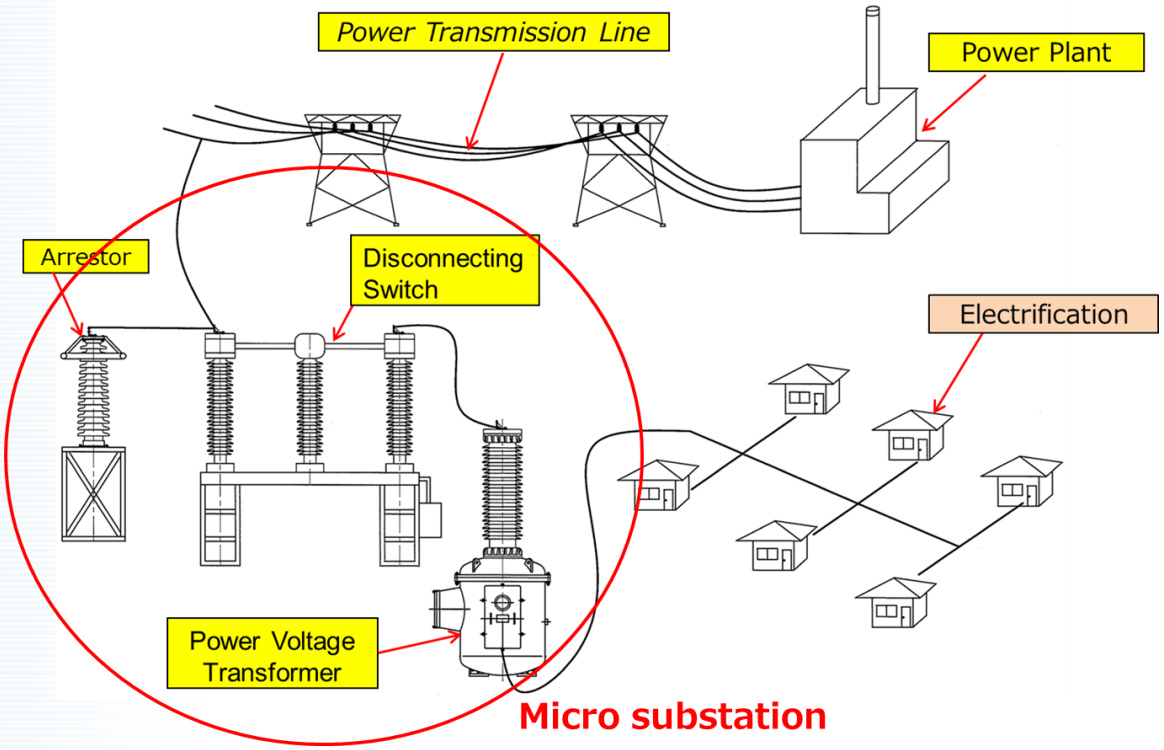
Introduction of Nissin's Micro-substation

Confidential

NISSIN ELECTRIC

NEDO Project :
International Demonstration project on Japan's Energy Efficienct Technologies

Nissin's proposal :
"Micro-substation with Power Voltage Transformer" to realize environmentally-friendly power supply in the areas with undeveloped distribution network

