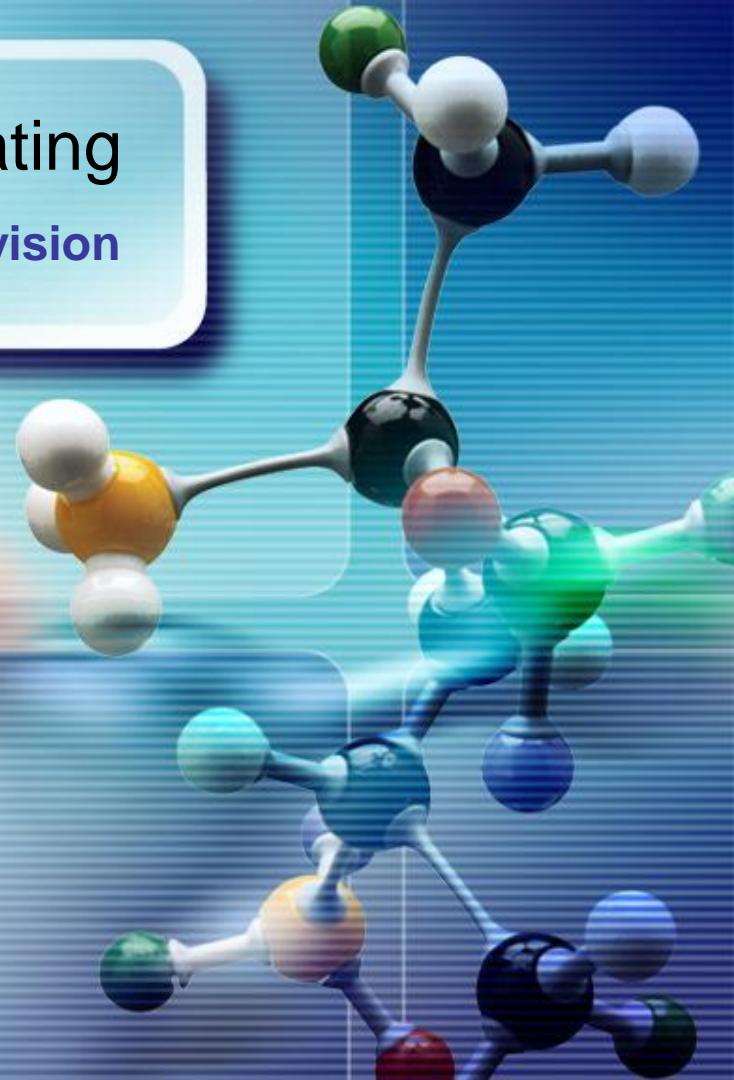


How to replace UPS while plant operating

Electrical Plant Maintenance Division

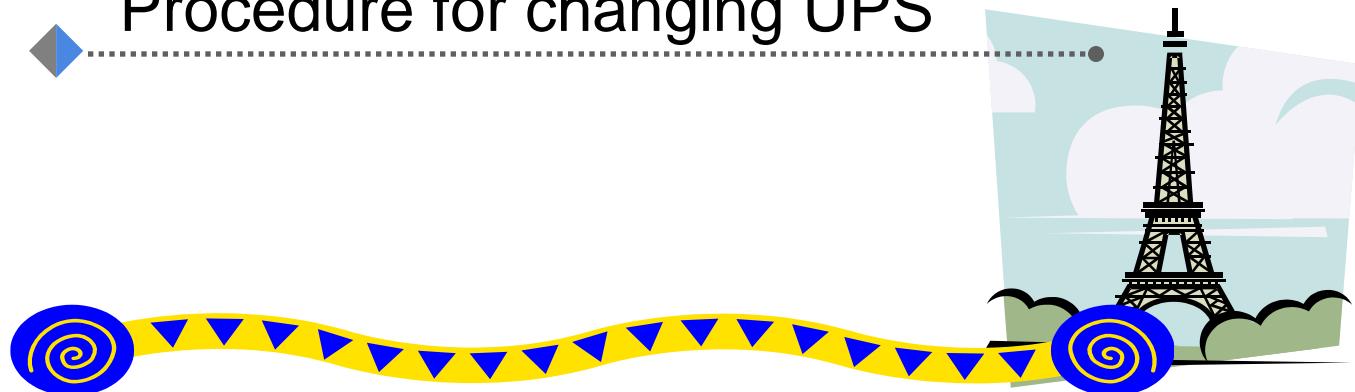
Chaiyasit Waleesuksan
Electrical Engineer



Contents



- ◆ Introduction to UPS
- ◆ Why do we have to change it ?
- ◆ Procedure for changing UPS

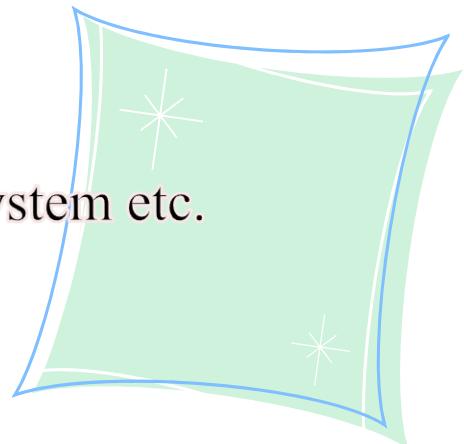


Introduction to UPS

■ **UPS (Uninterruptible Power Supply)**

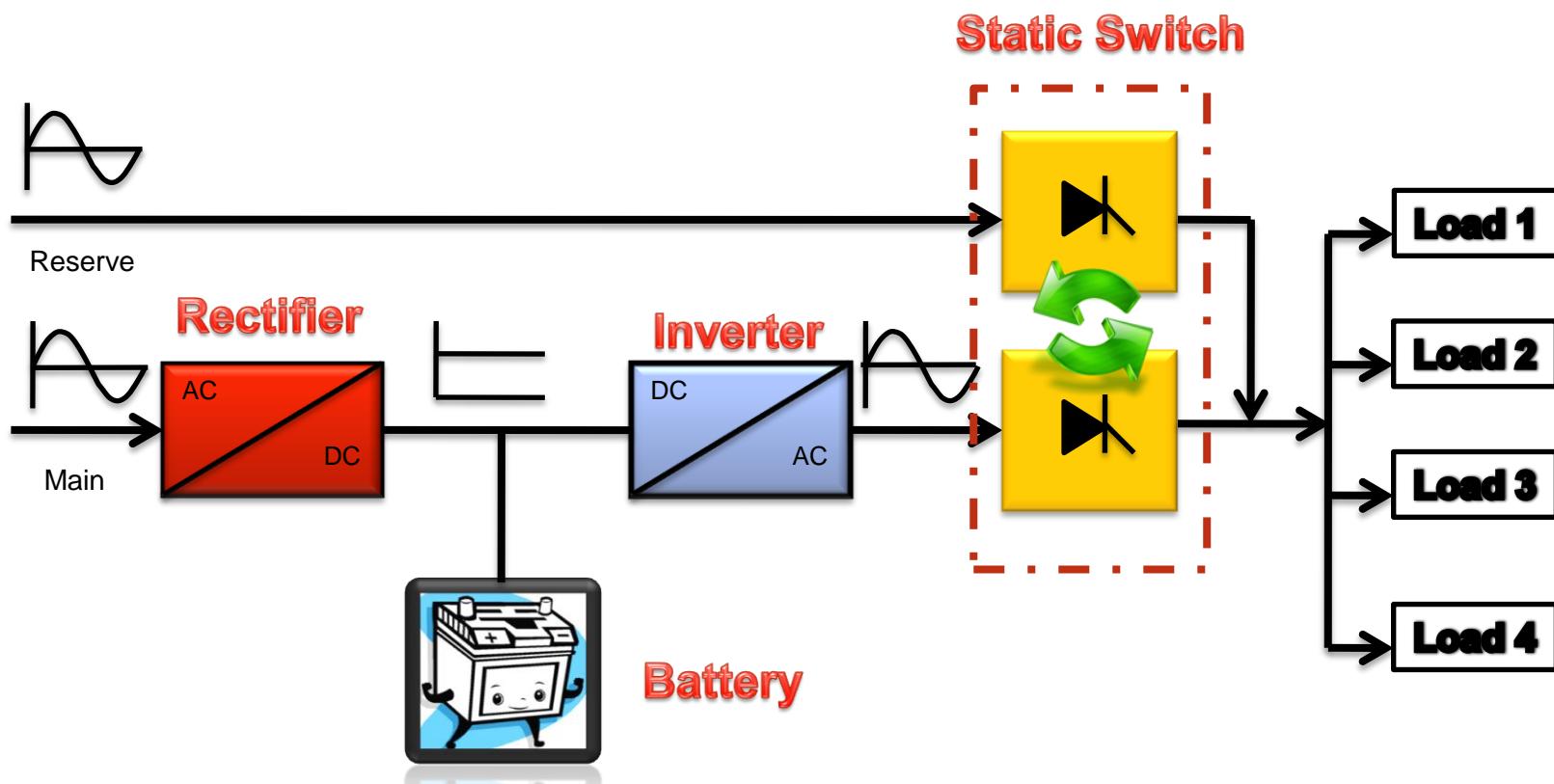
The Uninterruptible Power Supply is designed to supply AC sinusoidal electric power that cannot be interrupted by any occurrences.

UPS' s Load : DCS , GCP , PIS, Fire & Gas system etc.



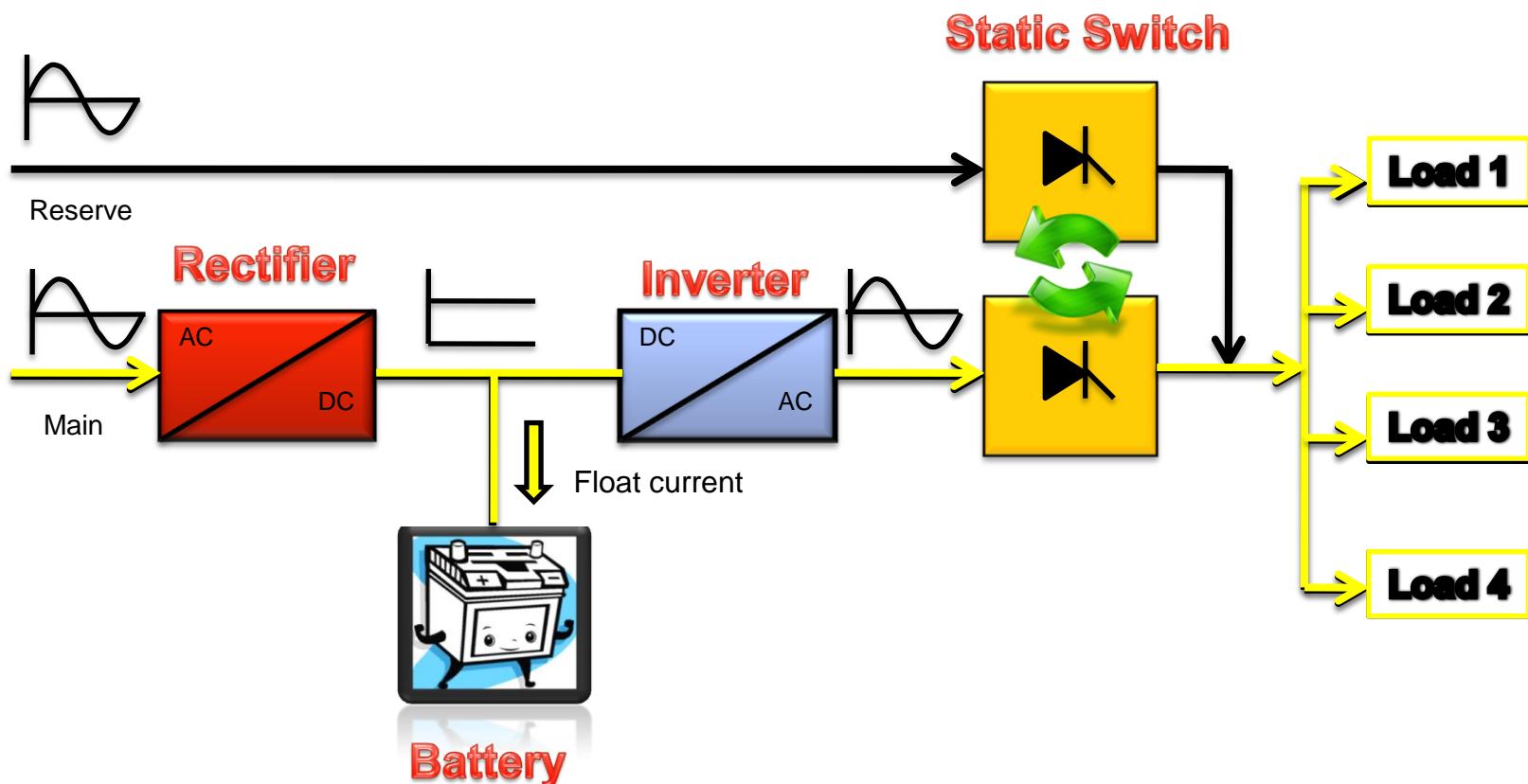
Introduction to UPS

- UPS



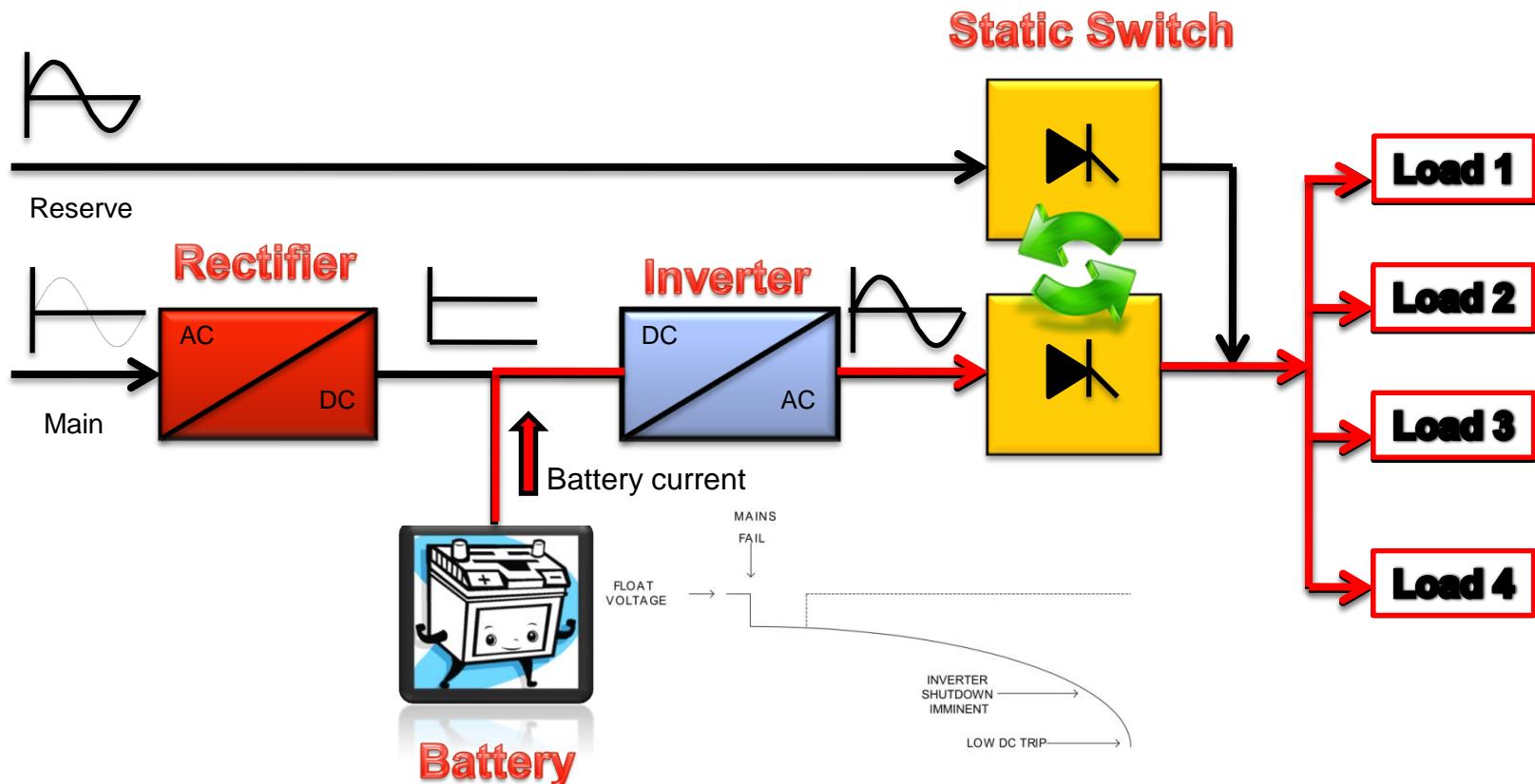
Introduction to UPS

- Normal operation



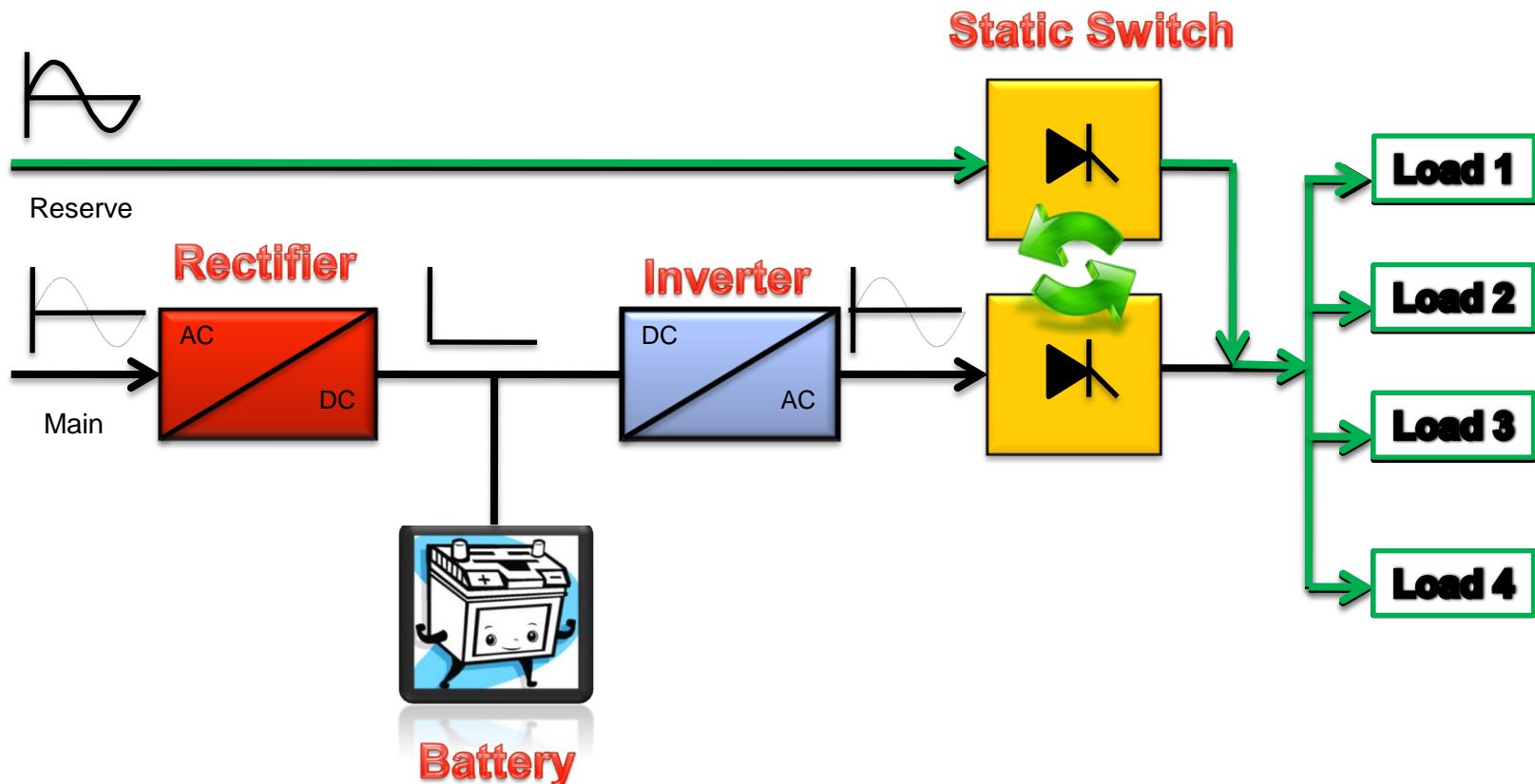
Introduction to UPS

- Main AC supply fail

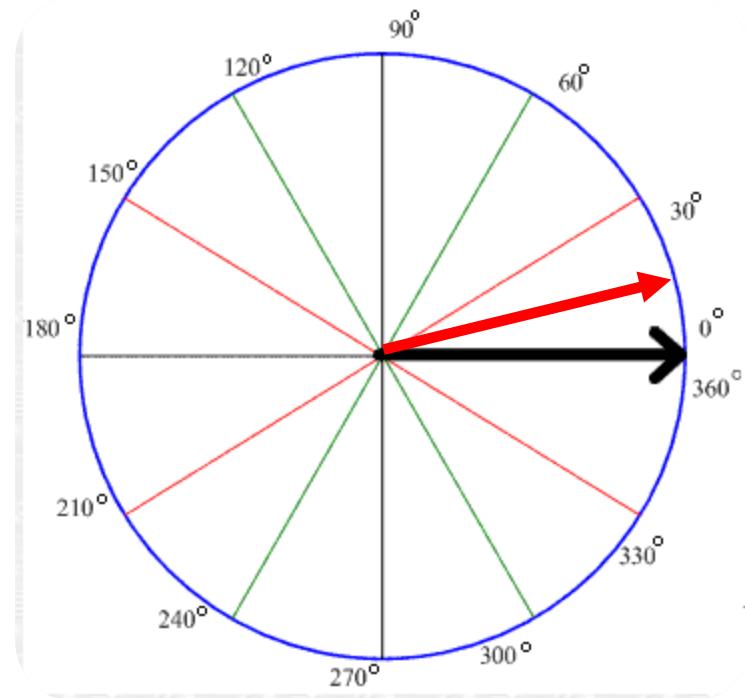
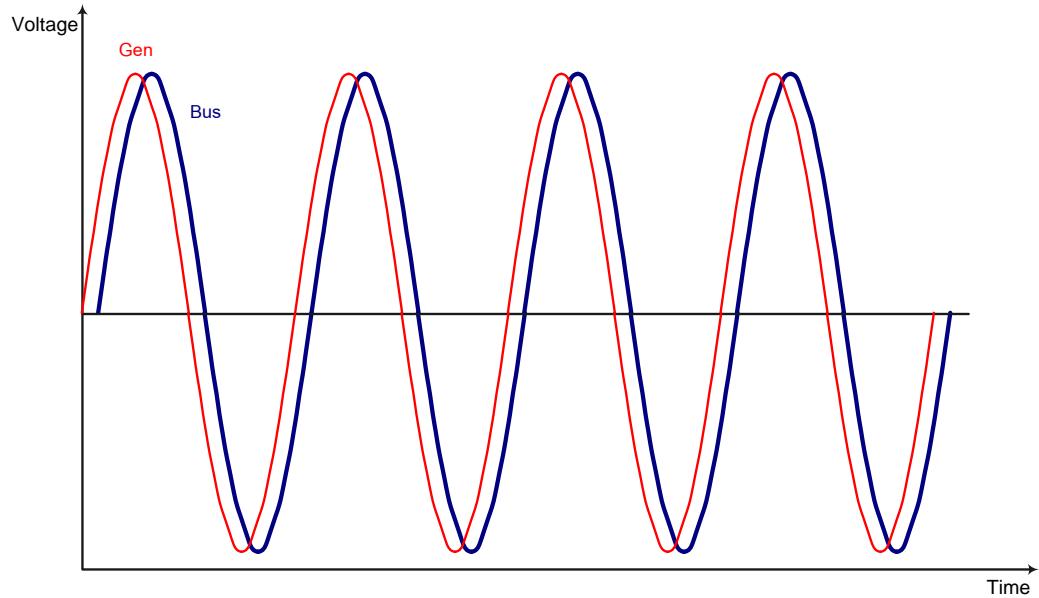


