



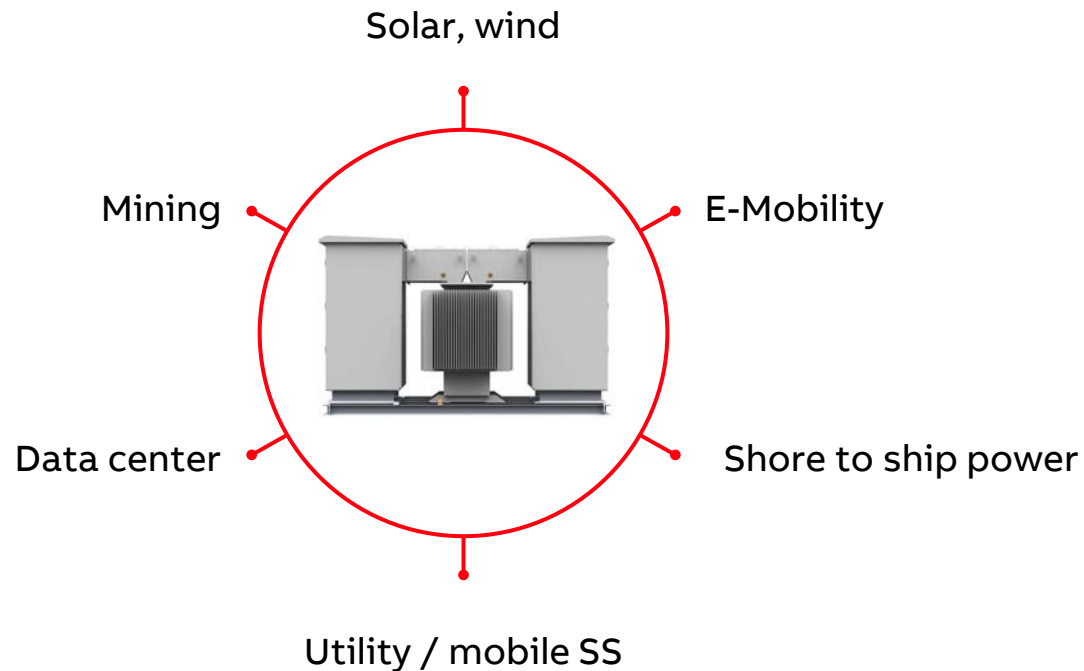
# Skid solutions

Product portfolio for Solar Applications

EPDS Modular Systems and Packaging

# Skid

## Skid can be used in various application



## Outdoor skid

Prefabricated unit substation with power distribution components such as medium voltage, transformer, low voltage integrated **on the frame** for outdoor uses with no environmentally controlled.

## Indoor skid

Prefabricated unit substation with power distribution components such as medium voltage, transformer, low voltage switchgear, **on the frame**, for installation in a building.

# Skid solutions

## Solar

- Short project execution and short delivery time
- Projects are located in remote locations
- Solar plants are in high radiant places
- Projects tends to be scalable

## Segment challenges

- 
- Standard offering
  - Factory assembled and routine tested
  - One piece delivery for minimized site works
  - Efficient cooling based an open air design with no additional HVAC required
  - No exposed live parts
  - Easy access for any repairs
  - ABB Ability enabled provides predictive maintenance and remote management

## How to address





# Skid components

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# What does a skid consist of?

## Overview

### Different components

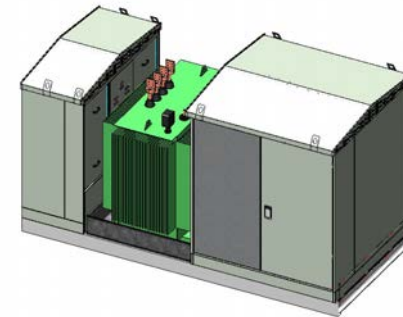
The skid unit generally have these main components:

- MV switchgear - up to 40.5 kV
- Transformer - up to 7.5 MVA, oil-type
- Low voltage switchgear or panels – Up to 1 kV
- Others – inverter, bus duct

The equipment is designed and coordinated mechanically and electrically.

Electrical substation mounted on skid which steps down/up to the usable voltage for customer system requirement.