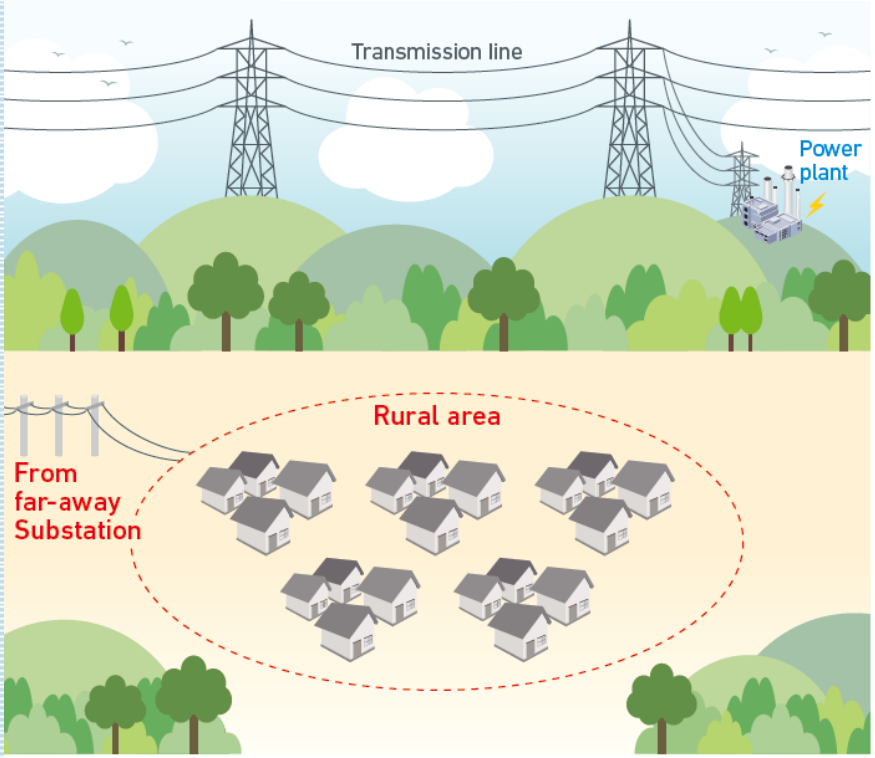


Concept of Micro-substation

NISSIN ELECTRIC

Image of power supply in rural area

Case 1: Long distribution from remote existing substation



Merit:

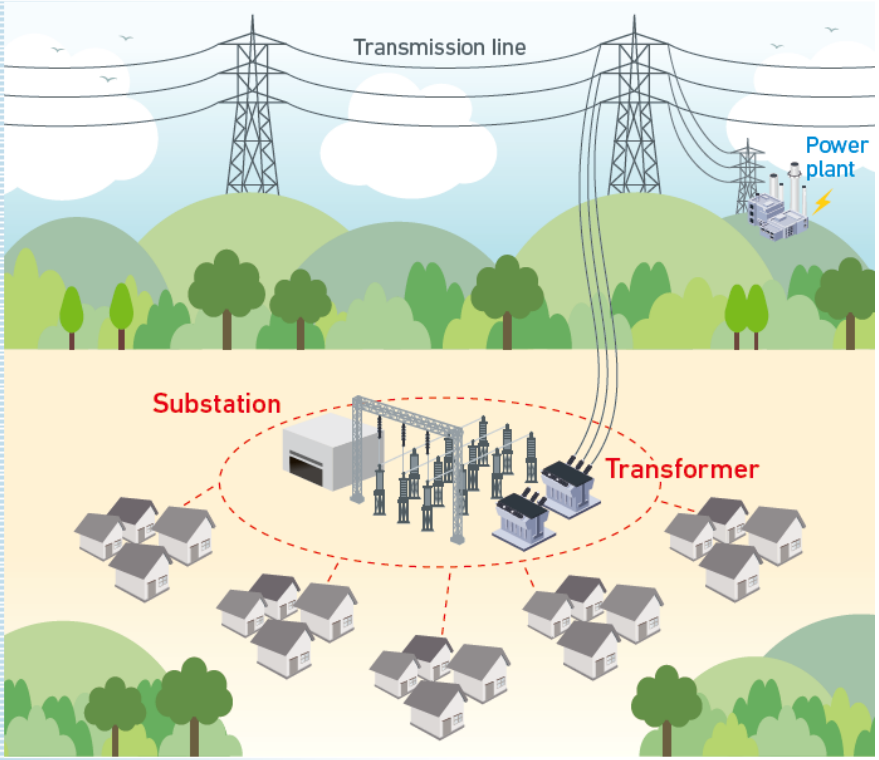
Construction of new substation is not necessary

Demerits:

Unstable electricity due to long distribution line

Concept of Micro-substation

Case 2: Construction of a conventional substation



Merit:

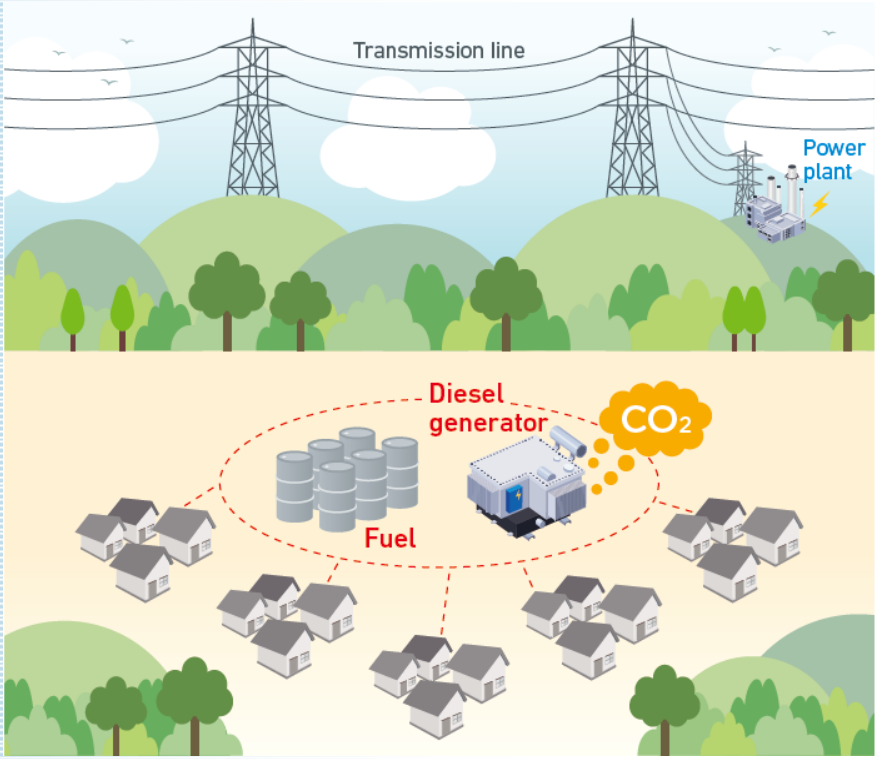
Stable electricity from new substation

Demerits:

Expensive production cost and large space

Concept of Micro-substation

Case 3: Distributed power system using diesel generator



Merit:

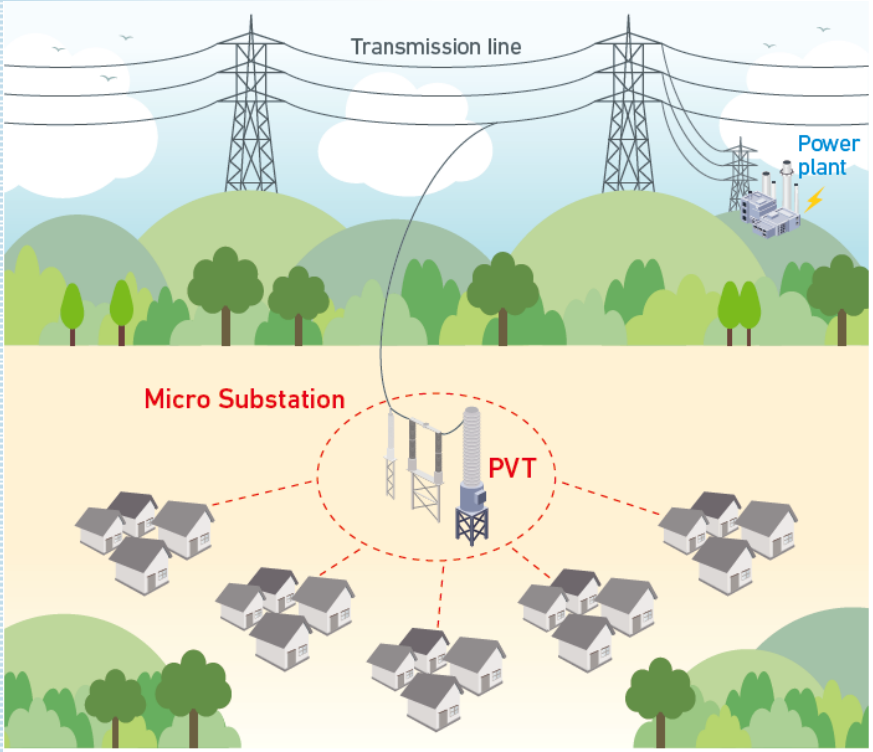
Stable electricity from fossil fuel

Demerits:

High cost for refueling and not environmentally friendly

Concept of Micro-substation

Case 4: Nissin's proposal of "Micro-substation with PVT"



Merit:

Stable electricity from Micro-substation with low cost and small space, also environmentally friendly

Demerits:

None

About Micro-substation with PVT

NISSIN ELECTRIC

■Advantages of Micro substation with PVT

1. **Simple and highly reliable system**
   - ◆Direct power supply from transmission line (EHV/HV) to LV with PVT
2. **Low Running Cost**
   - ◆Neither refueling nor frequent maintenance are necessary
3. **Low environmental burden**
   - ◆This system can reduce Co2 by 40% more than engine generator