Introduction to UPS

- Bypass Operation



Principle of synchronization

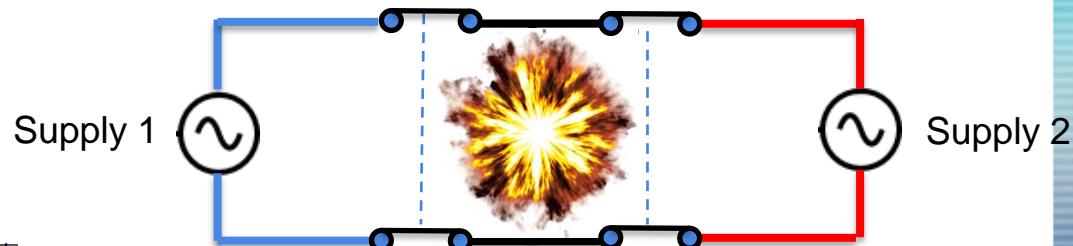
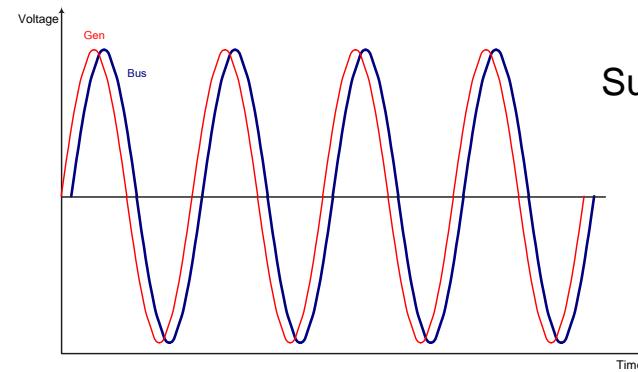
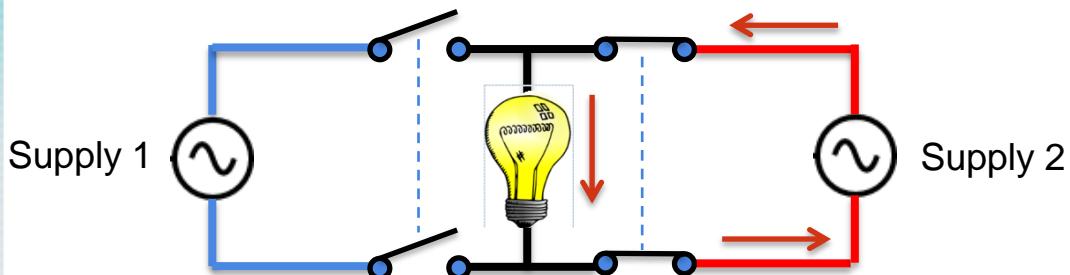


“Power supply from difference source cannot be connected to load directly.”

Principle of synchronization

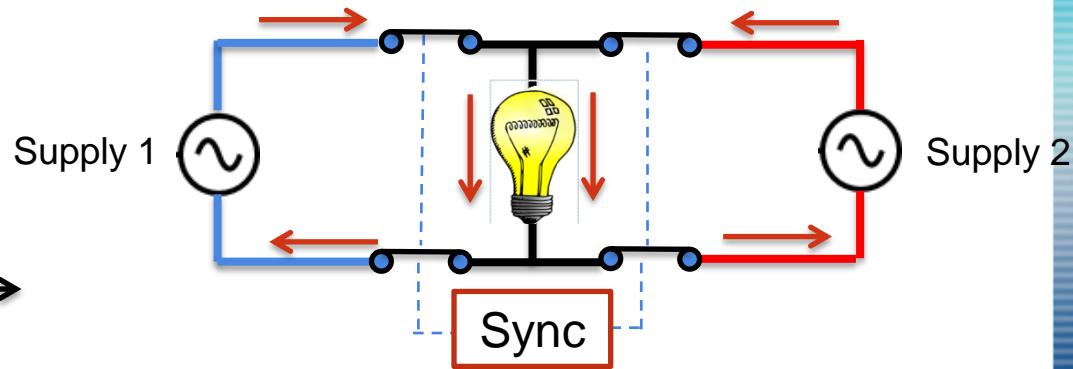
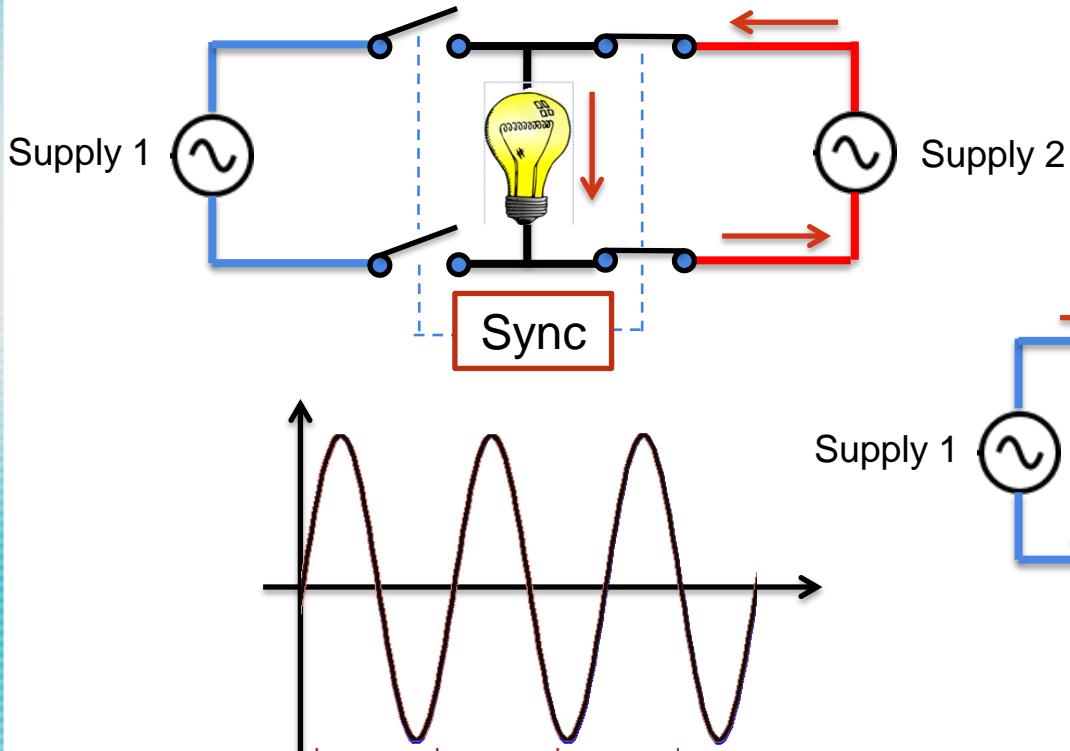


Switching power supply without synchronization check.



Principle of synchronization

Switching power supply with synchronization check.



“Sync check detect voltage of supply1&2. If waveform are the same,
There is no alarm and can parallel supply safety.

Why do we have to change it ?

- **Obsolete spare parts**
- **Increasing capacity**
- **Components breakdown**

Preparation before change UPS

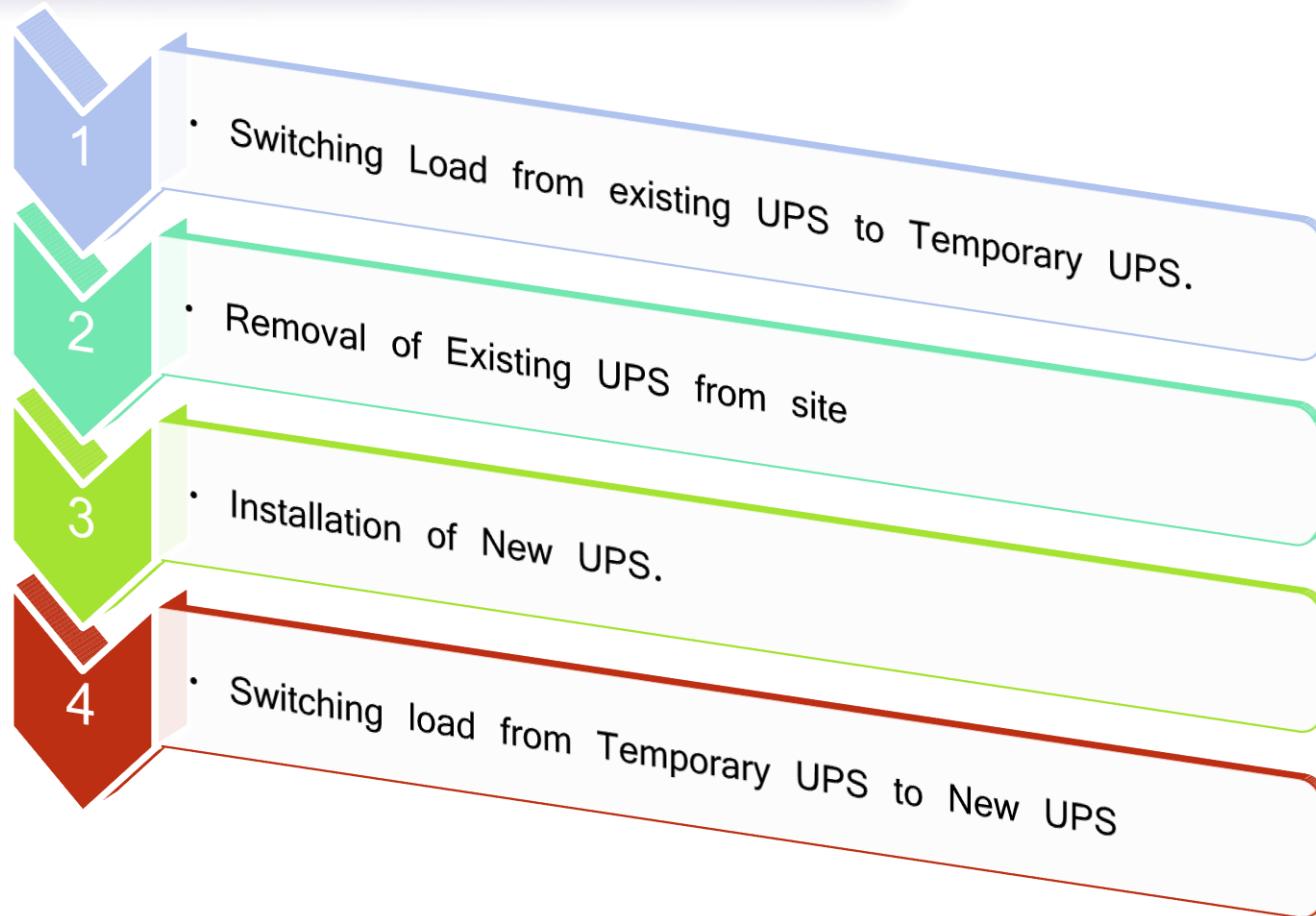
- Drawing
- Temporary UPS
- Temporary Distribution panel
- Temporary battery
- Multi meter, Clamp Amp Meter ,
Scope meter
- Cable

Challenges



- While Replacing UPS, Power supply must continuously supply to load **without interruption**, not effect to load.
- Due to change **ONLINE**, some points are live circuit. Technician must concentrate in **safety** to prevent electric shock & equipment failure.

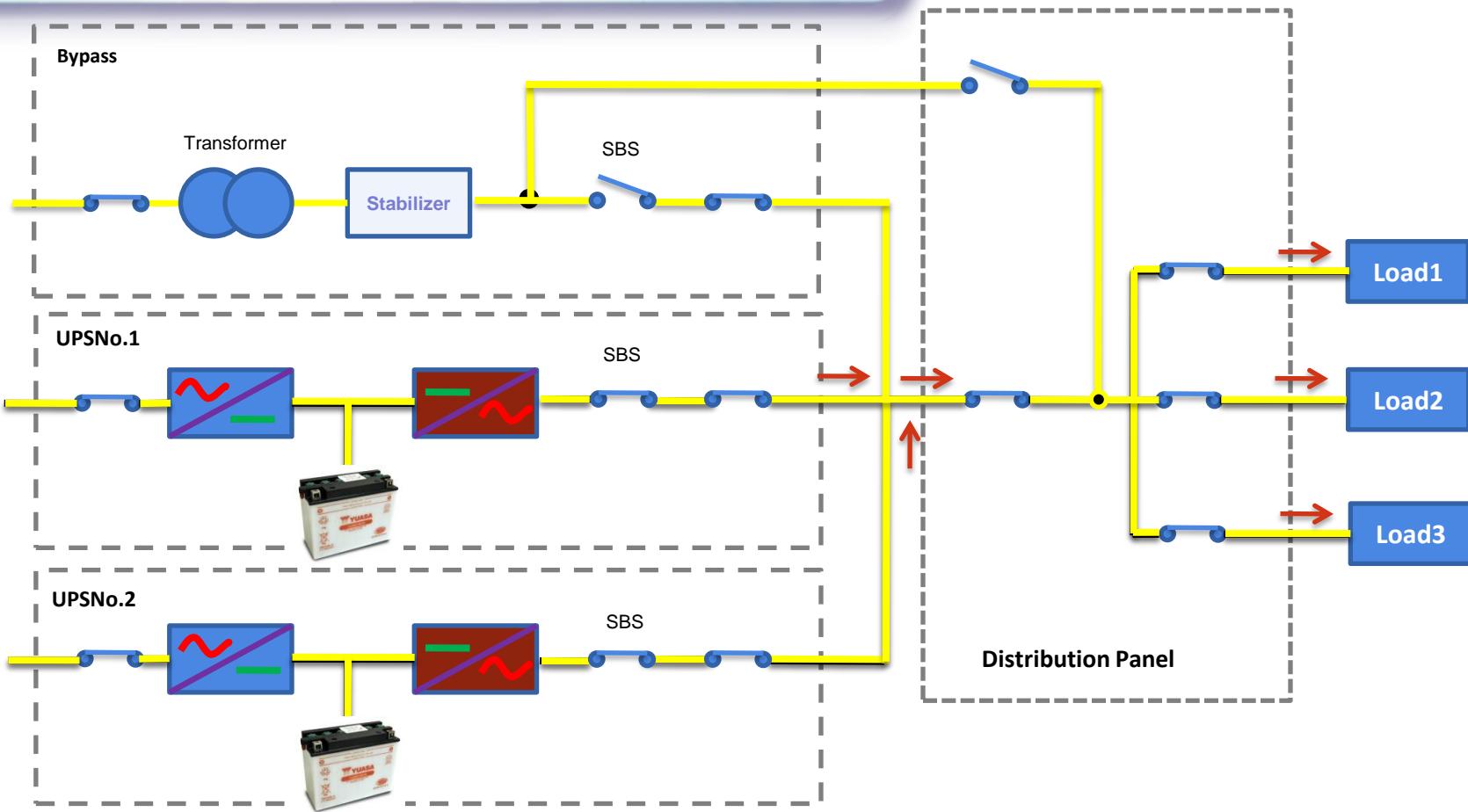
Procedure for changing UPS



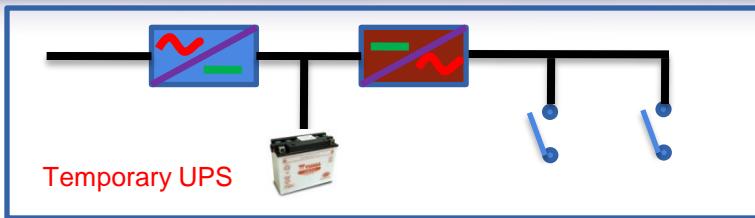


- SWITCHING LOAD FROM EXISTING UPS TO TEMPORARY UPS.

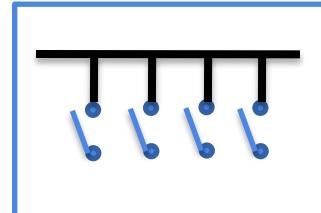
Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.