### Typical skid



## Several configurations possible on LV side

### LV switchgear

- Several incoming and outgoing feeder options
  - direct connected, circuit breakers, fused disconnectors or load break switches
- Various number of ratings
- Equipment for metering, measuring and control available
- Voltage up to 800V, current up to 5000 A
- Different width for different applications: 5M , 8M , 12M, 16M, 20M



**Benefit: Flexibility to match customer requirements**

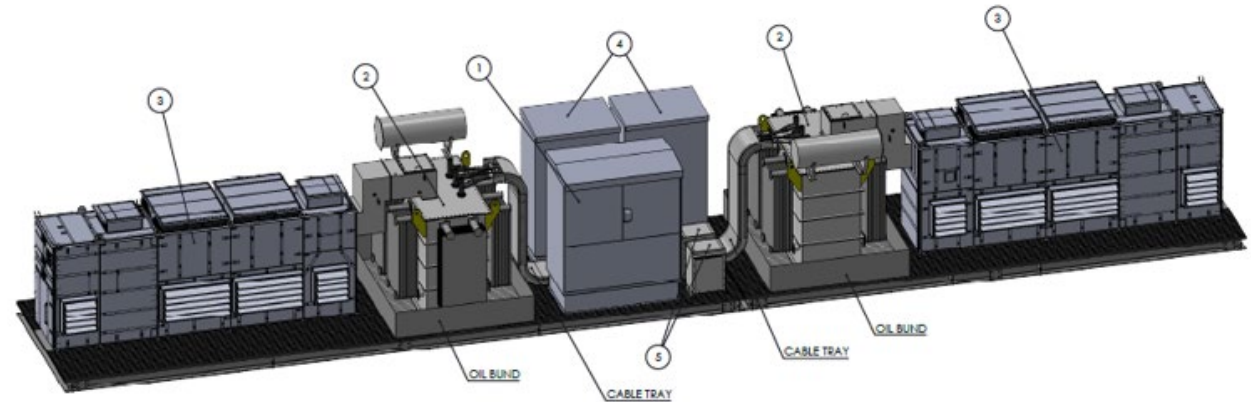
# Combined Skid

## Components

Further reducing the installation work on site while increasing the power of DTR

- One common RMU and auxiliary cabinet
- Twin Transformer
- Twin Central inverter
- or LV cabinet for connection to string inverter

Depending on the dimension can be split in two skids for transportation purpose





# What does a skid structure consist of?

Transportation facility

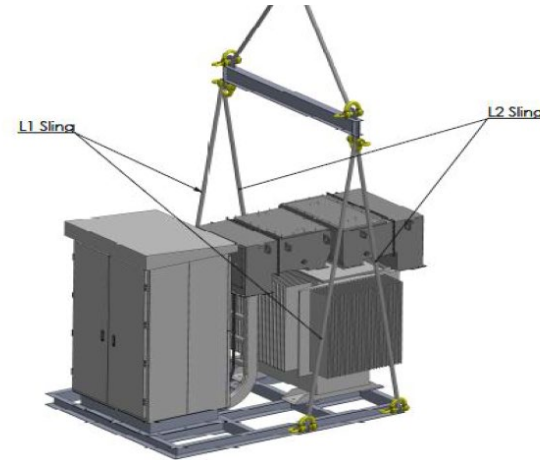
## Different types of transportation

The skid has **two transportation methods**, depending on site operational requirements. The skid must be designed for the specific requirement:

1. The skid can be lifted and placed by crane on the concrete foundation. The substation is to be lifted from lifting brackets located as the base frame with the help of spreader and crane. The length of the four part lifting chain/sling is dependent on the actual size of the skid.
2. The skid can be dragged by tractor. Dragging is done by attaching the steel holding lines with hooks to the ends of the skids where the anchoring points are, once the lines are attached the tractor is moving the substation in to the other place in the pit. Even the surface is not even and conditioned. It is used in the open pit mining.

