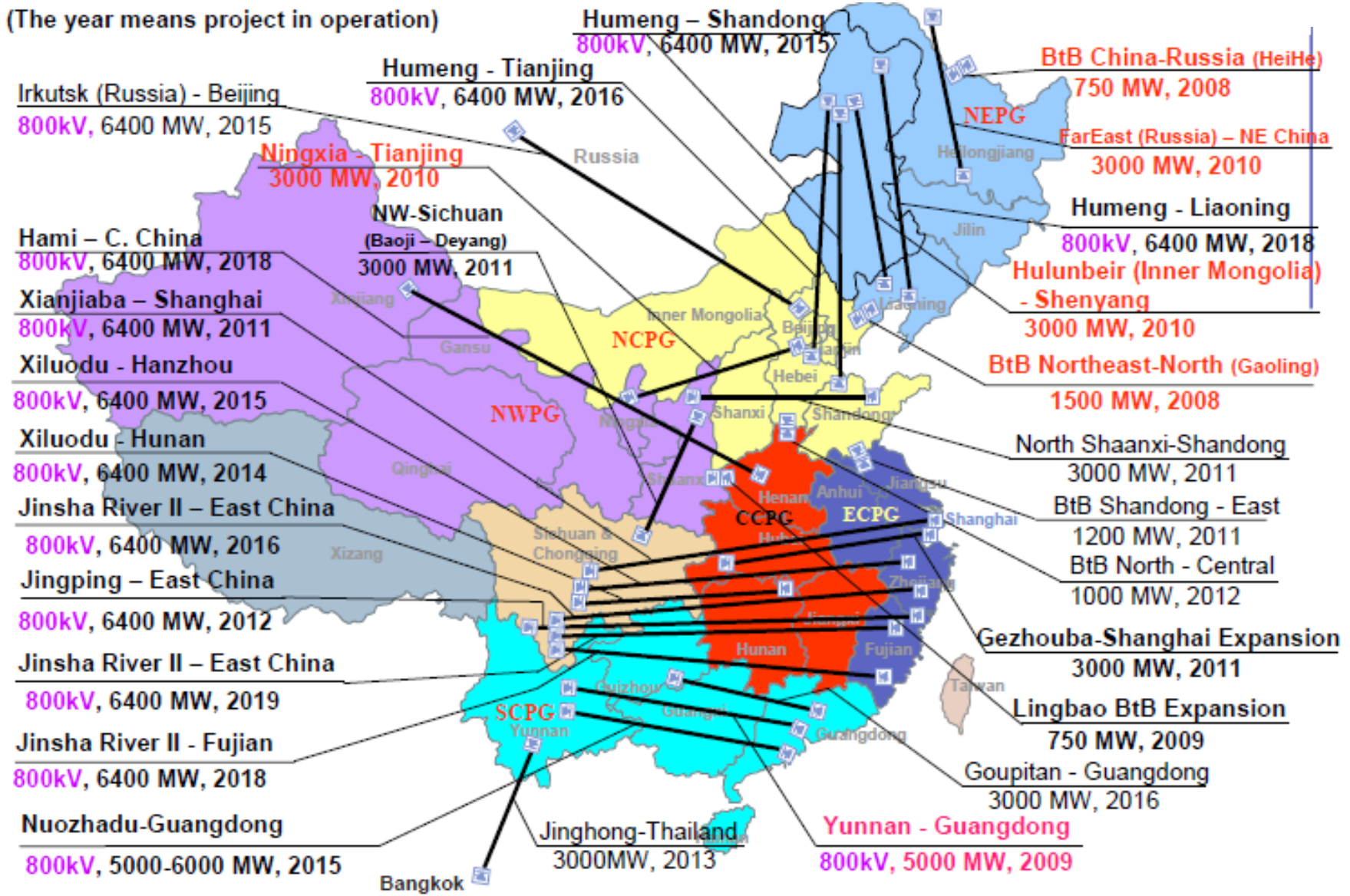


DISTRIBUTION

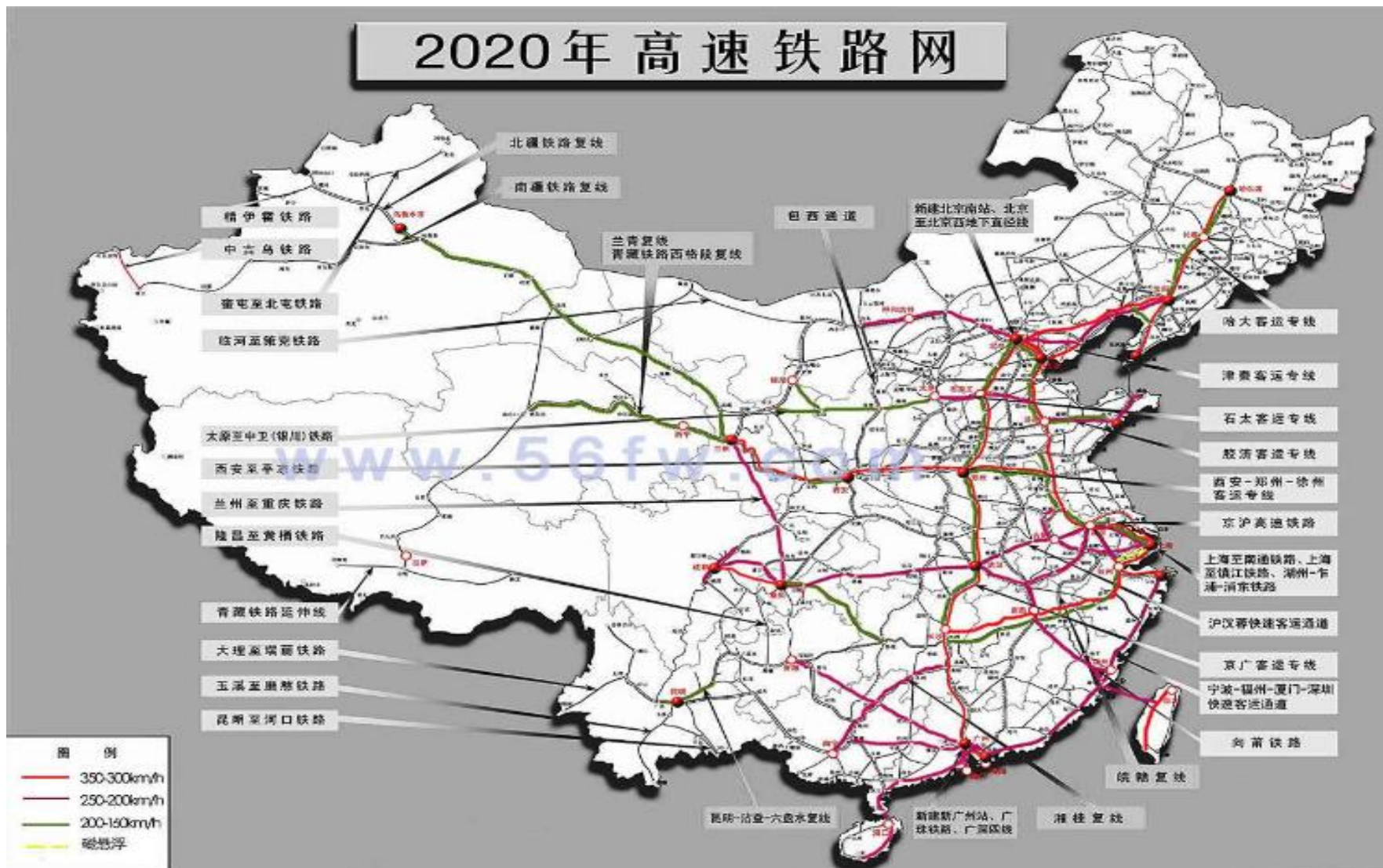


HVDC Projects by 2020 - China

(The year means project in operation)



High Speed Railway by 2020 - China



Let Us Work Closely Together !



**Thank you for
your
Attention!**