Temporary Distribution panel



Turn off
Bypass supply



Bypass



Stabilizer

SBS

UPSNo.1



SBS

UPSNo.2



SBS

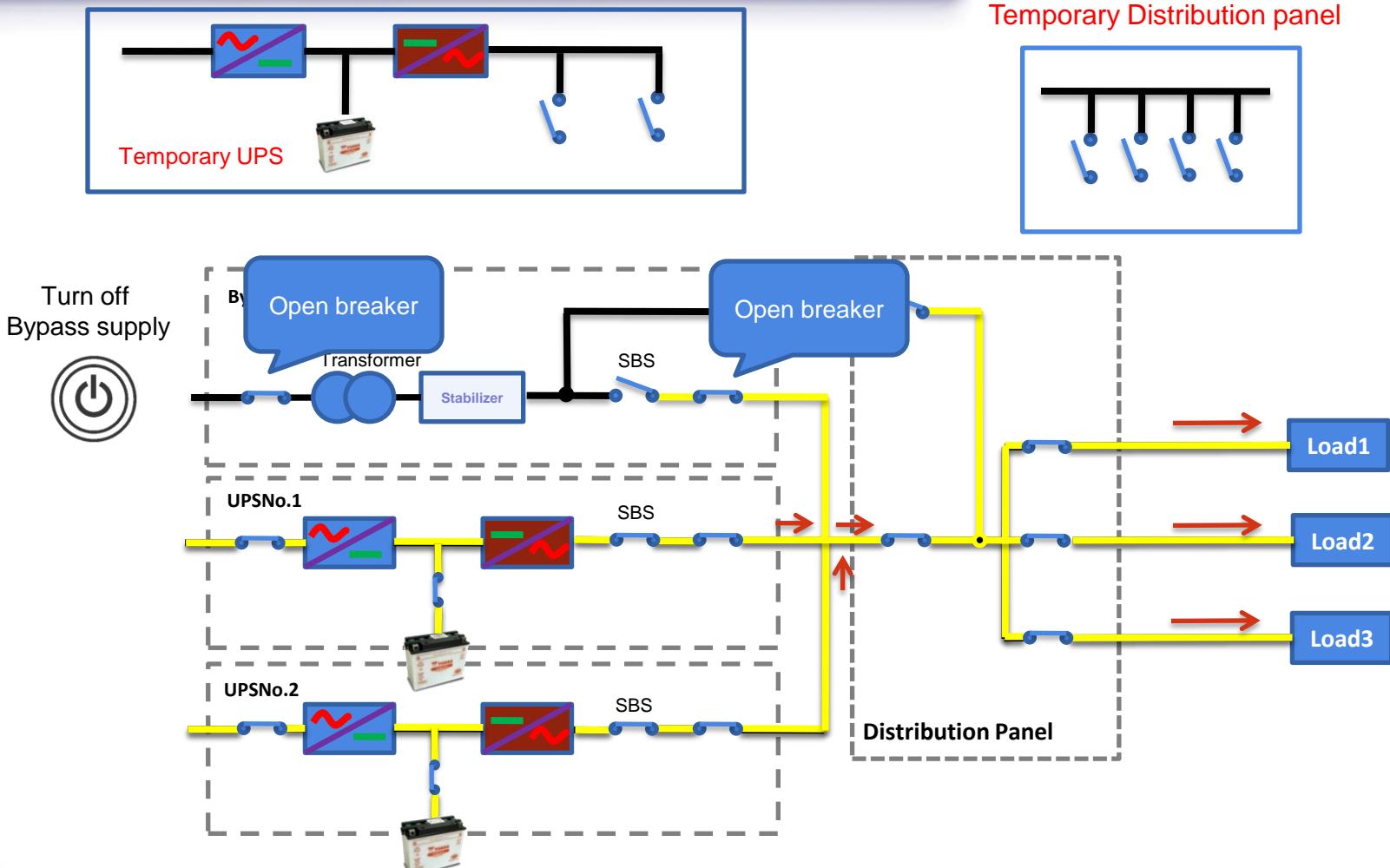
Distribution Panel

Load1

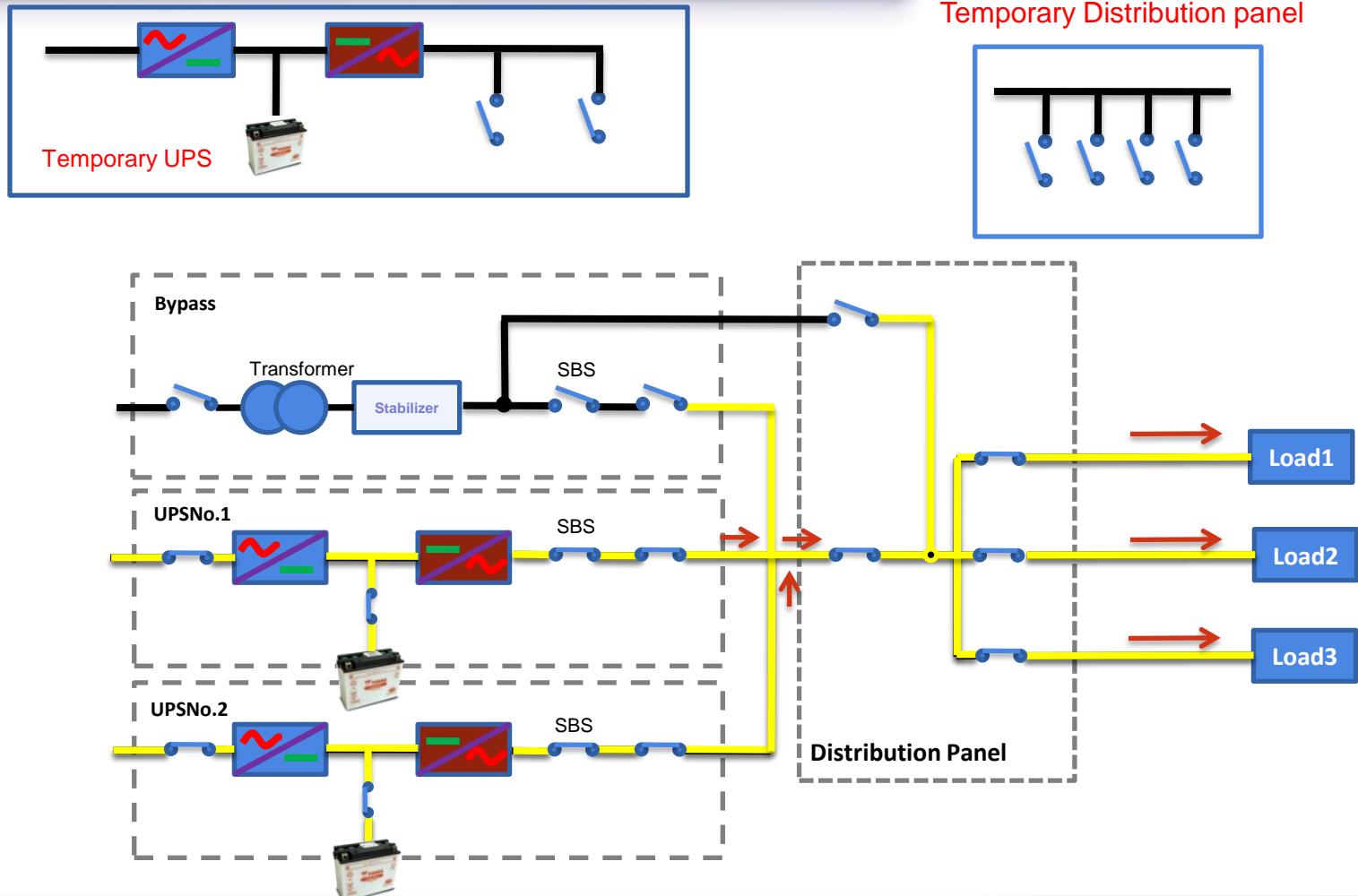
Load2

Load3

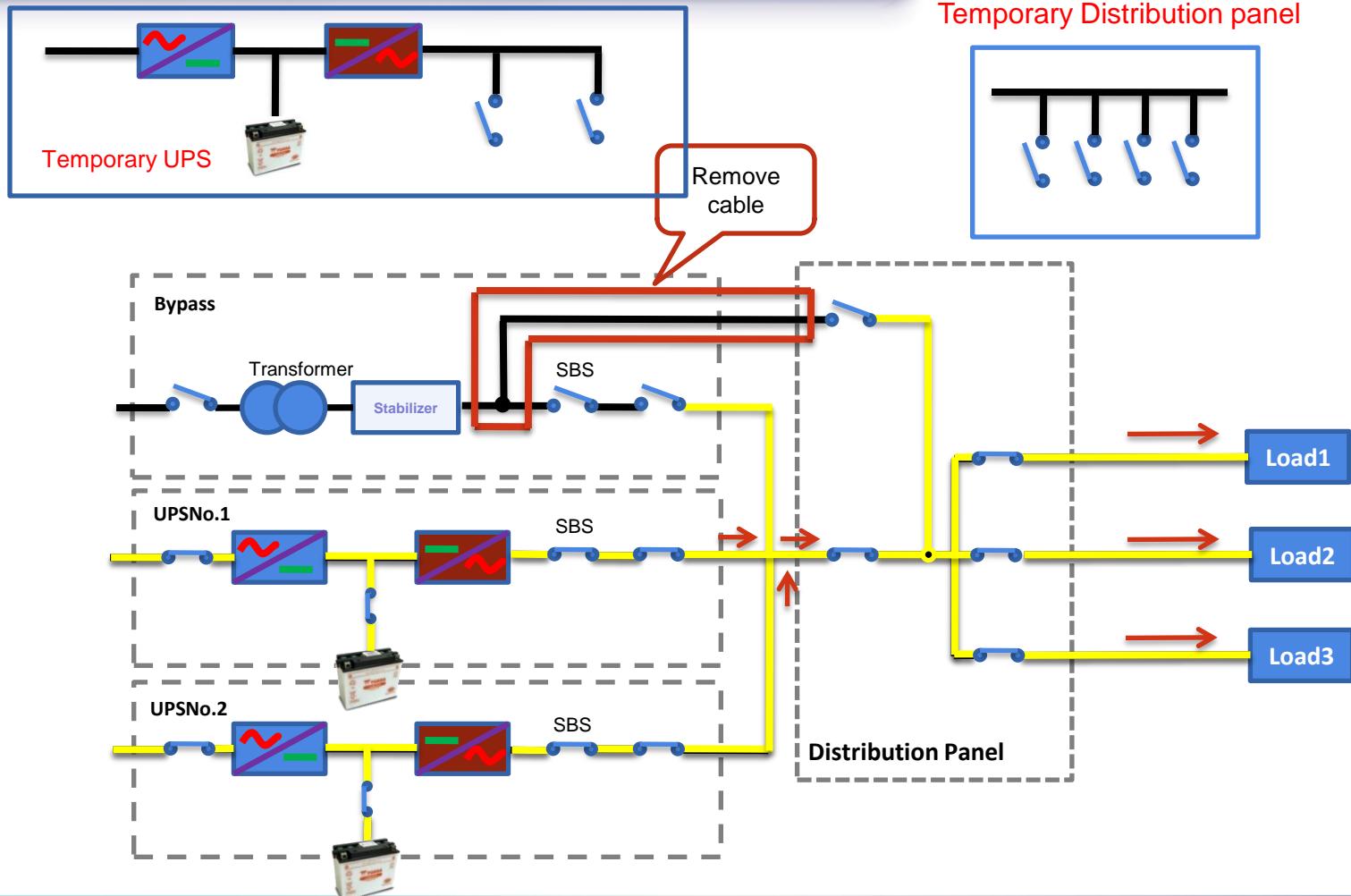
Switching Load from existing UPS to Temporary UPS.



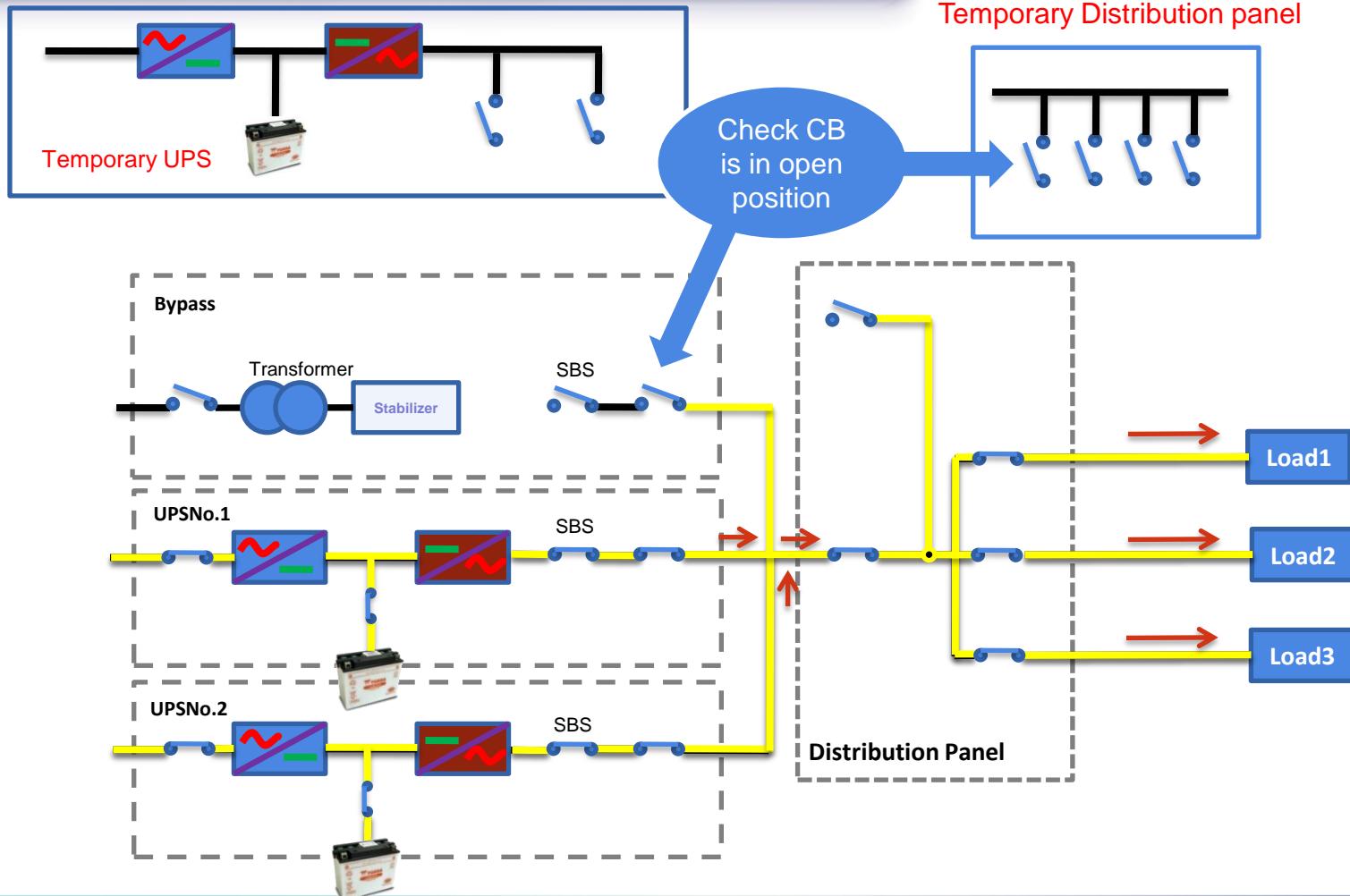
Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.

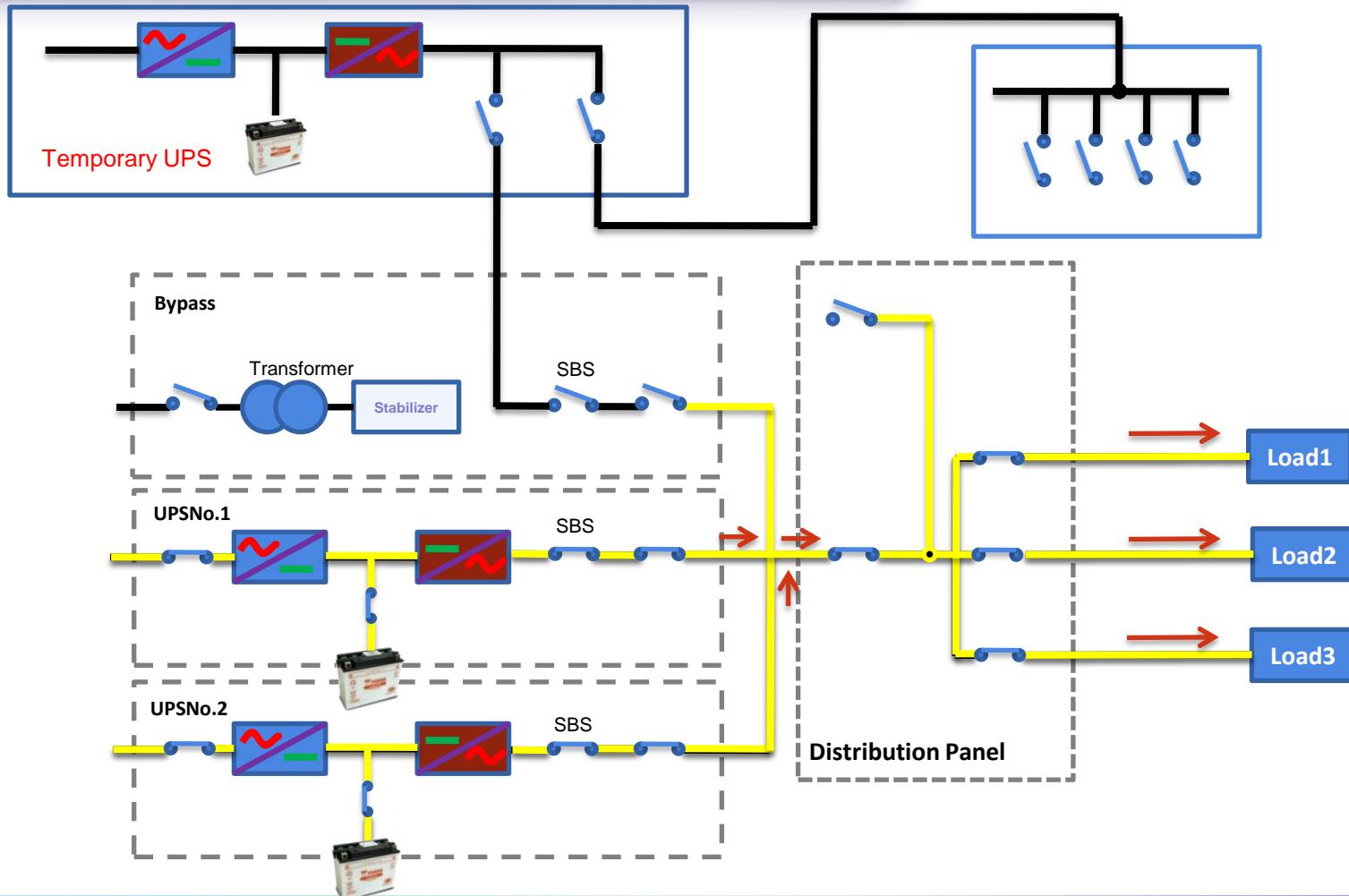


Switching Load from existing UPS to Temporary UPS.

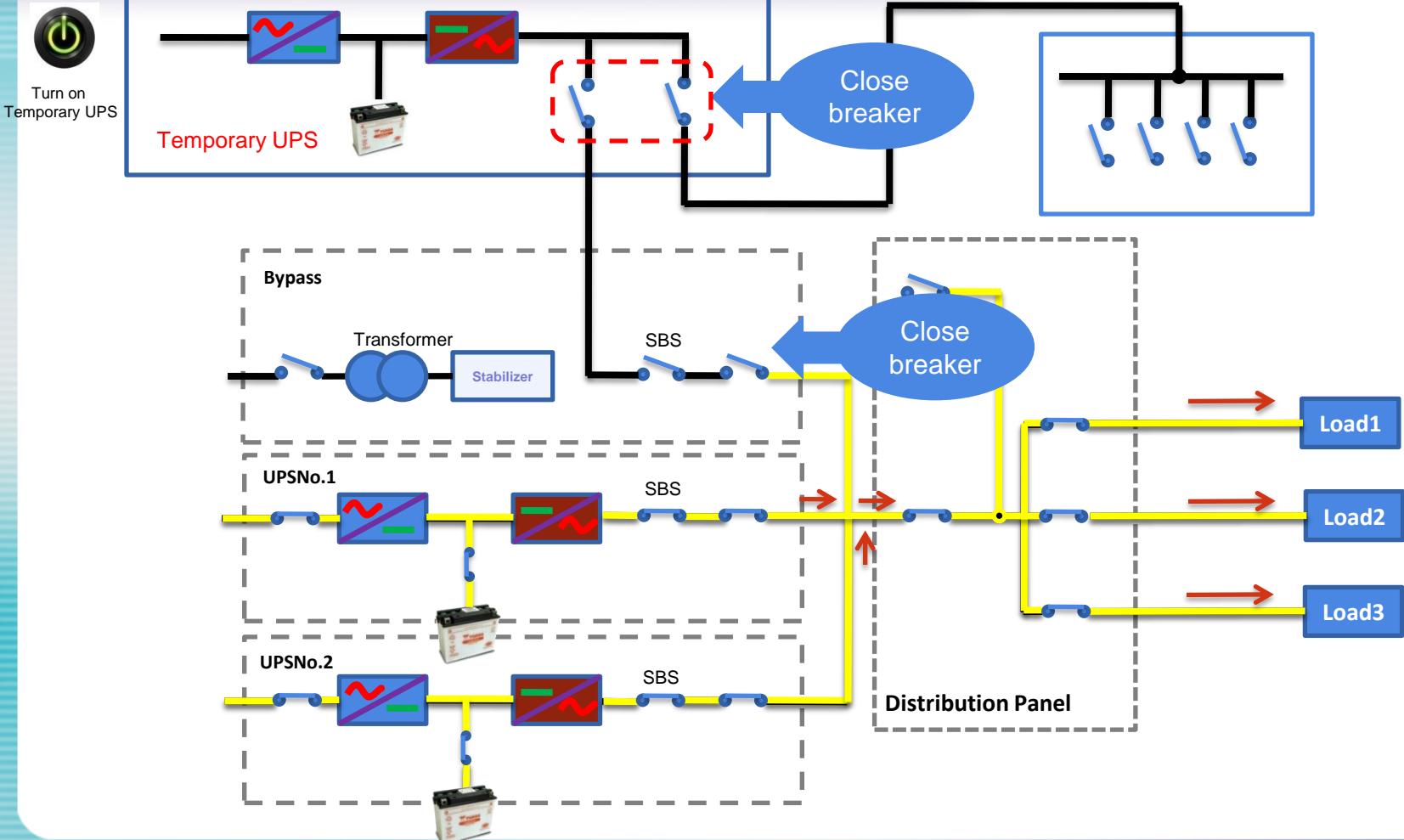


Switching Load from existing UPS to Temporary UPS.

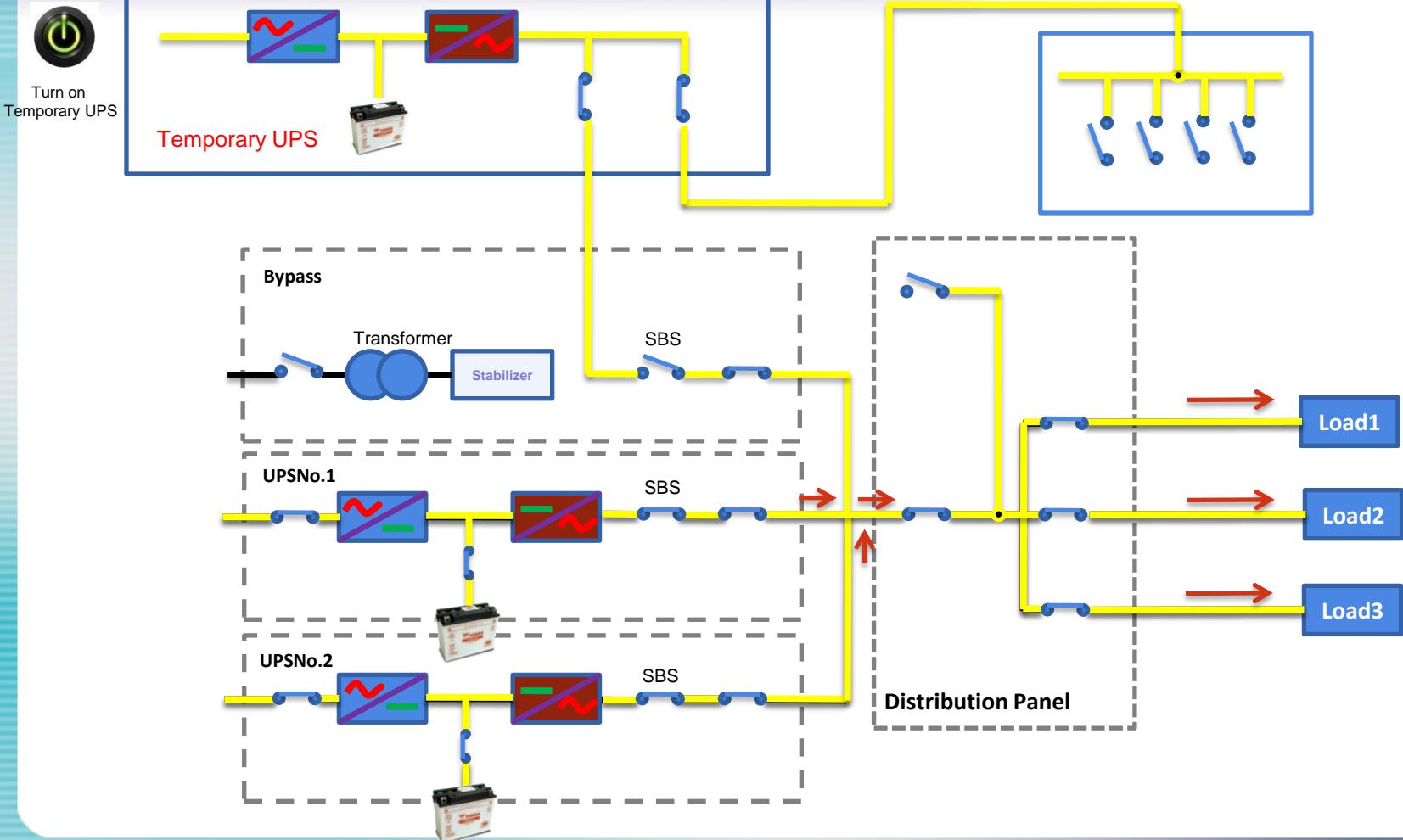
Temporary Distribution panel



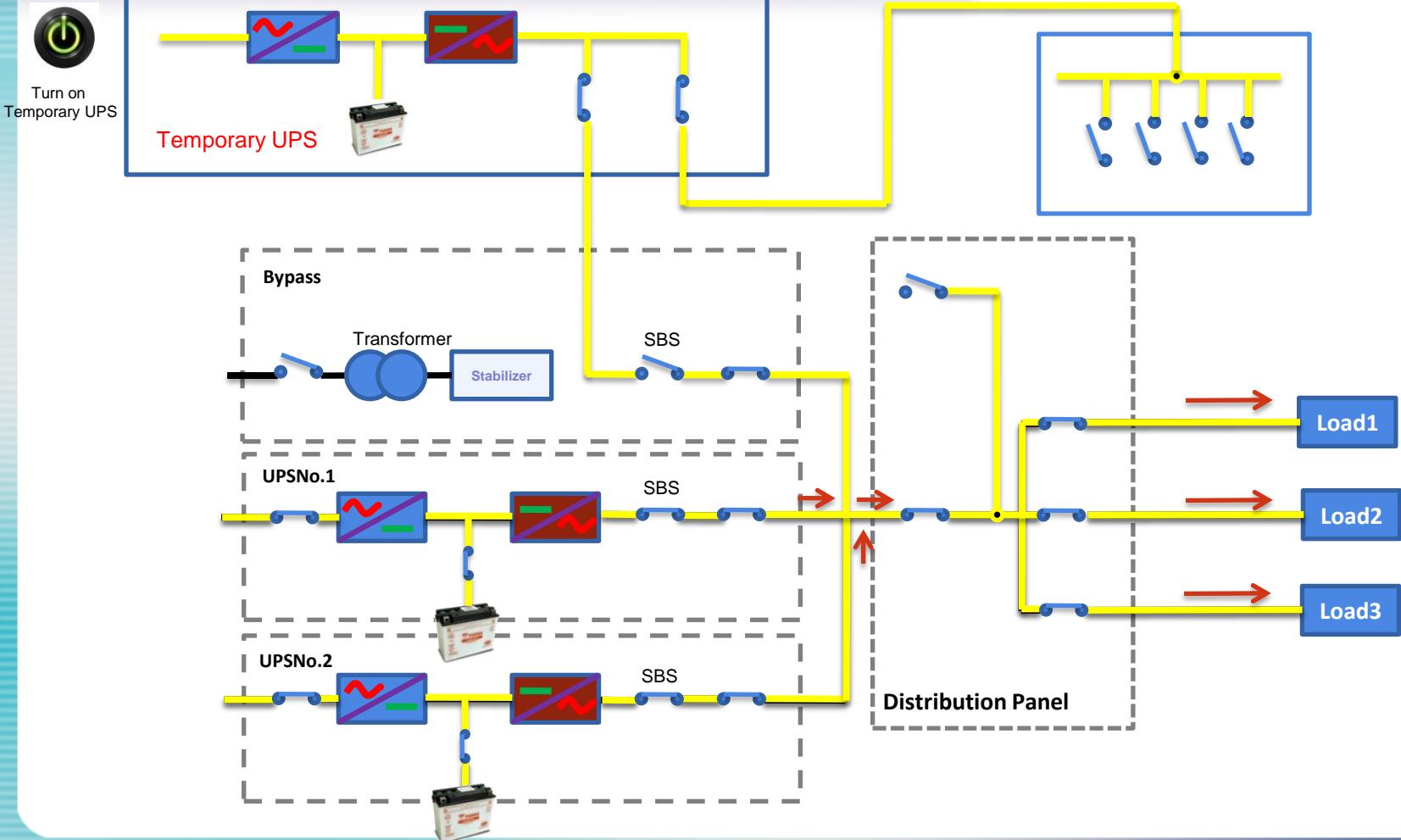
Switching Load from existing UPS to Temporary UPS.