## Summary of transportation choices

### 1 Lifting by crane



### 2 Dragging by tractor








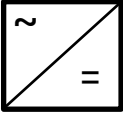

# — Offering

# Offering overview

Several electrical combination

## Several combination

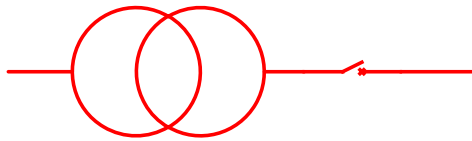
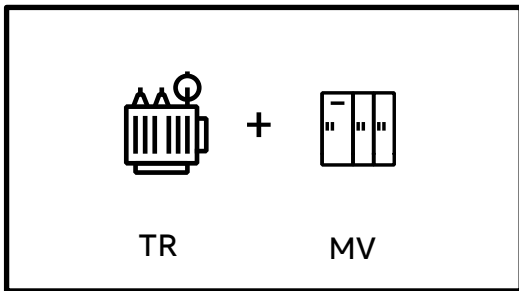
- To match site and plant requirements
- For plant with both Central and String inverter
- From smaller to larger installation
  - Combining several equipments on the same skid

				
MV SWGR	Transformer	LVS	Inverter	IP ratings
•	•			IP43/IP54
•	•	•		IP43/IP54
•	•		•	IP43/IP54

# SSU MV station

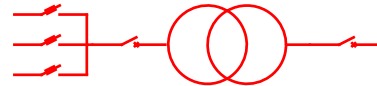
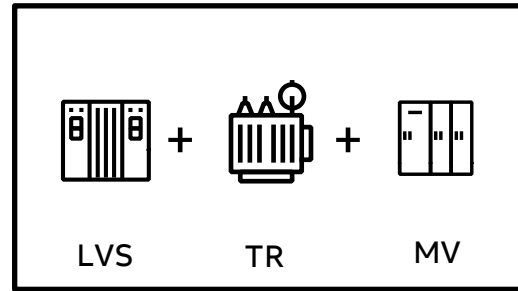
## Detail portfolio and product description

### 1. SSU MV station



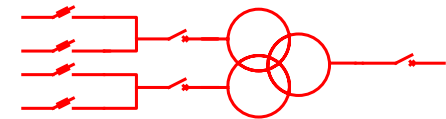
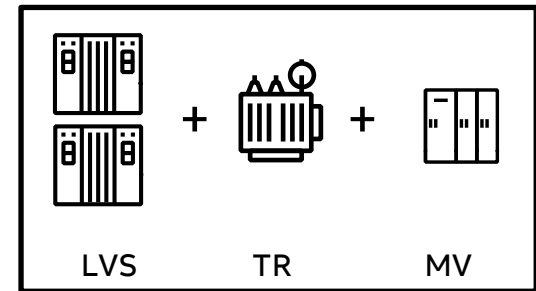
- RMU: 2.4 - 40.5 kV
- Trafo type: Oil

### 2. SSU MV+LVS



- RMU: 2.4 - 40.5 kV
- LVS: 400-800 V – up to 20M
- Trafo type: Oil up to 3.6 MVA

### 3. MV + 2 LVS

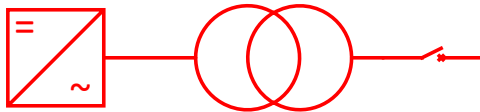
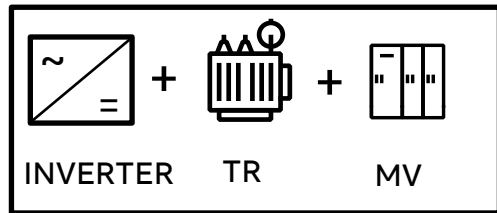


- RMU: 2.4 - 40.5 kV
- LVS: 400-800 V – up to 20M each
- Trafo type: Oil up to 7.5 MVA

# SSU MV + INV

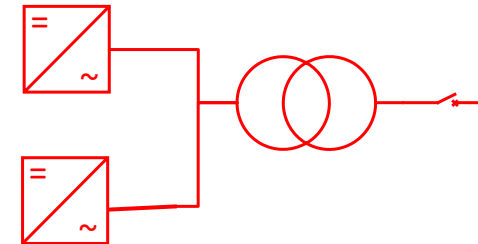
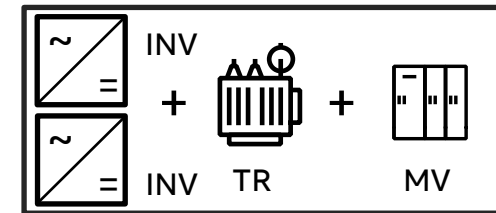
## Detail portfolio and product description