■System comparison

	Micro substation	Conventional substation	Diesel generator
Initial cost	○ Low	△ High	◎ Average
Running cost	◎ Low	◎ Low	△ High
Occupancy space	◎ Small	△ Big	◎ Small
Environmental impact	◎ Low	◎ Low	△ High
CO2 emissions (※)	67.5ton/CO2		113.9ton/CO2

※ Based on average power consumption 10kW*365days*24h

About Micro-substation with PVT

■"PVT" is based on the technology of Gas Insulated Voltage Transformer

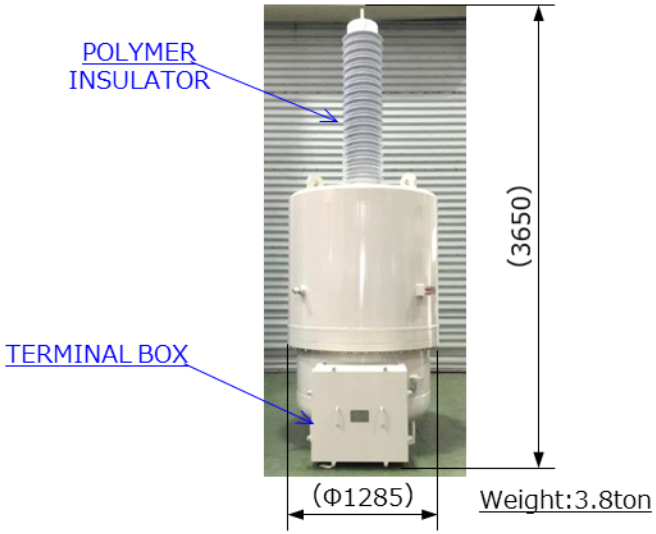
PVT is based on GVT technology but can be manufactured at bigger capacity with output power of up to 100kVA.
The technology to convert power from HV/EHV to LV is based on the GVT technology in which Nissin is very experienced. We have high level of techniques and we deliver GVT from 23kV to 1,000kV all over the world.
(※ Delivery record of GVT: Total 59246 sets, in India 1521 sets)

◆Electrical specification

Voltage class (kV)	66	110	145	245
Primary voltage (kV)	66/√3	110/√3	145/√3	245/√3
Rated frequency withstand voltage (kV)	140	230	275	460
Rated lighting impulse withstand voltage (kV)	325	550	650	1050
Secondary voltage (V)	120/240			
Output power(kVA)	25~100			
Frequency (Hz)	50/60			

◆Ambient environment

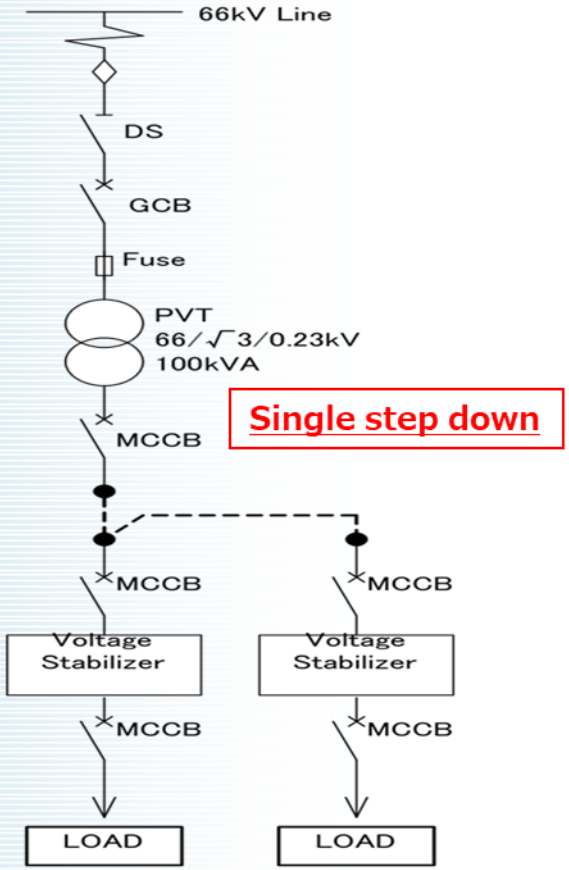
Voltage class (kV)	66	110	145	245
Ambient temperature	-30~45℃			
Altitude	< 1000m			
IP rating	IP53			