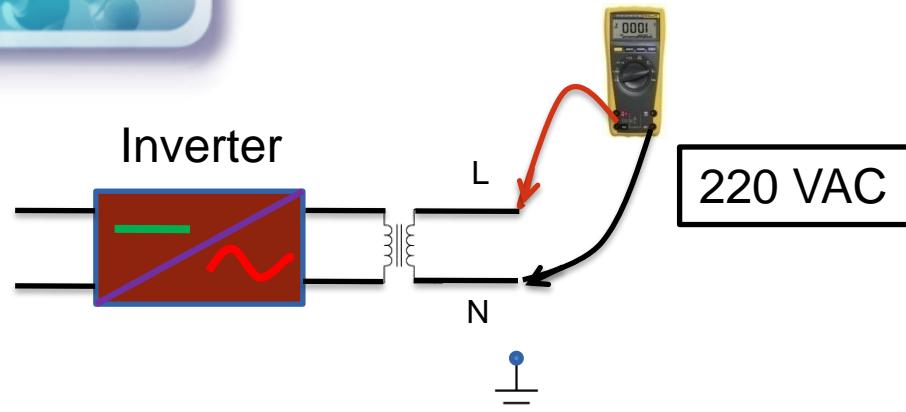
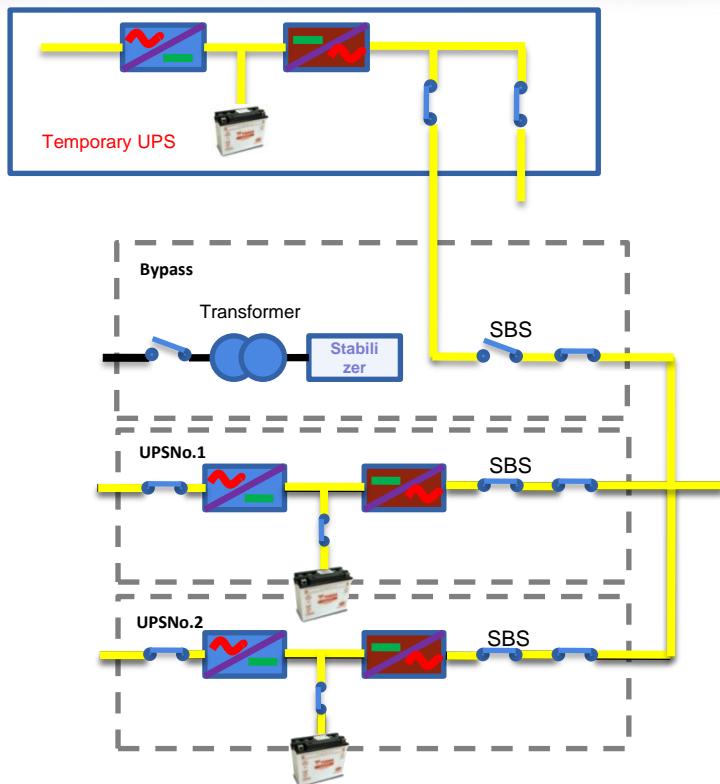
Switching Load from existing UPS to Temporary UPS.



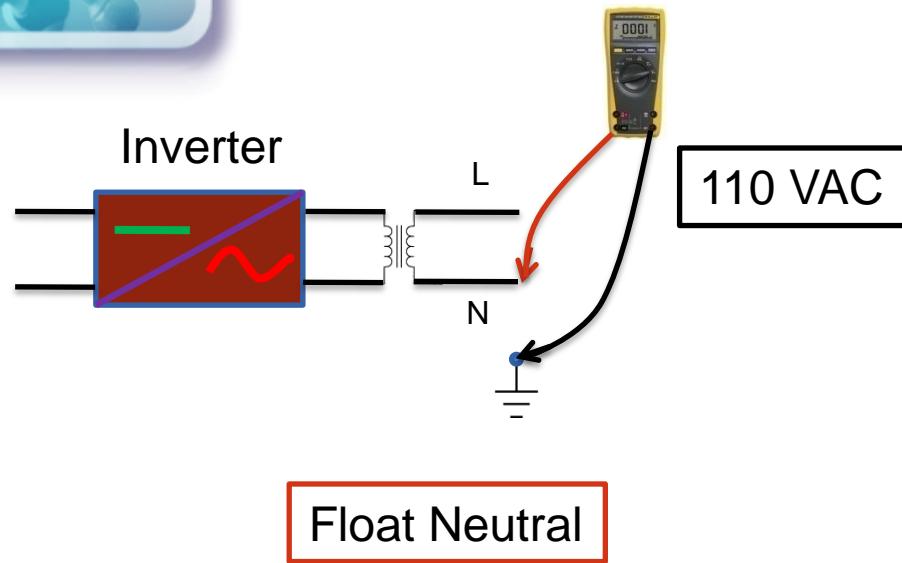
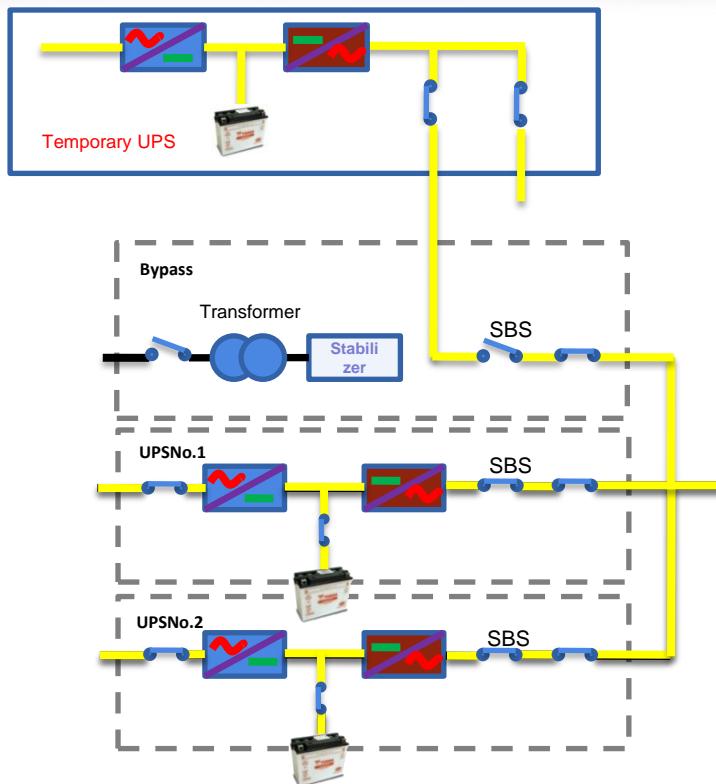
Switching Load from existing UPS to Temporary UPS.



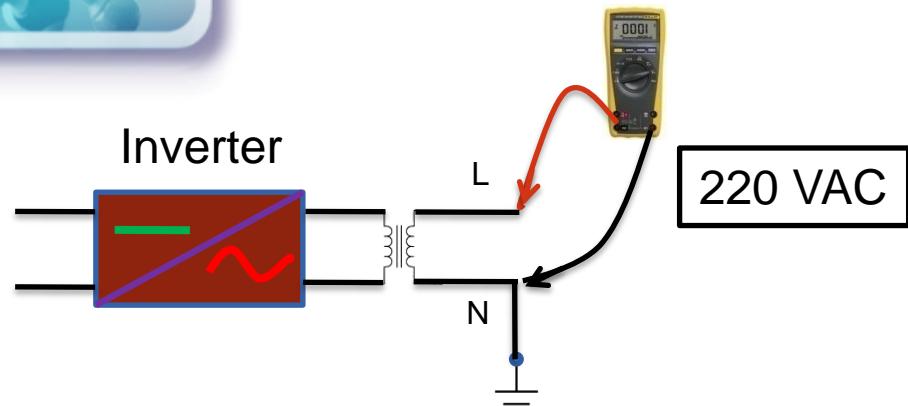
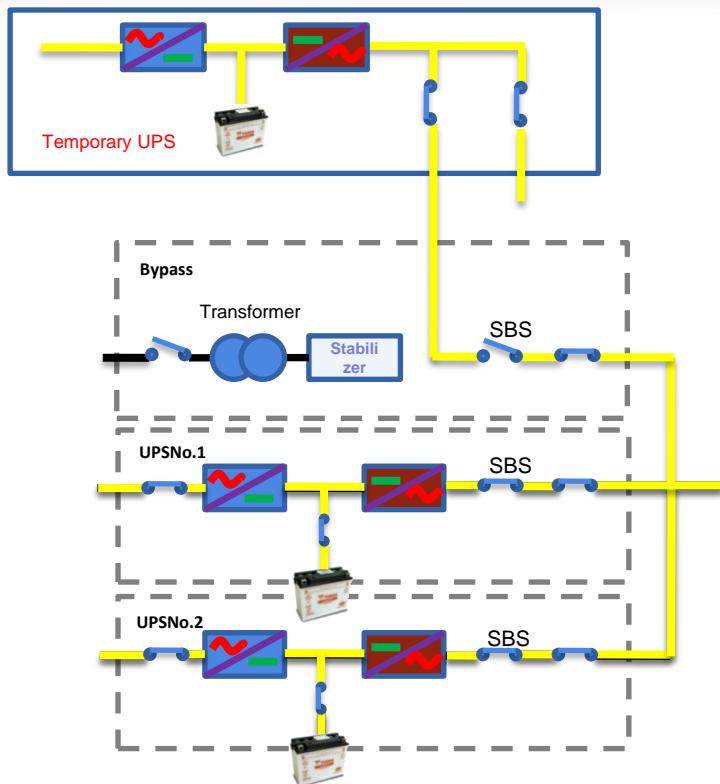
Switching Load from existing UPS to Temporary UPS.



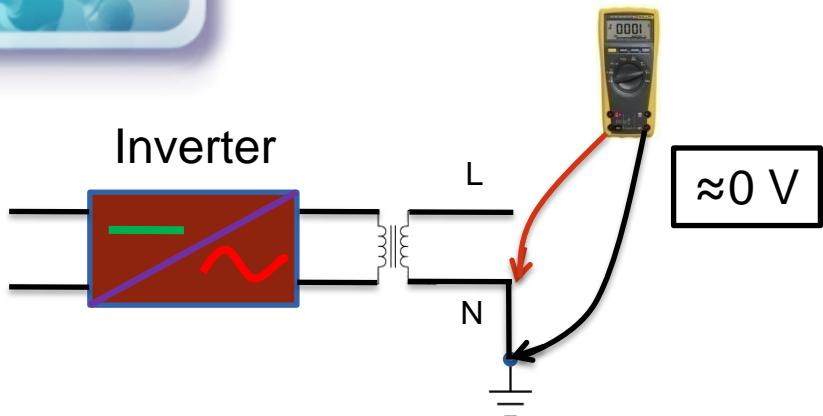
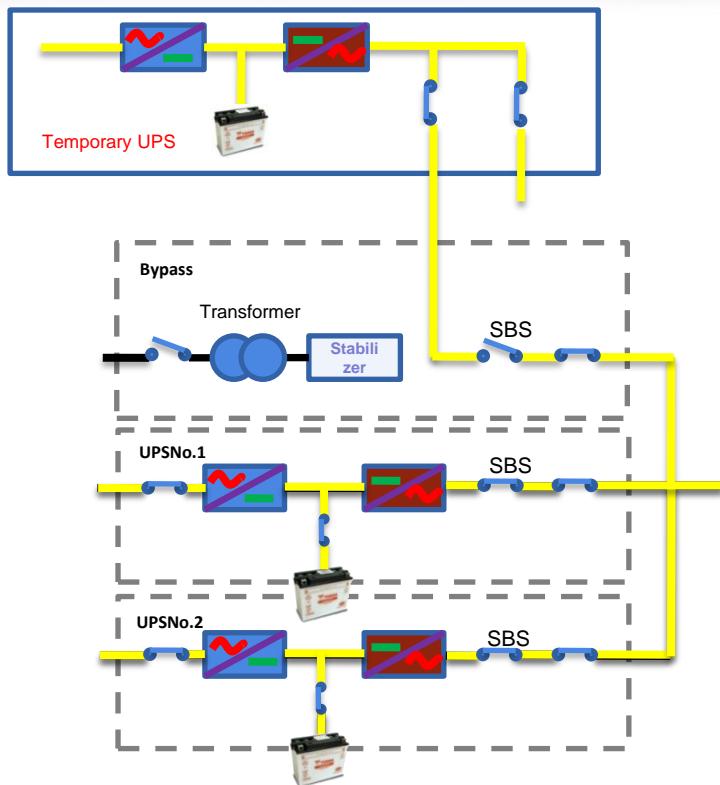
Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.



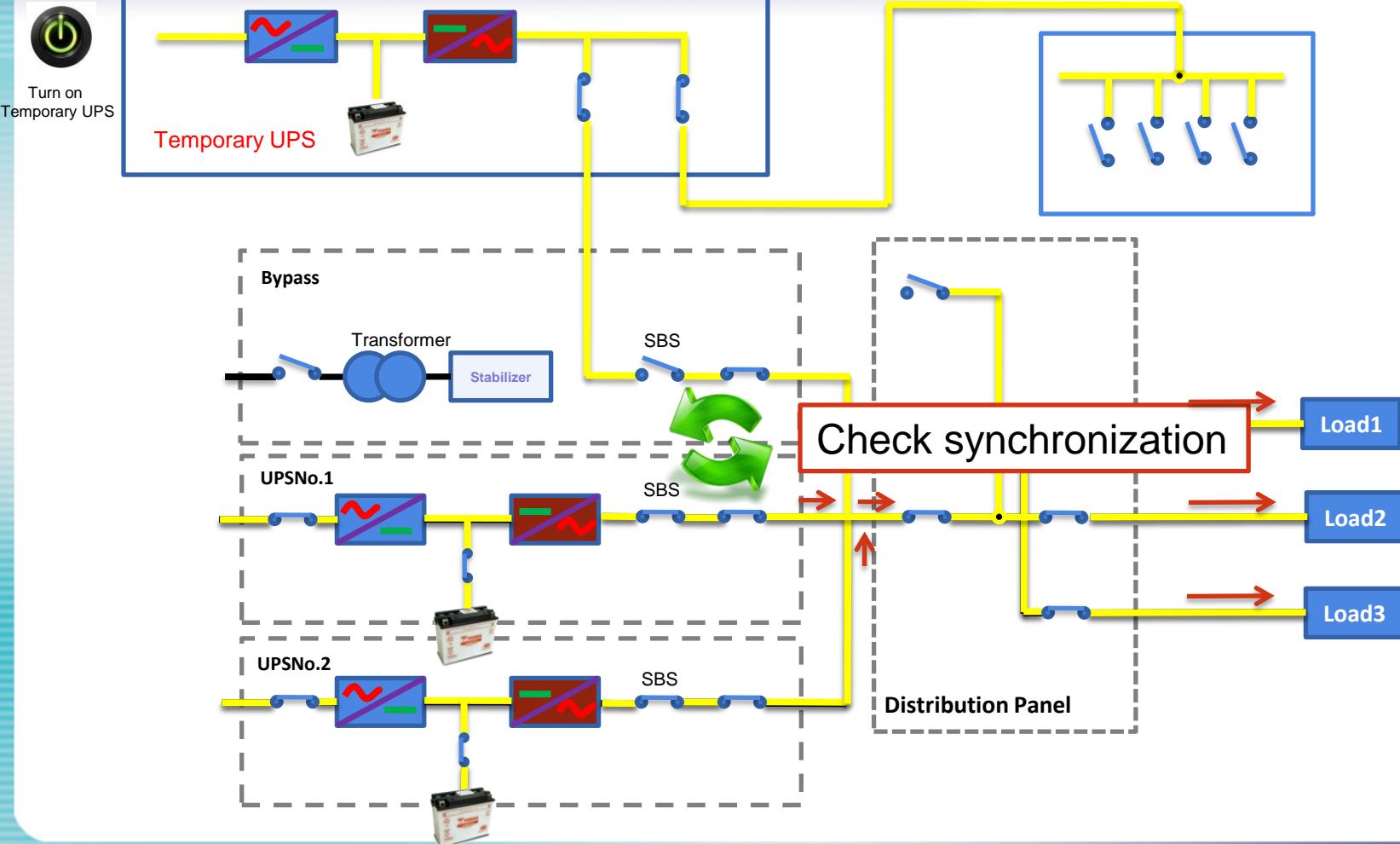
Switching Load from existing UPS to Temporary UPS.



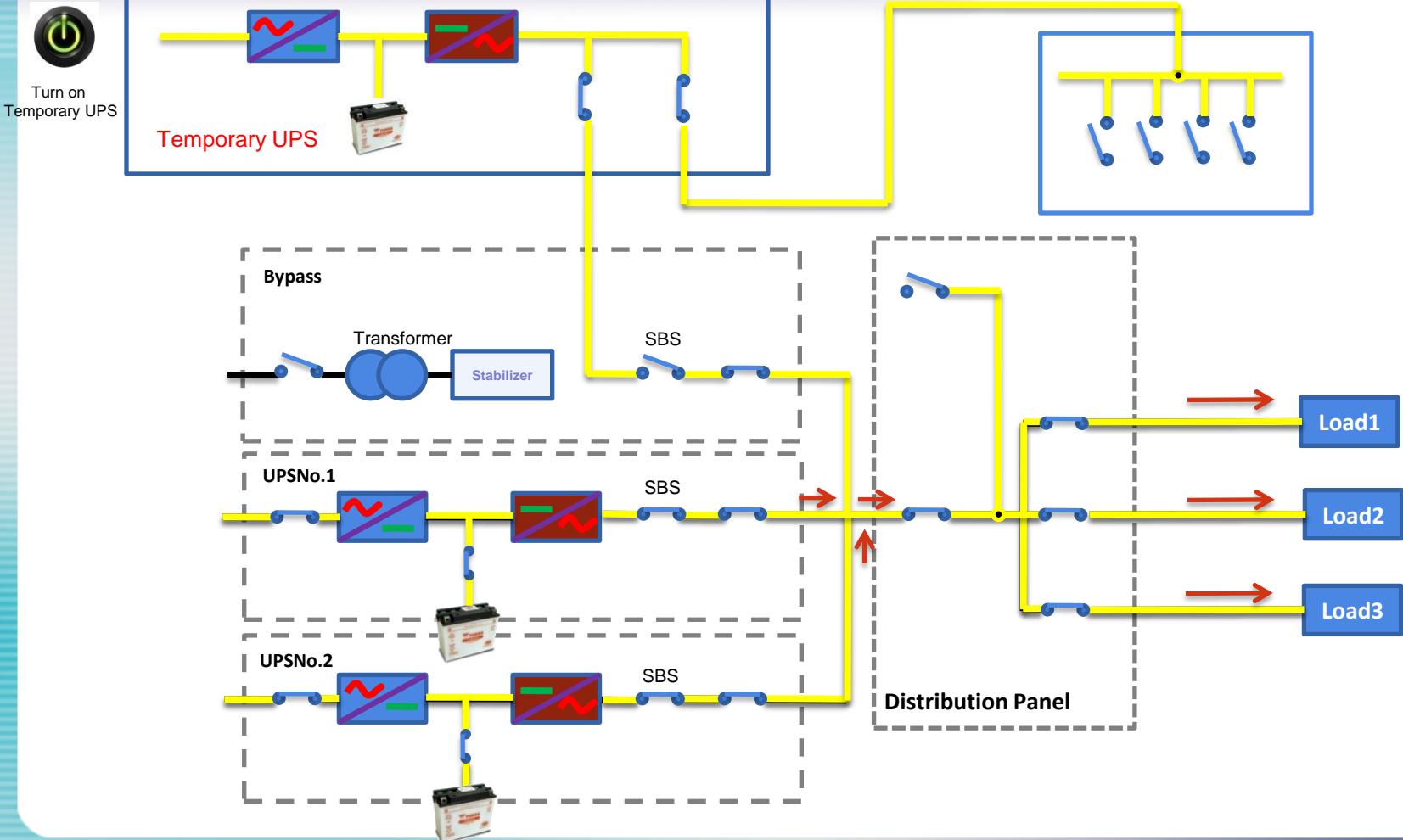
Neutral to ground

Switching Load from existing UPS to Temporary UPS.