### 4. MV + INV



- RMU: up to 40.5 kV
- Trafo type: Oil
- Central Inverter

### 5. MV + 2 INV

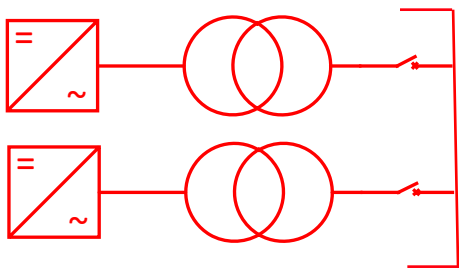
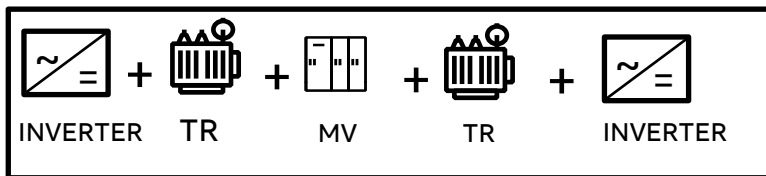


- RMU: up to 40.5 kV
- Trafo type: Oil
- Central Inverter

# SSU – Combined Skid

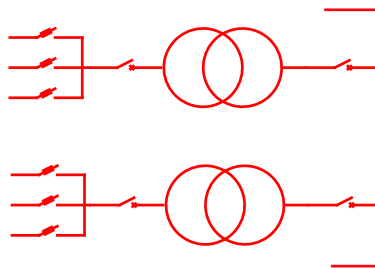
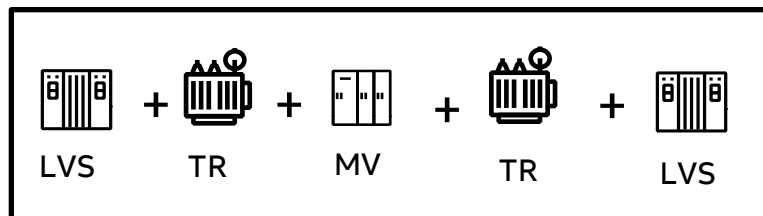
## Detail portfolio and product description

### 6. MV + 2 DTR + 2 INV



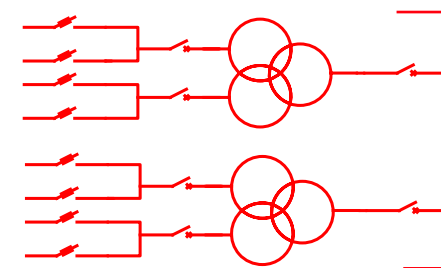
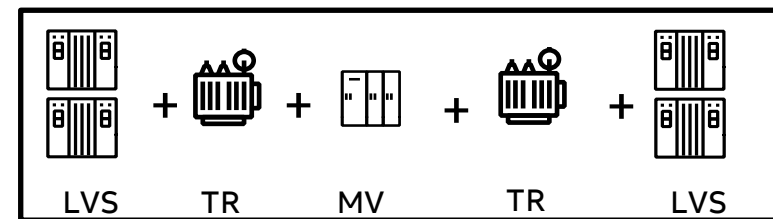
- RMU: up to 40.5 kV
- Trafo type: Oil up
- Central Inverter

### 7. MV + 2 DTR + 2 LVS



- RMU: up to 40.5 kV
- LVS: 400-800 V – up to 20M
- Trafo type: Oil up to 3.5 MVA