PVT image
(145kV 100kVA)

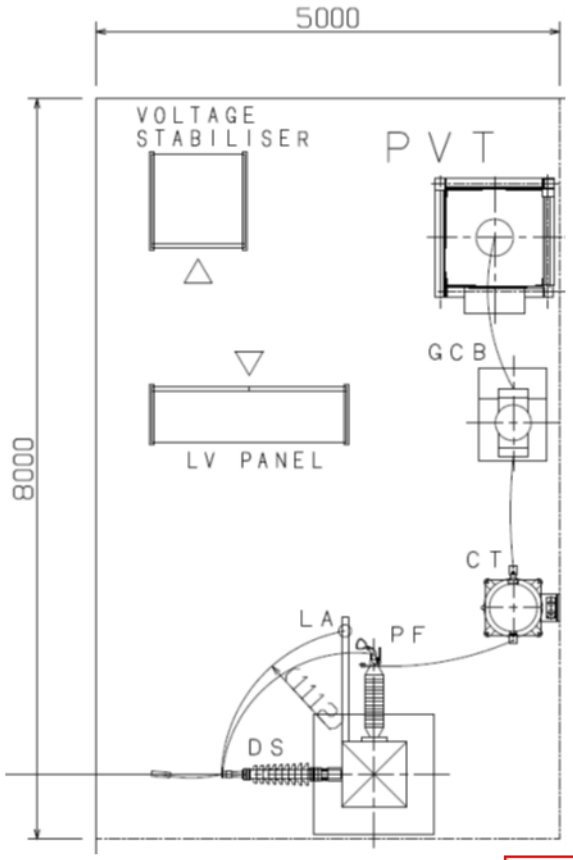
About Micro-substation with PVT

■System outline



Single step down

Single Line Diagram



Small space(5m*8m)

Equipment layout

Plan of demonstration project in India

NISSIN ELECTRIC

■ Technical issues

1. System design based on the conditions of Indian power system and regulations
2. Evaluation of power quality in case of normal condition and unexpected failure conditions that may occur in India
3. Prove effectiveness through demonstration project

■ Business issues

1. Market size across India
2. Profitability evaluation as a power supply business

Nissin Electric in collaboration with NEDO is conducting pre-demonstration survey for the demonstration project in India until the end of Feb 2021.

Thank you!

Please contact us at idzutsu tatsuya@nissin.co.jp
if you have any questions or comments.

Corporate Data

Company Outline

Company Name
Nissin Electric Co., Ltd.
Head Office
47 Umezu-takase-cho, Ukyo-ku, Kyoto 615-8686, Japan

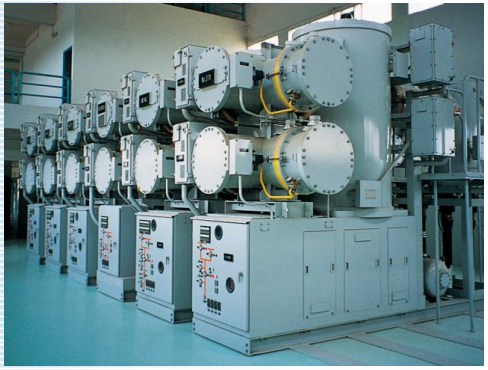
Incorporated
April 1917
Stated Capital
\10,252,845,127
Employees
5,112 (As of March 2020, consolidated)

Business

Power System Equipment Business	Gas insulated switchgear/ Circuit breaker/ Instrument transformer/ Transformer/ Switchgear/ Capacitor/ Reactor etc.
Renewable Energy and Environment Business	Photovoltaic system/ Power conditioner for photovoltaic system/ Power conditioner for storage battery/ Voltage dip/blackout compensator/ Supervisory control system/ Supervisory control system for waterworks/ Vehicle recognition system etc.
Charged Beam Equipment and Processing Business	Ion implanter for semiconductor/ Ion implanter for FPD/ Electron-beam processing system/ Electron-beam processing service/ Thin-film coating equipment/ Thin-film coating service etc.
Life Cycle Engineering Business	Installation, Adjustment, Inspection and maintenance for the above business

NISSIN ELECTRIC

Power System Equipment



123kV Gas Insulated Switchgear

77/66kV Harmonic Filter Equipment

800kV Capacitor
Voltage Transformer

1100kV Gas Insulated
Voltage Transformer

66/77kV Compact Gas Insulated Switchgear

Power Capacitor