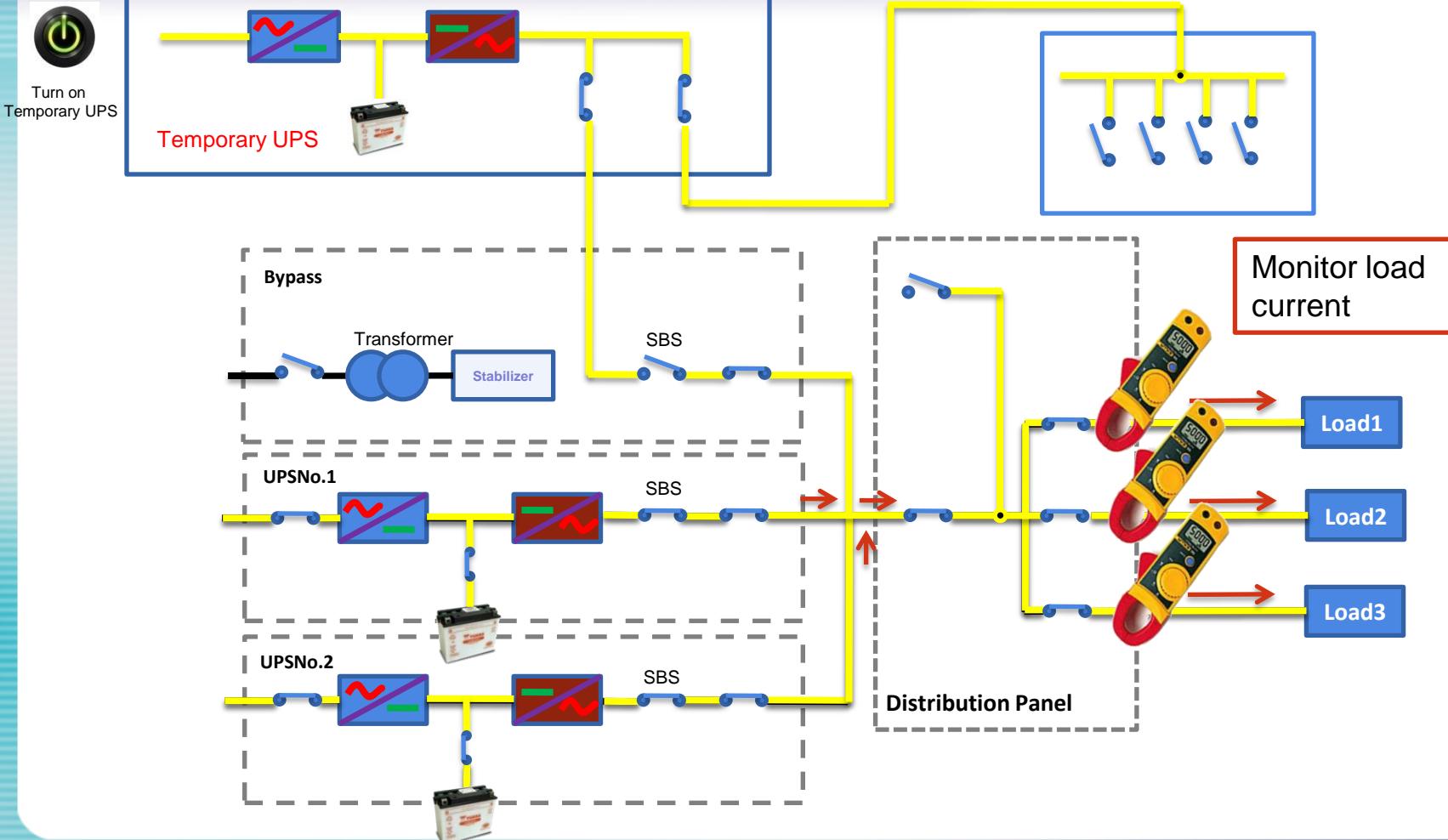
Temporary Distribution panel



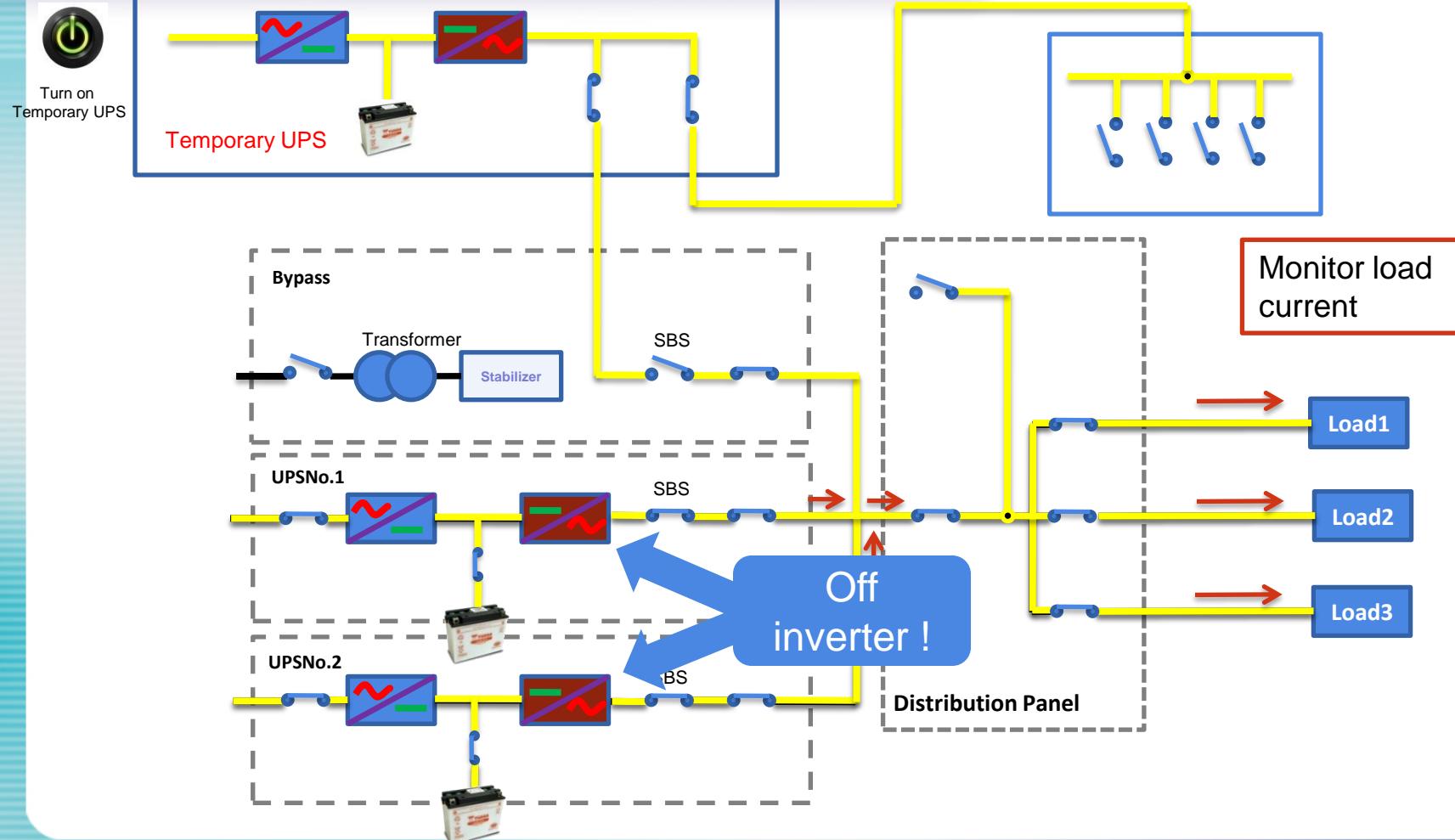
Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.

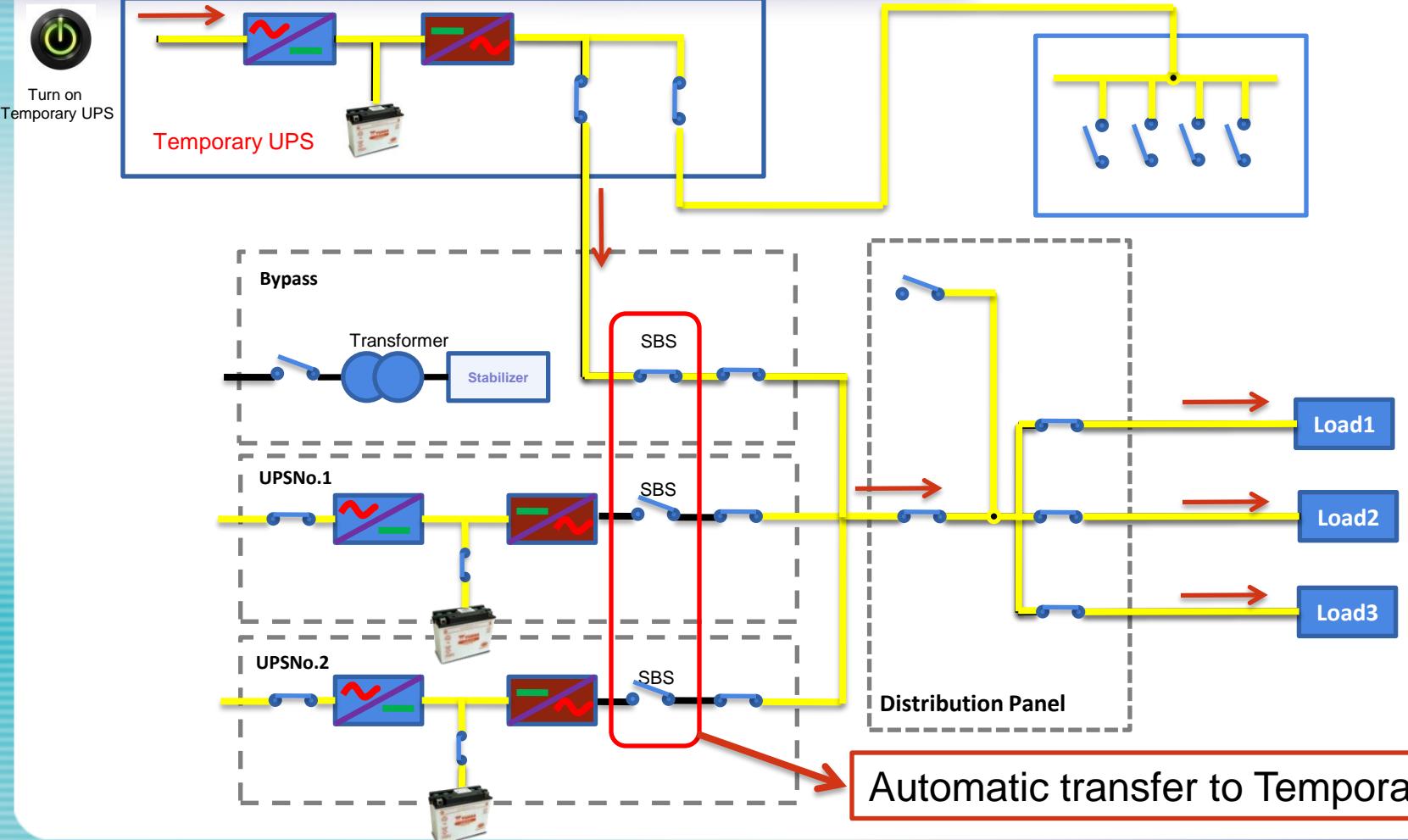


Switching Load from existing UPS to Temporary UPS.



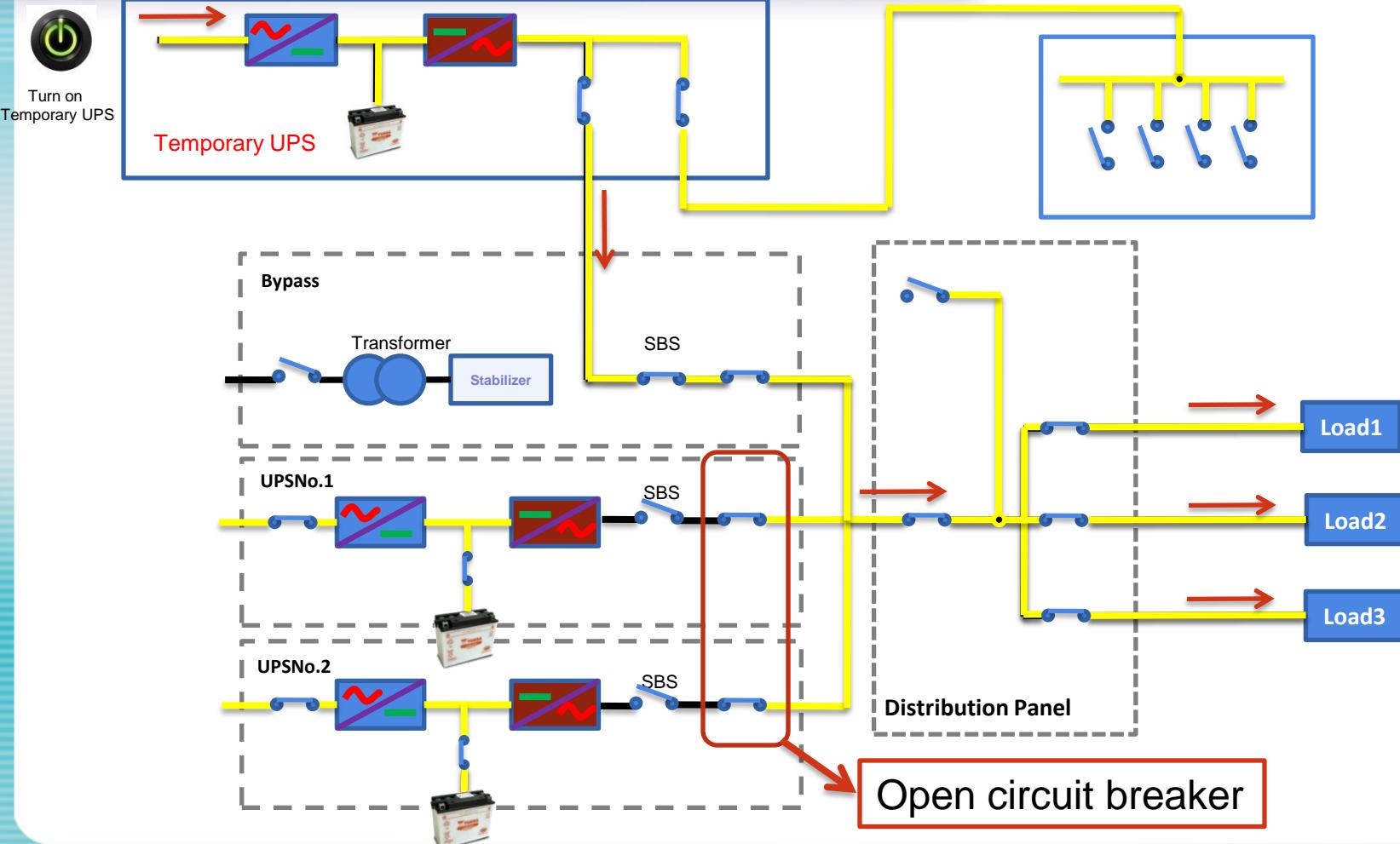
Switching Load from existing UPS to Temporary UPS.

Temporary Distribution panel

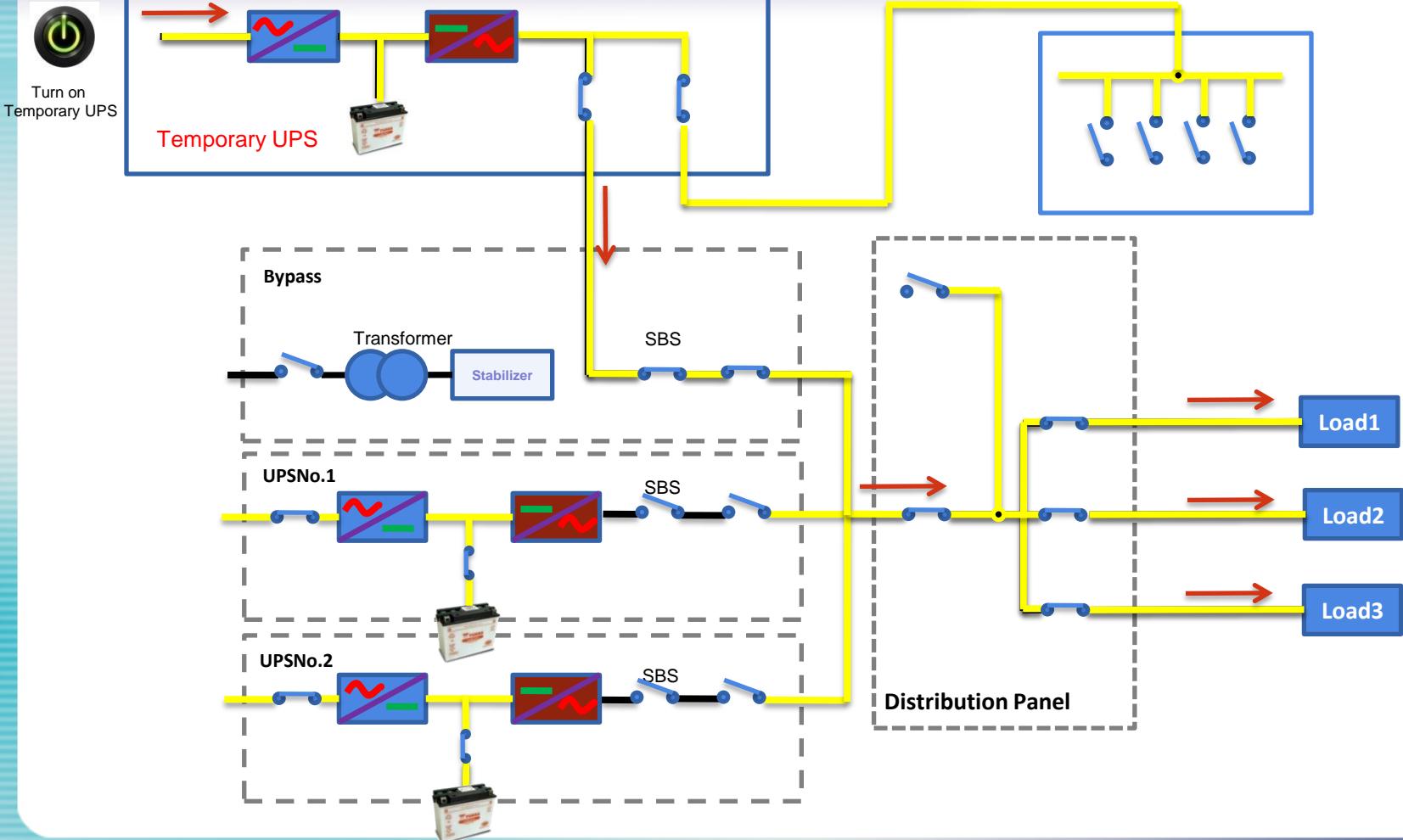


Switching Load from existing UPS to Temporary UPS.

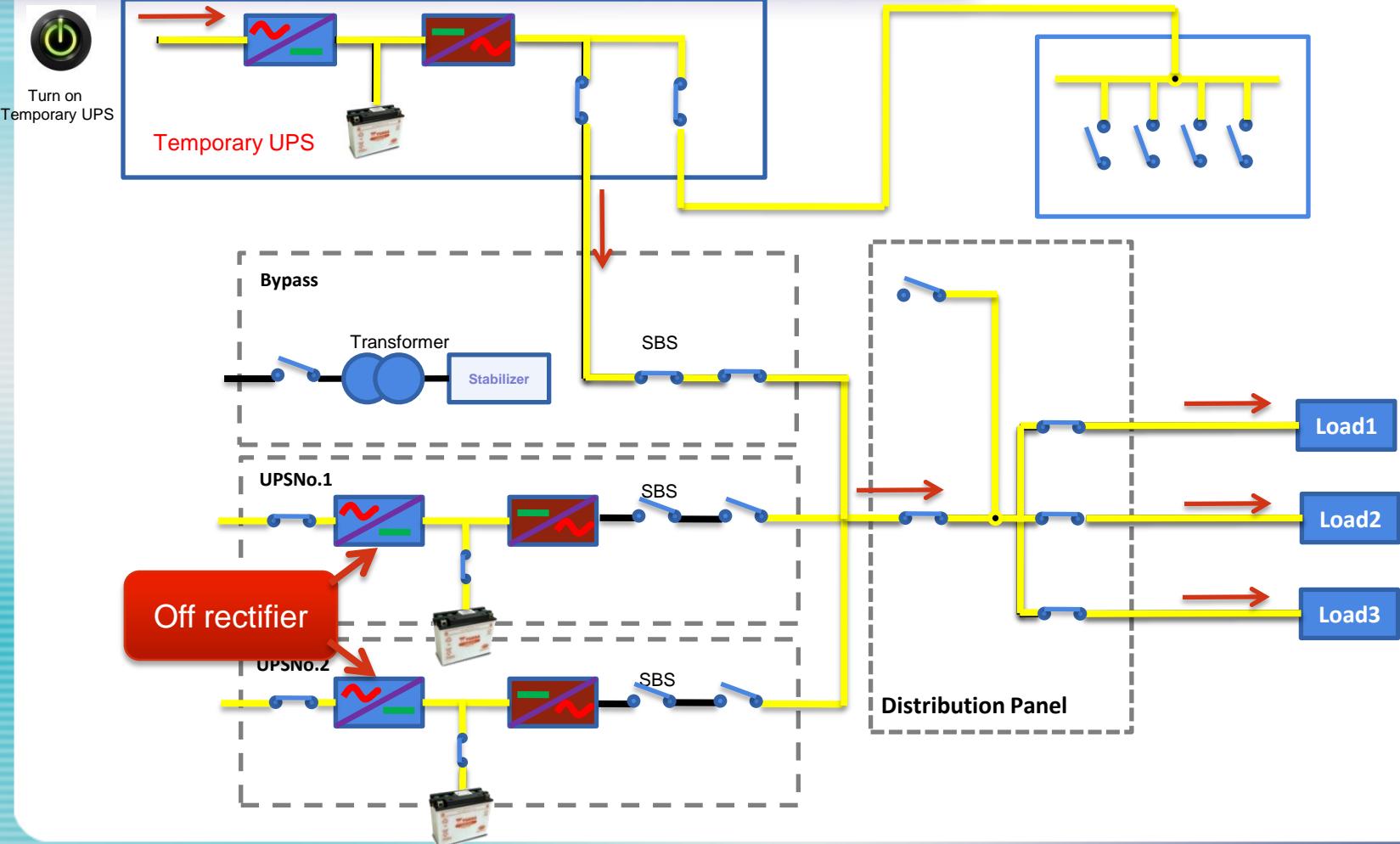
Temporary Distribution panel



Switching Load from existing UPS to Temporary UPS.