### 8. MV + 2 DTR + 2 LVS



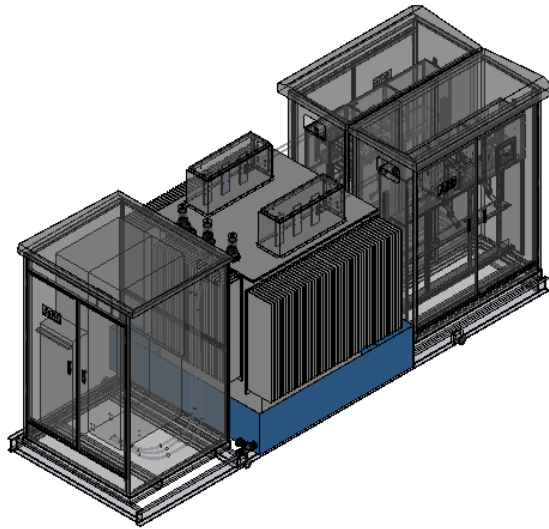
- RMU: up to 40.5 kV
- LVS: 400-800 V – up to 20M each
- Trafo type: Oil up to 7.2 MVA

# Skid solutions

## Options

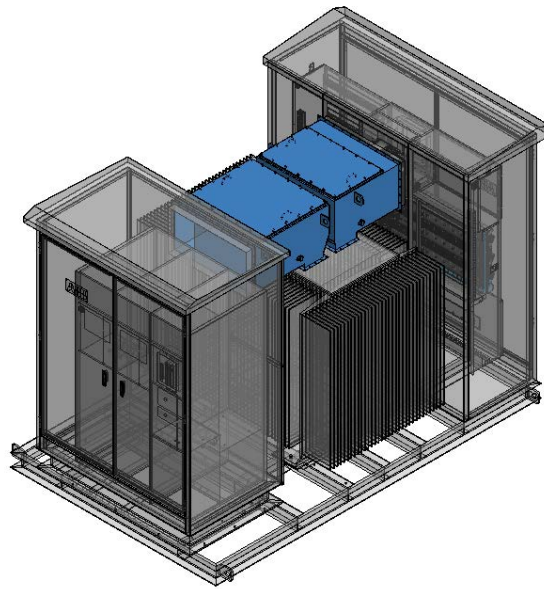
### Oil collect pit

- Embedded in the civil foundation
- Embedded in the skid solution



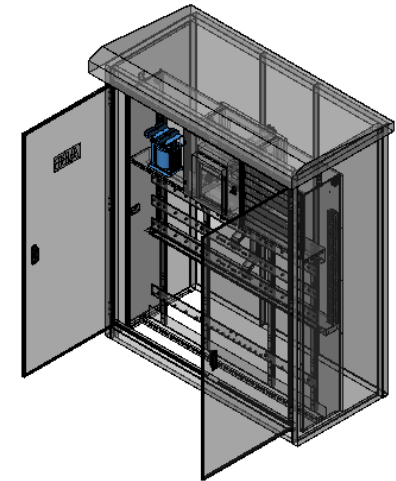
### Cable protection cover

- Additional enclosure for MV or LV connections



### Control TR

- Supplied in the LVS enclosure or outdoor beside distribution TR



# SSU

## Values to customers



<b>Simple and quick installation</b>	Units are pre-designed, pre-tested and assembled at the factory, and shipped in one piece so it is simple to drop in place and connect cables. Open-air design allows easy access to equipment for quick installation procedures.
<b>Pre-engineered products</b>	Simple and modular concept with pre-engineered designs to be combined to meet project requirements. Pre-engineered units shorten design time, eliminating design errors.
<b>One piece delivery</b>	All electrical equipment installed in 1 frame to minimize site works and maximize pretesting and safety
<b>Efficient cooling</b>	Open-air design with natural air cooling allows maximum transformer cooling. There is no need to consider derating due to limited ventilation.
<b>No exposed live parts</b>	Although it is an open-air design, there are no exposed live parts. All live parts are covered to ensure safety against electrical shock.
<b>Type tested</b>	All electrical equipment contained within the SSU are type tested according to their relevant standards, ensuring quality of sub components.
<b>Easy access</b>	Open-air design provides easy access for visual inspection of equipment. Trained personnel can open covered parts for service.
<b>ABB Ability™</b>	ABB Ability provides predictive maintenance and remote management through, smart sensing and communication, internet based management, data historian and connected asset lifecycle management.
<b>Homologation</b>	Electrical equipment conforms to local regulations.