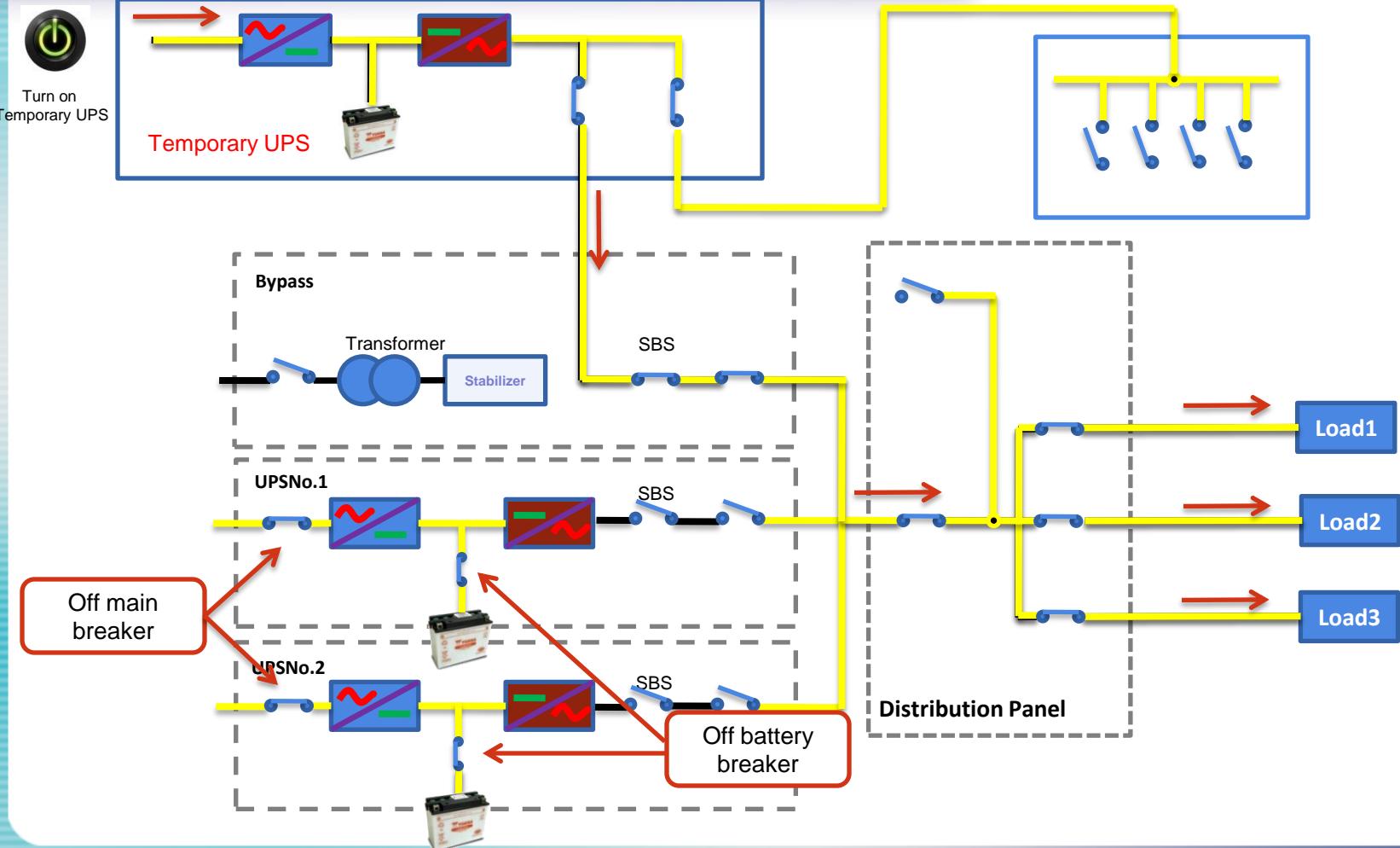


Switching Load from existing UPS to Temporary UPS.



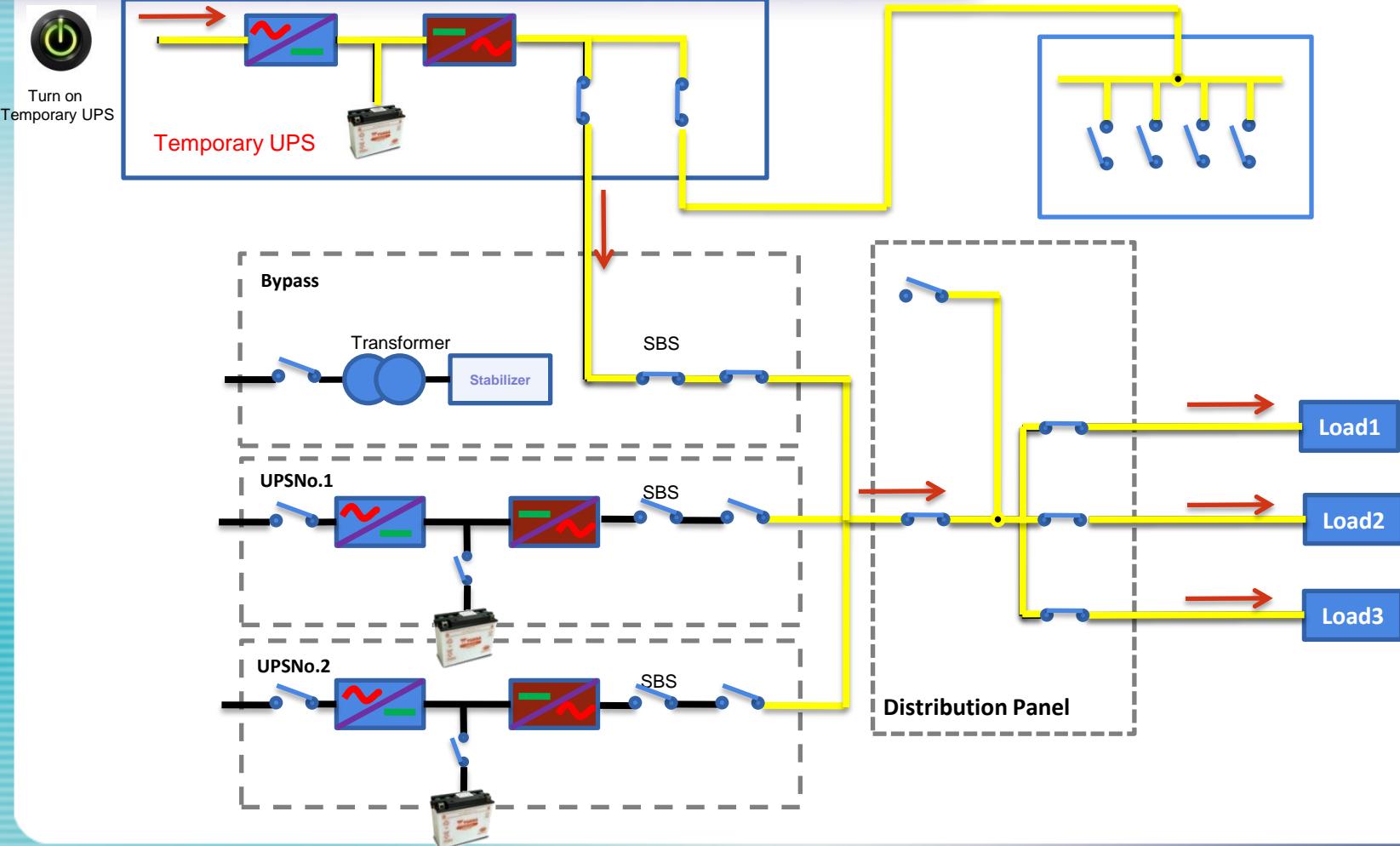
Switching Load from existing UPS to Temporary UPS.

Temporary Distribution panel

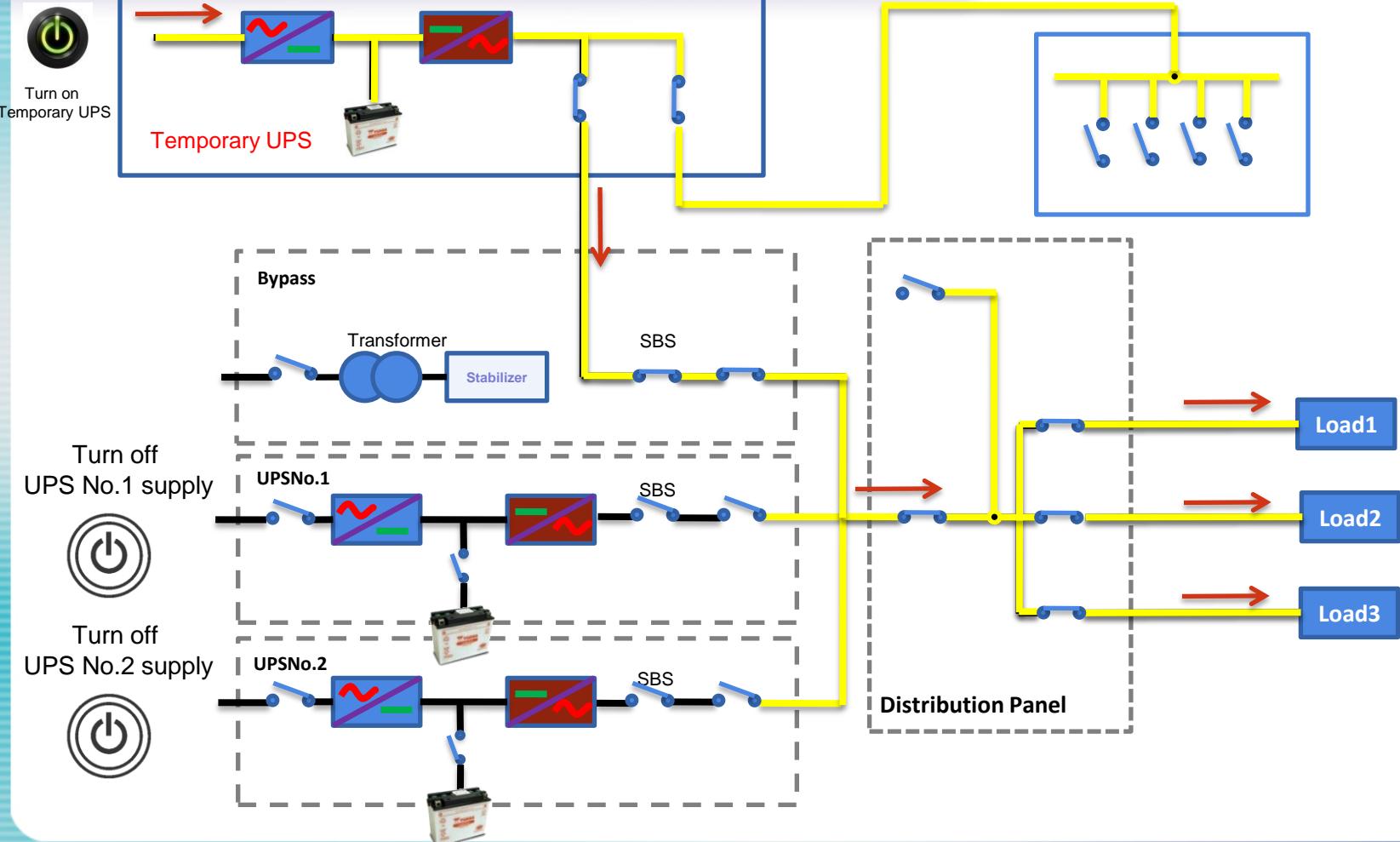


Switching Load from existing UPS to Temporary UPS.

Temporary Distribution panel



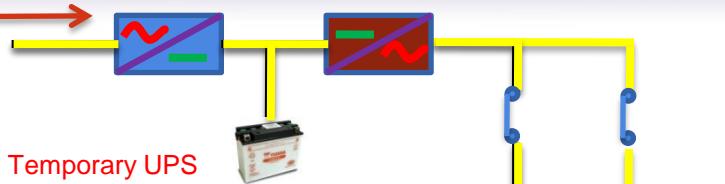
Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.

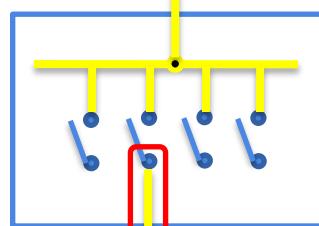


Turn on
Temporary UPS



Temporary UPS

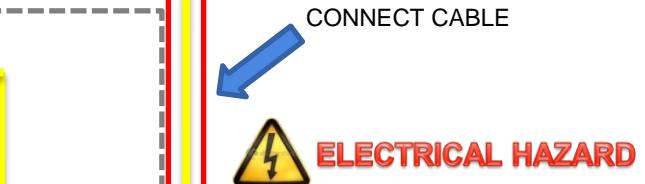
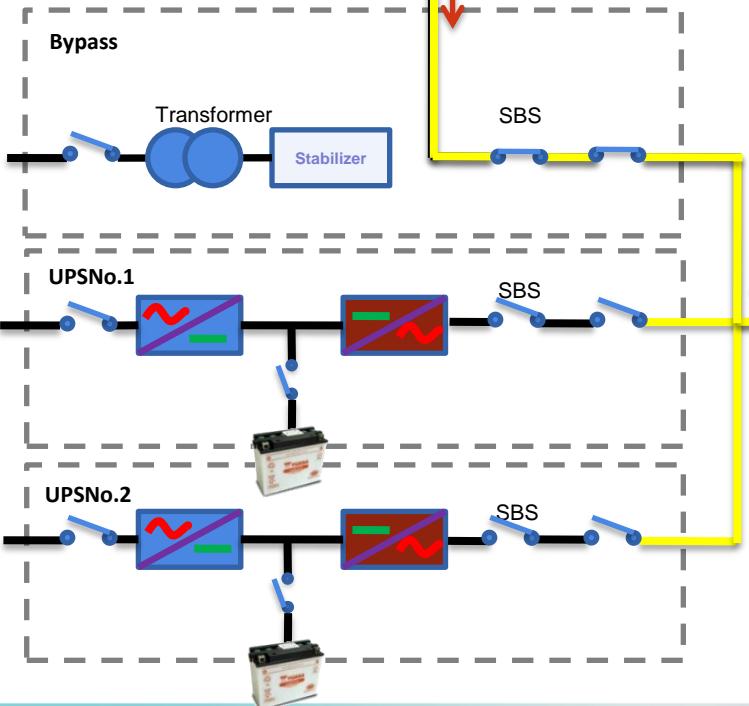
Temporary Distribution panel



Turn off
UPS No.1 supply



Turn off
UPS No.2 supply



Distribution Panel

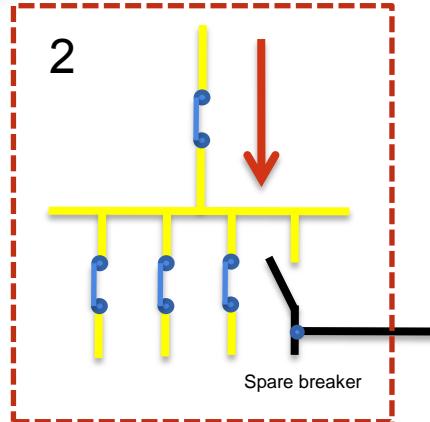
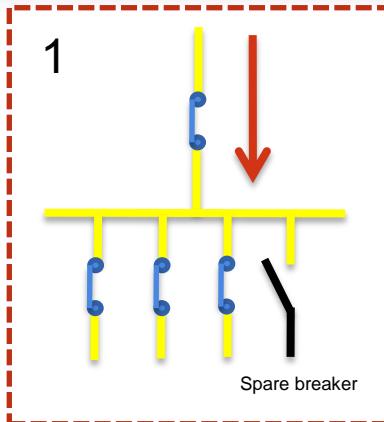
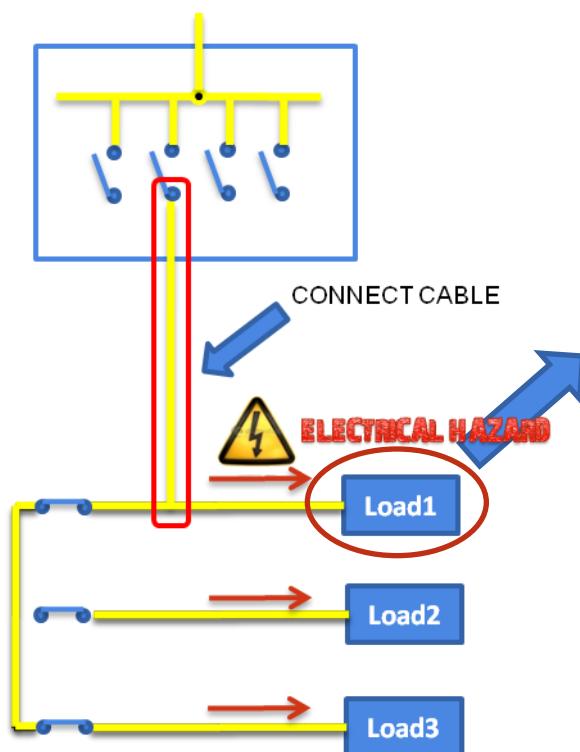
Load1

Load2

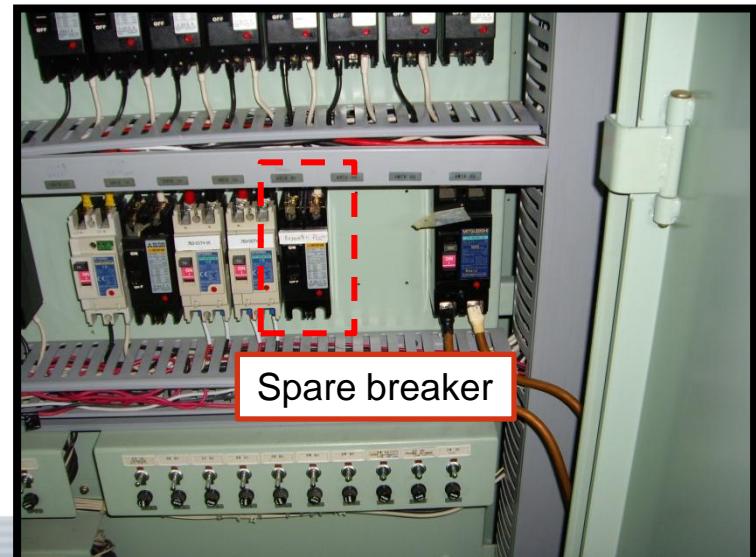
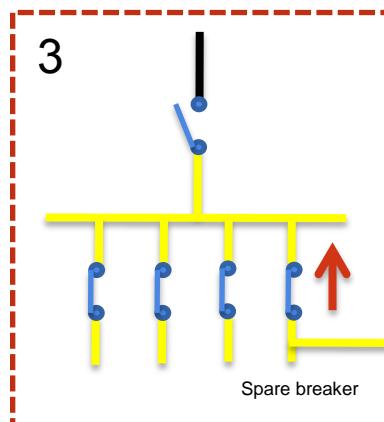
Load3

Switching Load from existing UPS to Temporary UPS.

Temporary Distribution panel

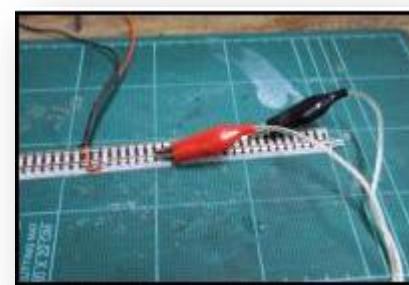
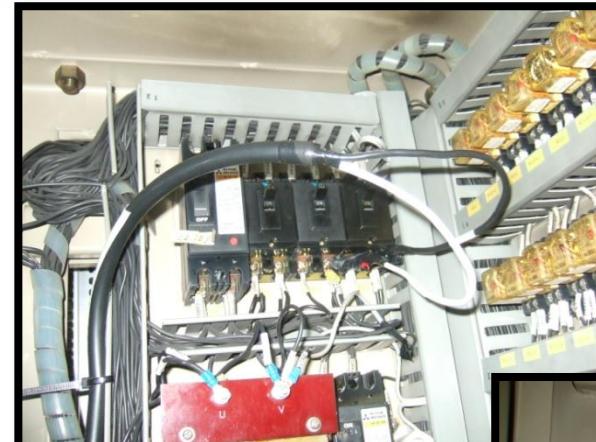
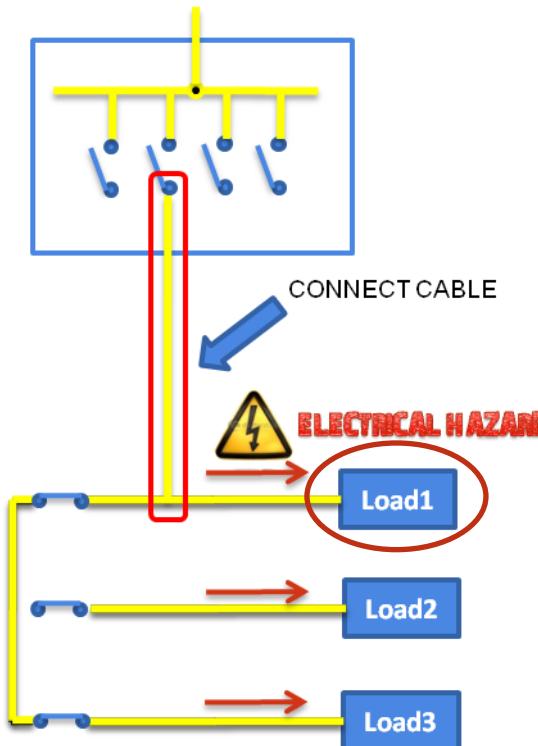


Cable from tempo distribution panel



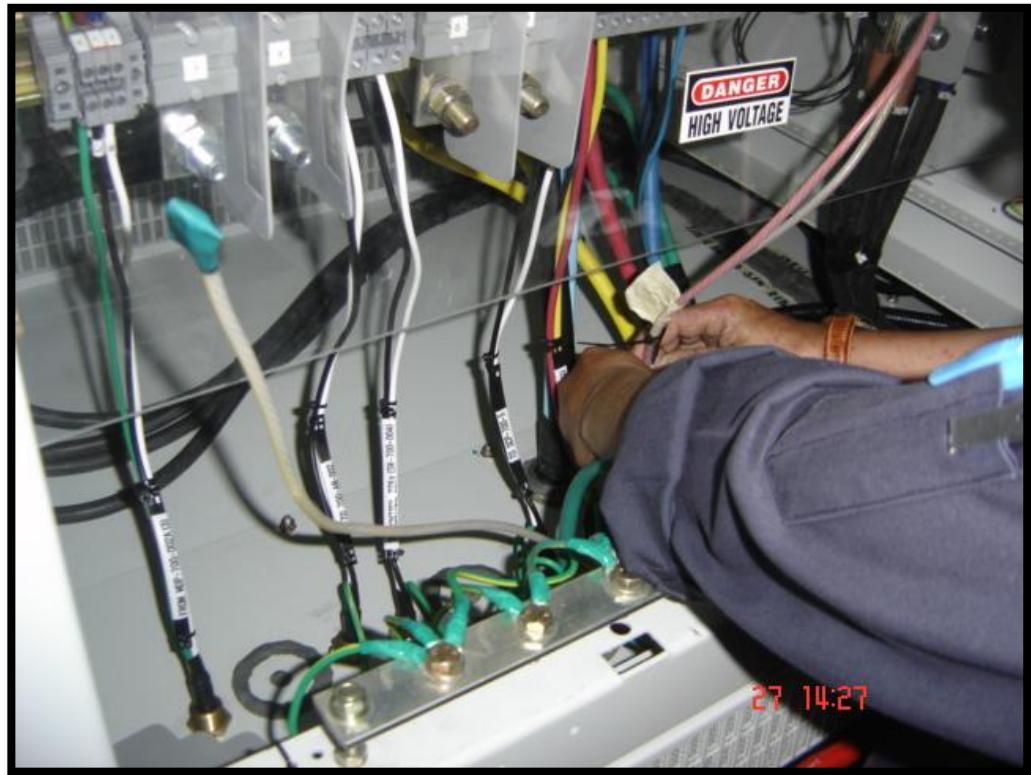
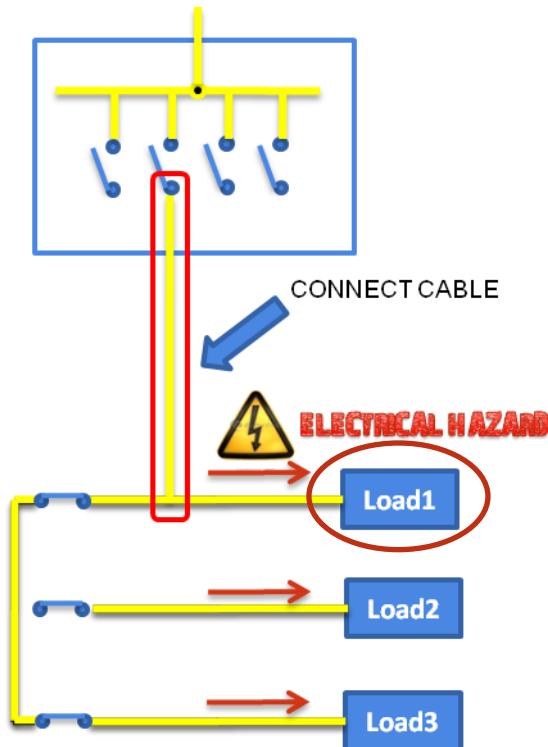
Switching Load from existing UPS to Temporary UPS.

Temporary Distribution panel

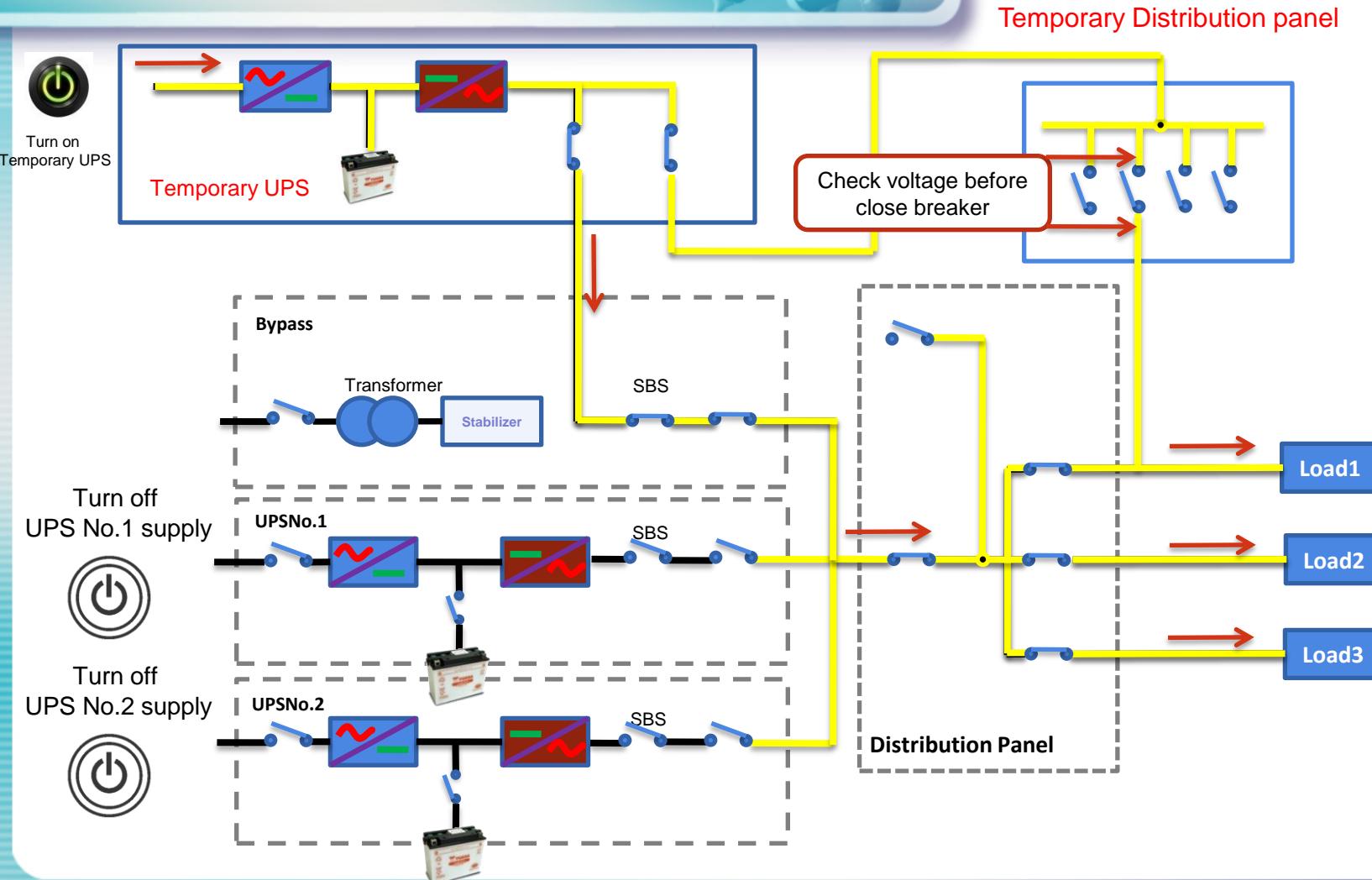


Switching Load from existing UPS to Temporary UPS.

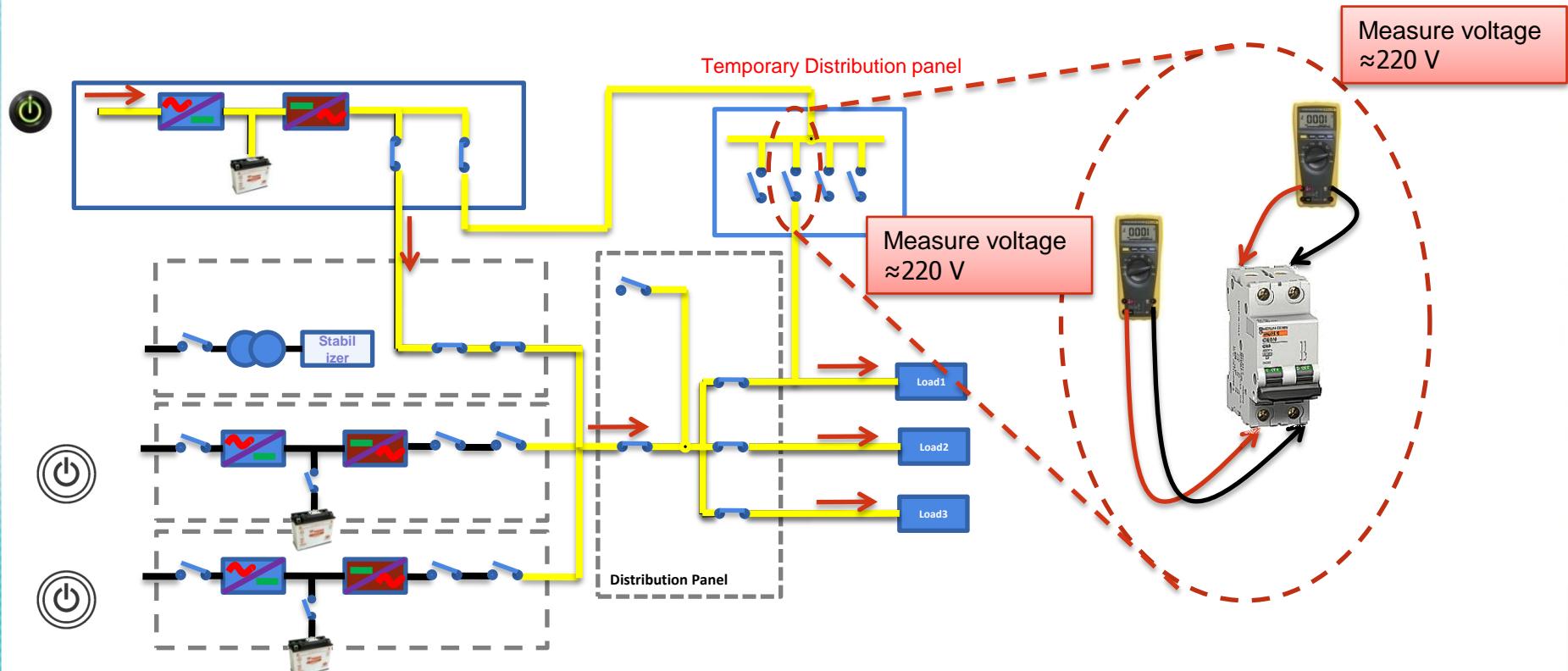
Temporary Distribution panel



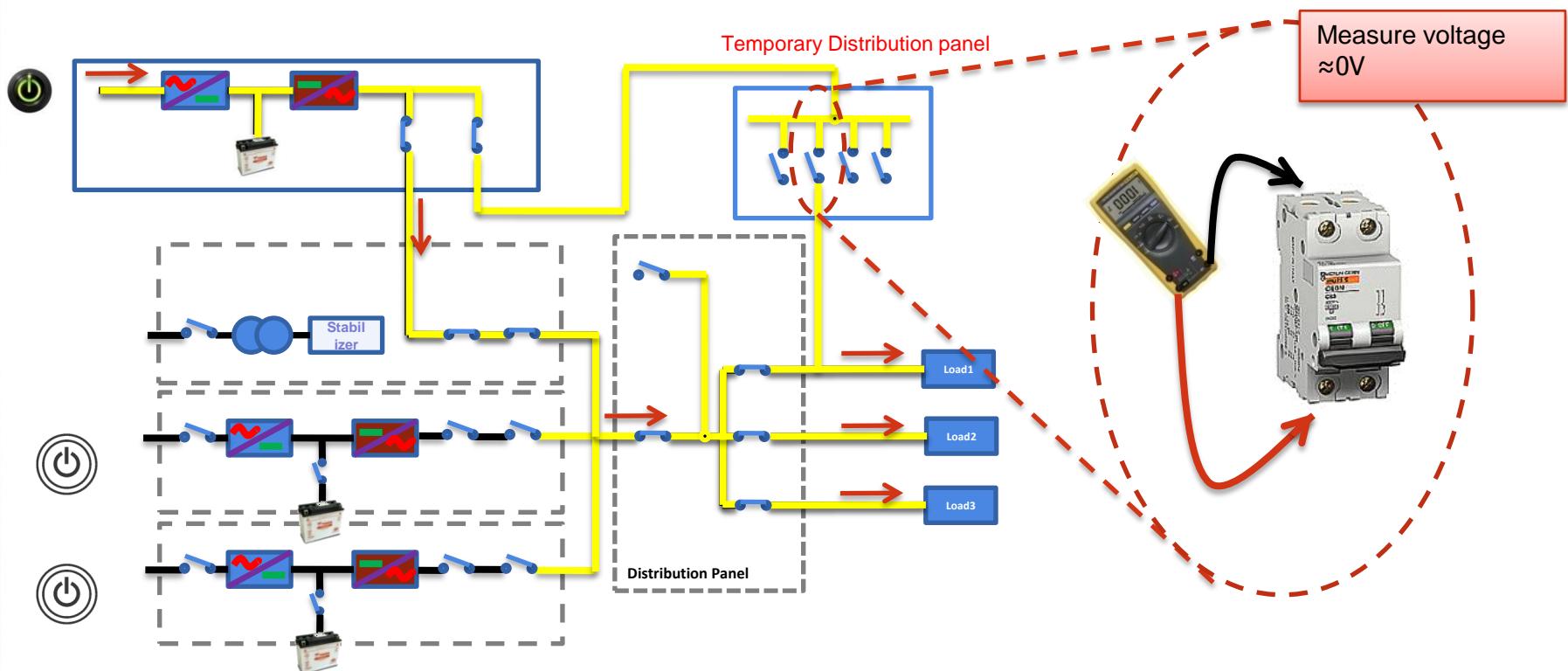
Switching Load from existing UPS to Temporary UPS.



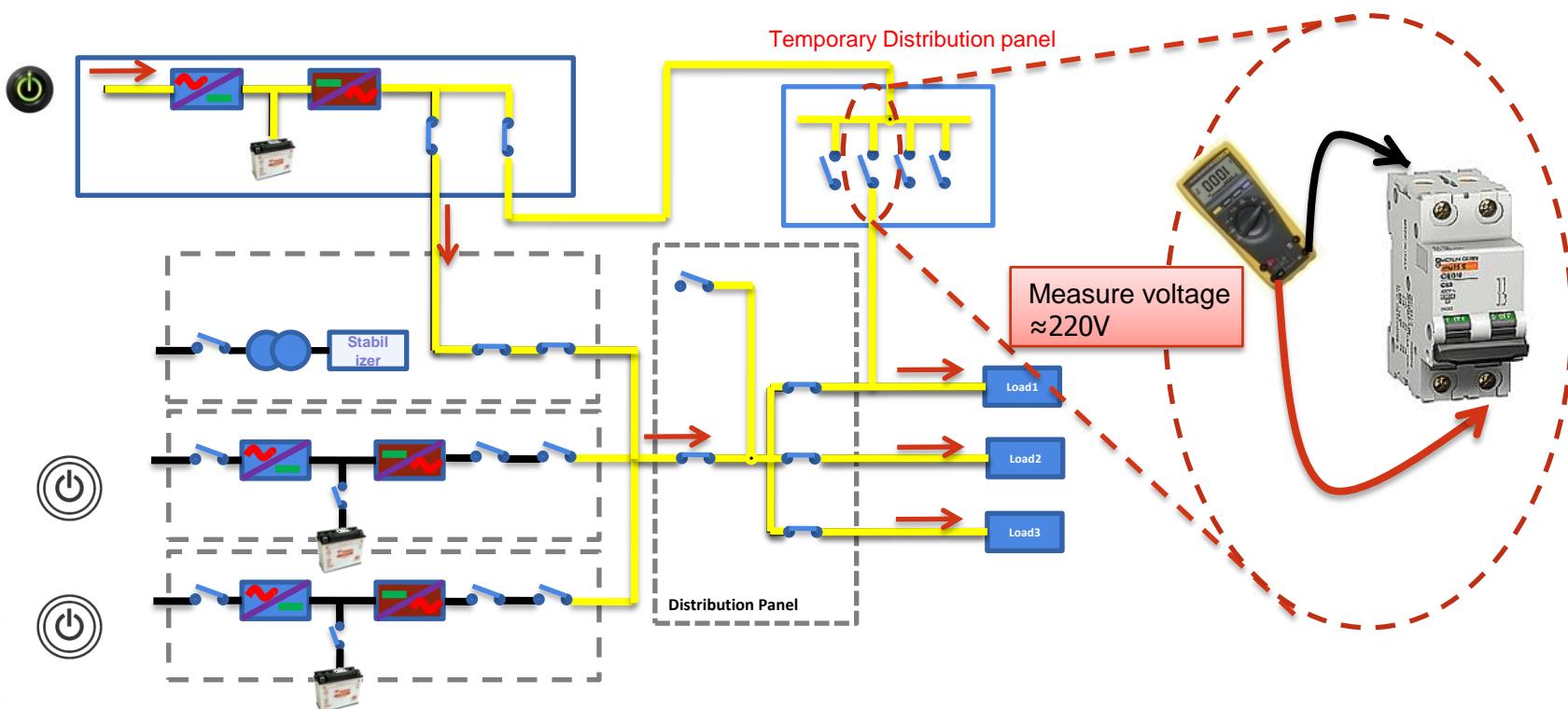
Switching Load from existing UPS to Temporary UPS.



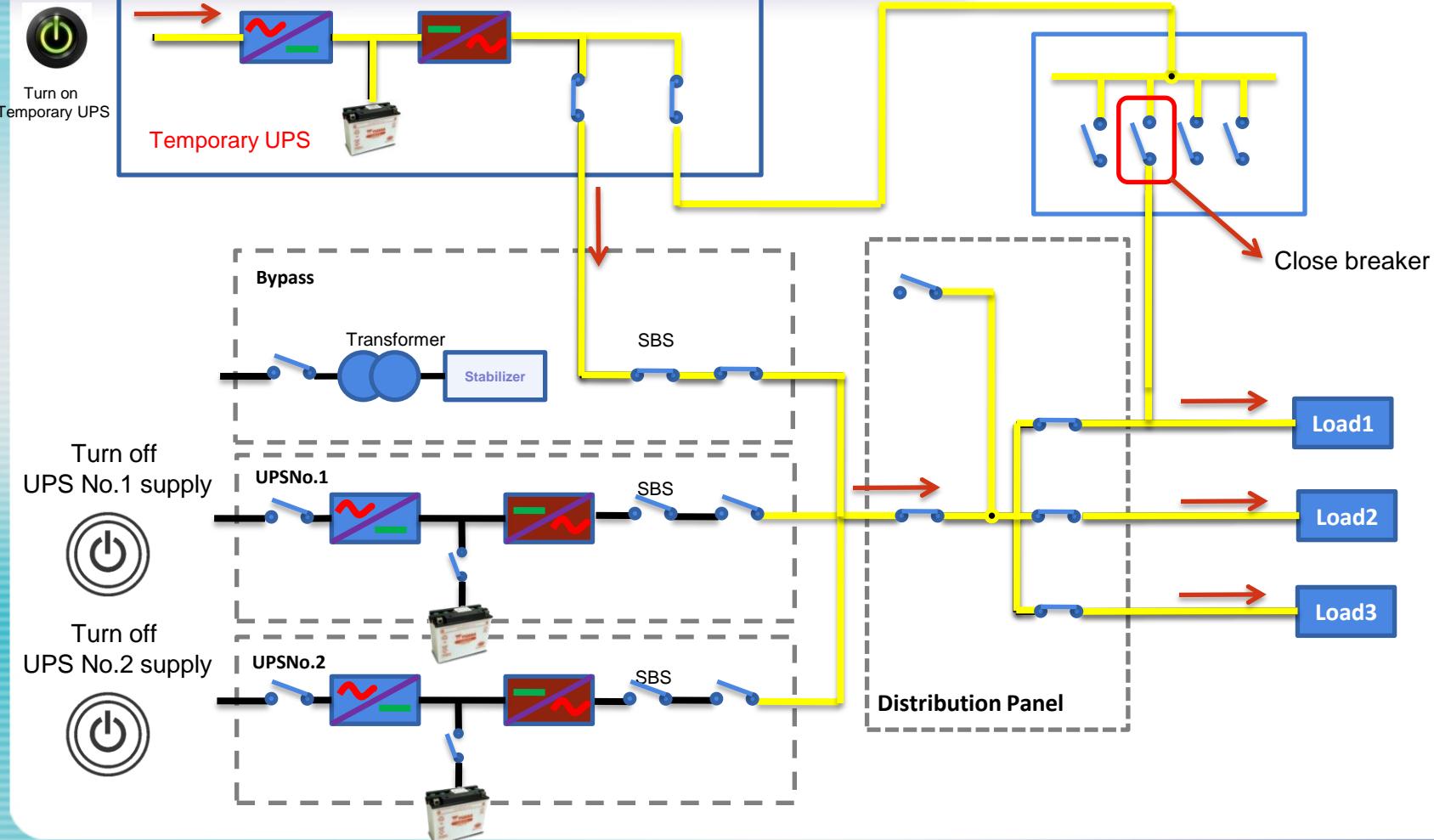
Switching Load from existing UPS to Temporary UPS.



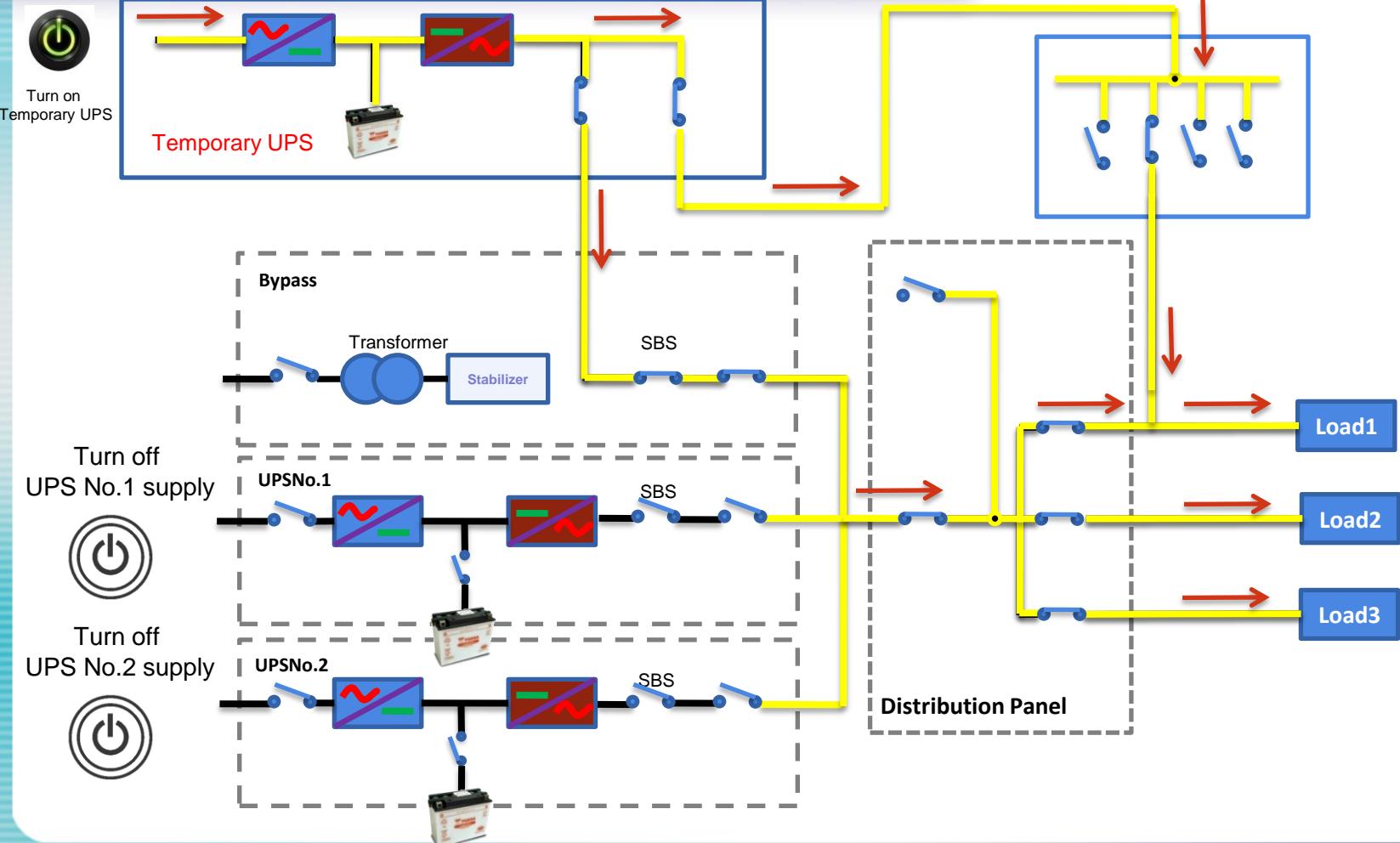
Switching Load from existing UPS to Temporary UPS.



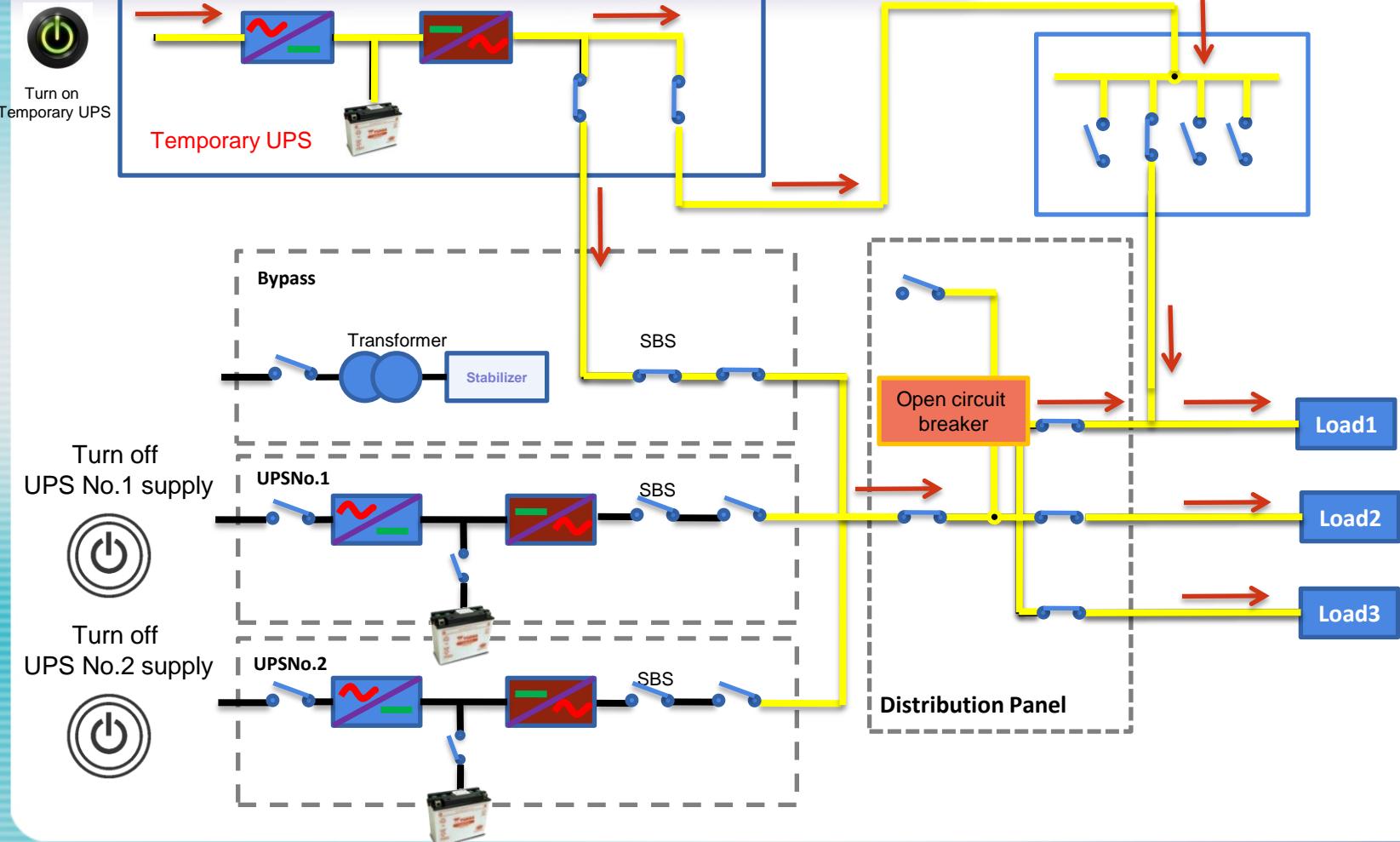
Switching Load from existing UPS to Temporary UPS.



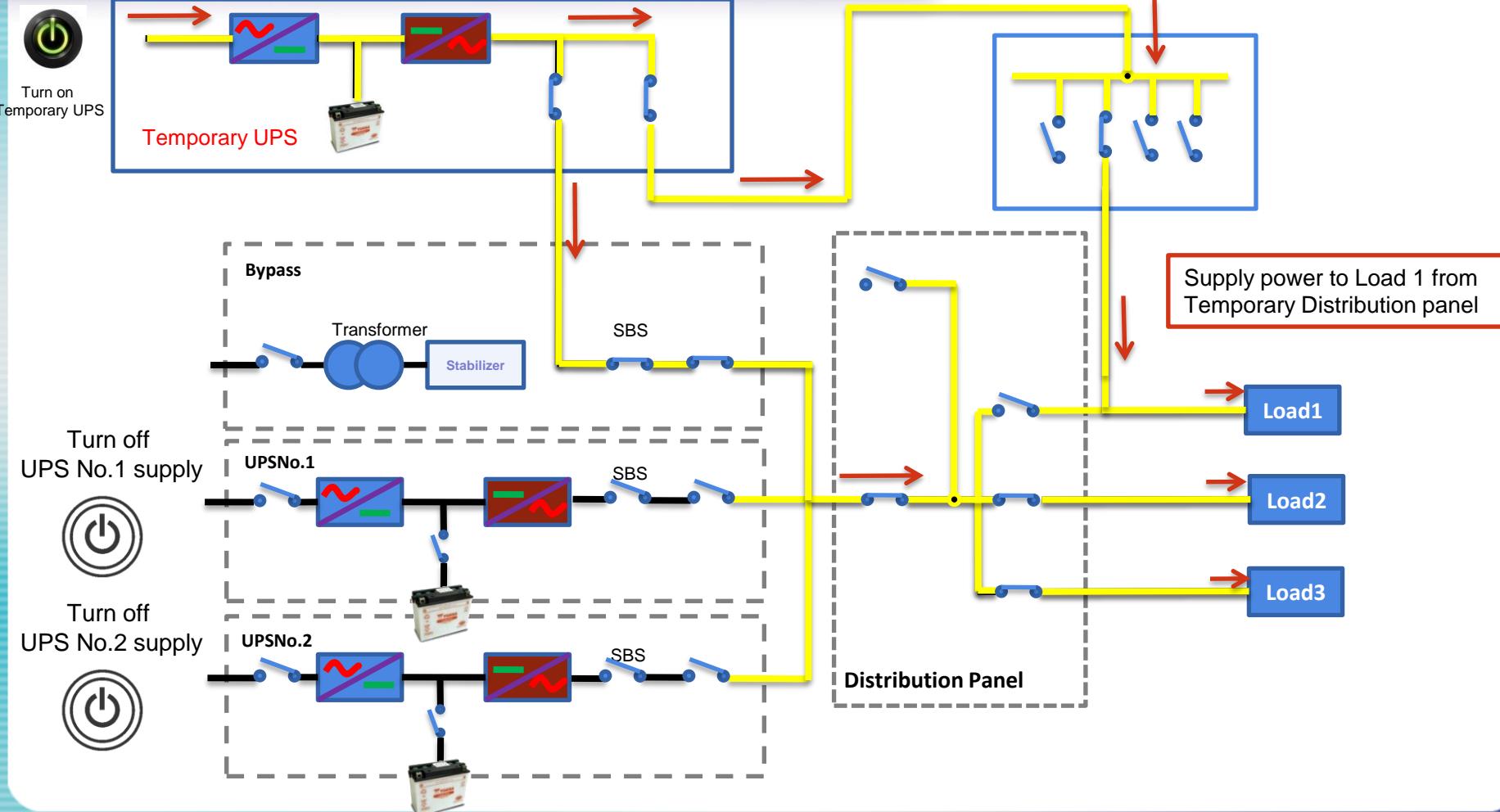
Switching Load from existing UPS to Temporary UPS.



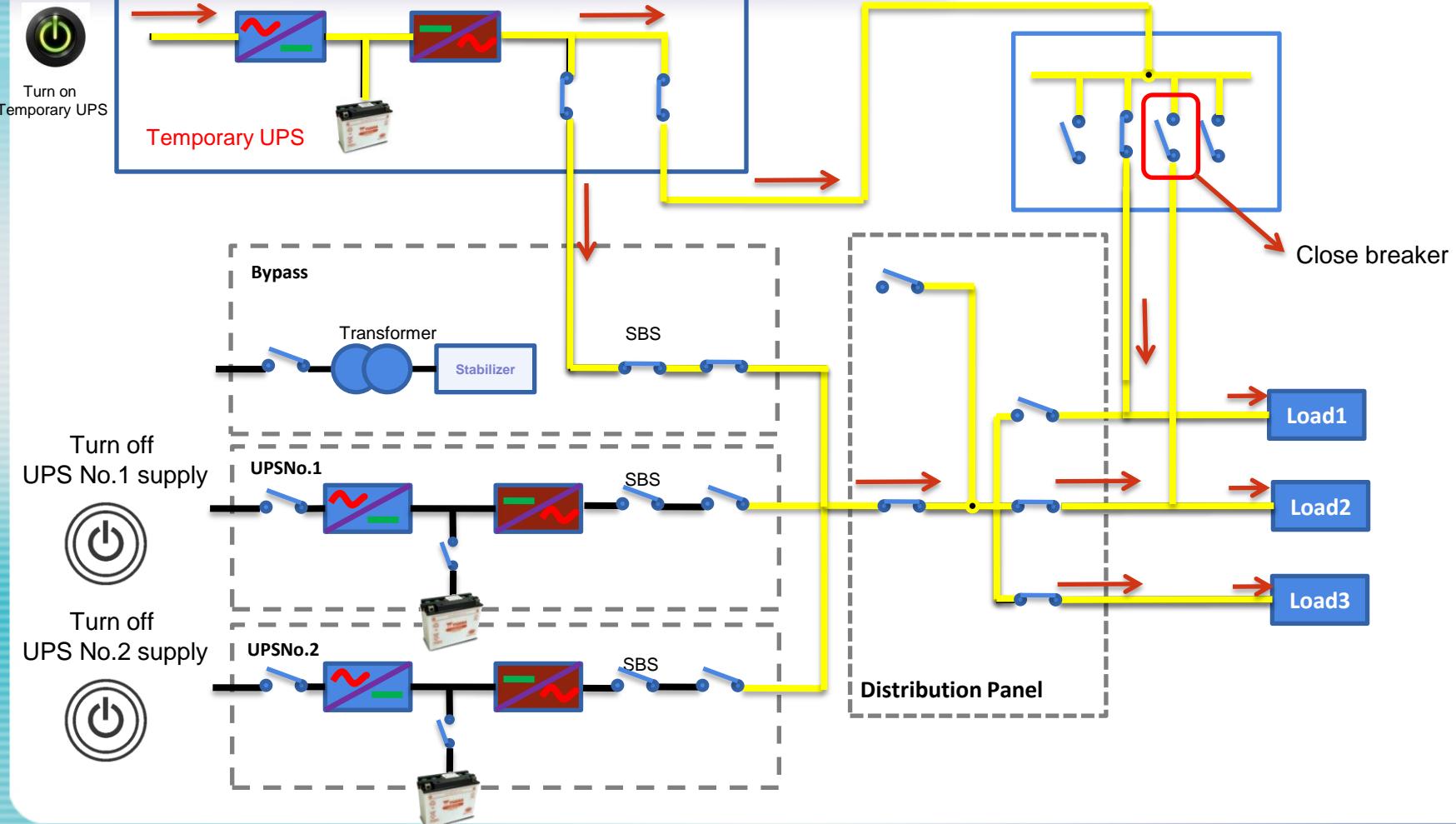
Switching Load from existing UPS to Temporary UPS.



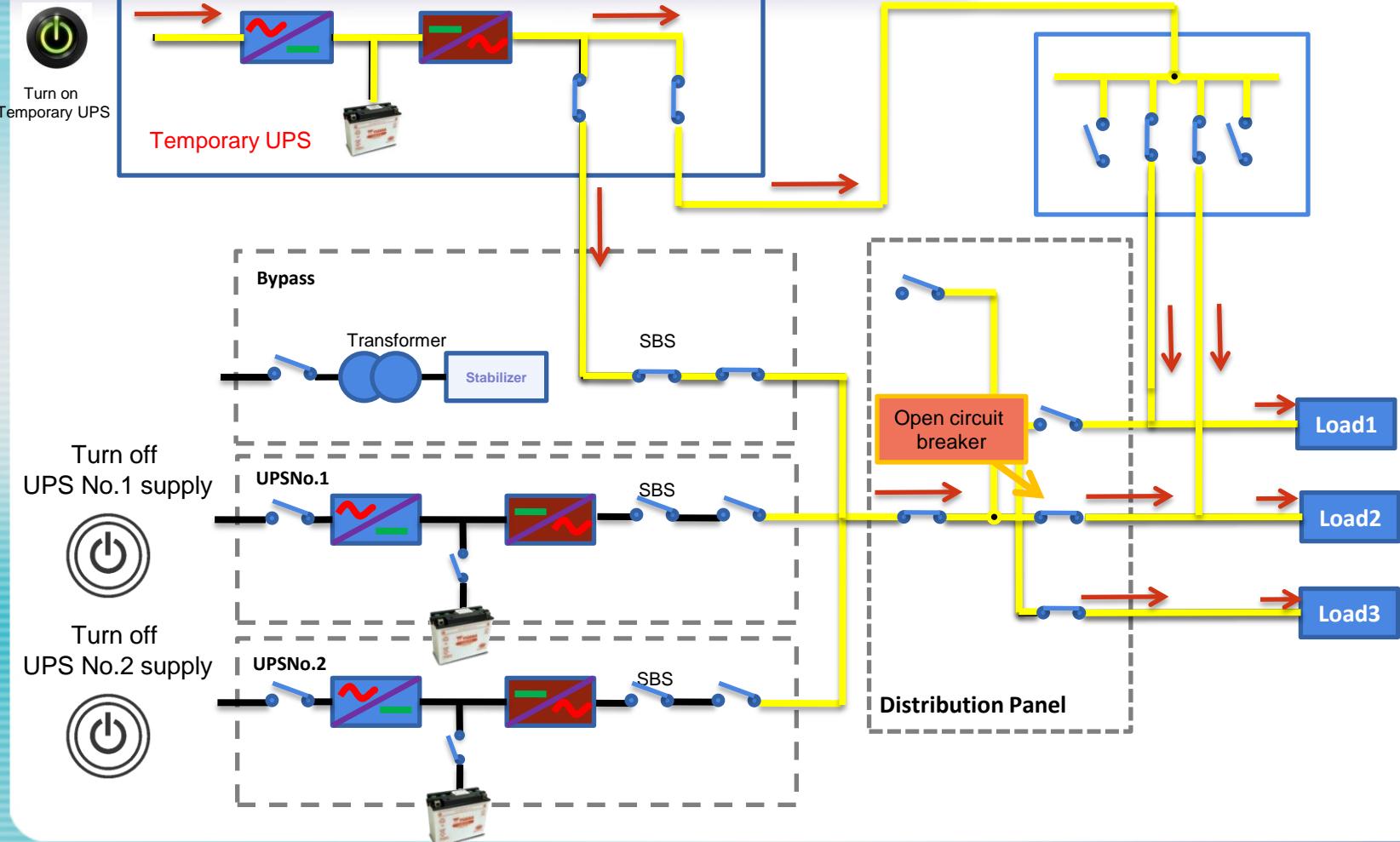
Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.



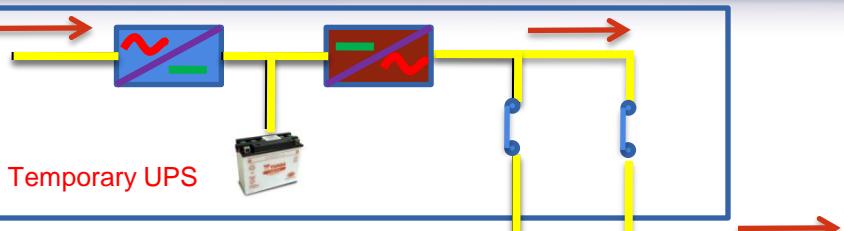
Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.



Turn on
Temporary UPS



Temporary Distribution panel

Bypass



Turn off
UPS No.1 supply



Turn off
UPS No.2 supply



SBS

SBS

SBS

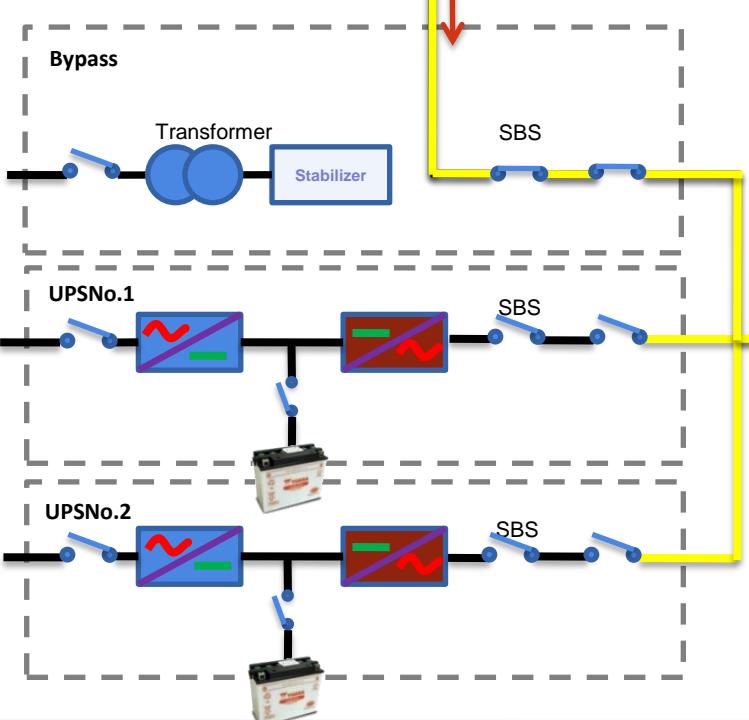
SBS

Supply power to Load 2 from
Temporary Distribution panel

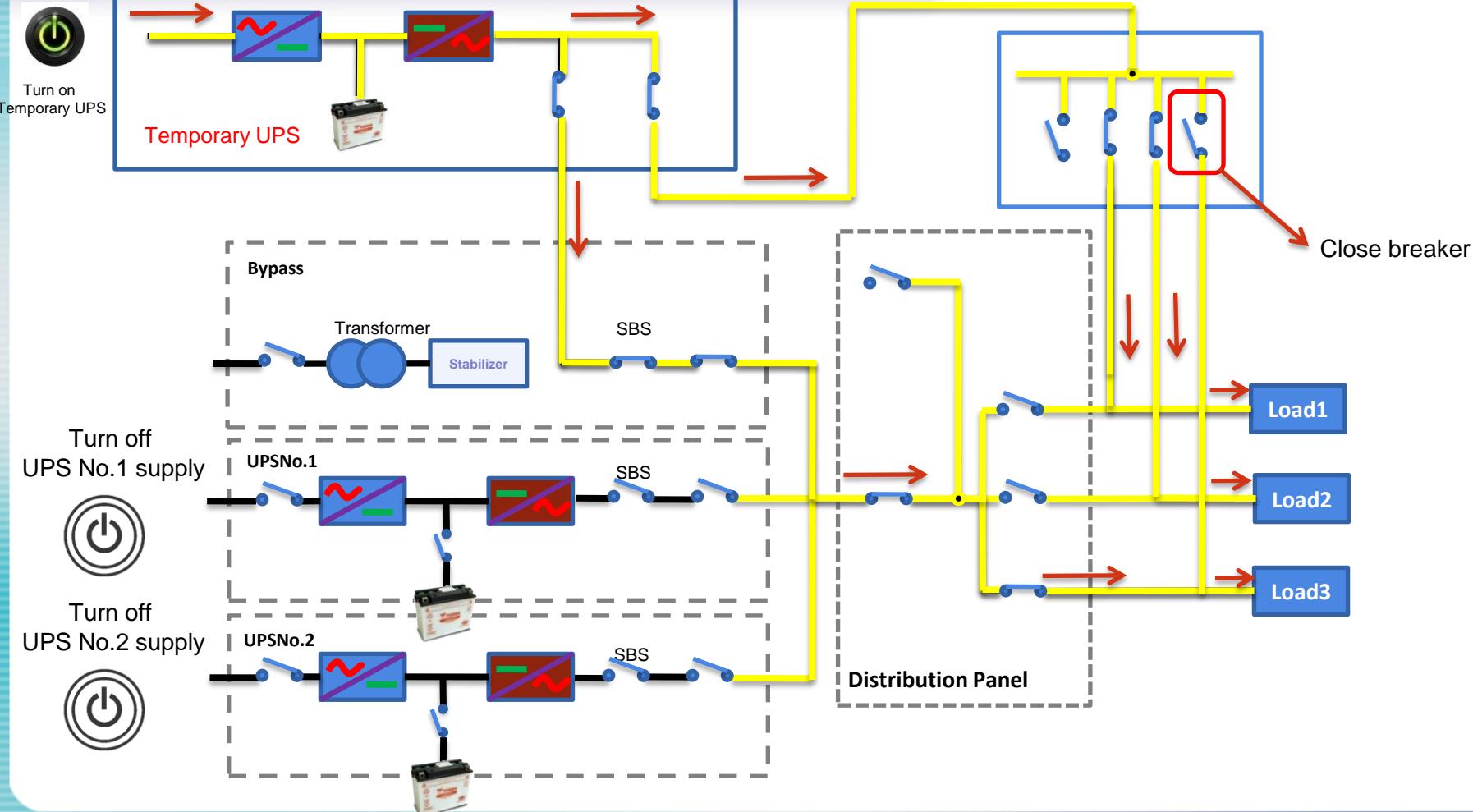
Load2

Load3

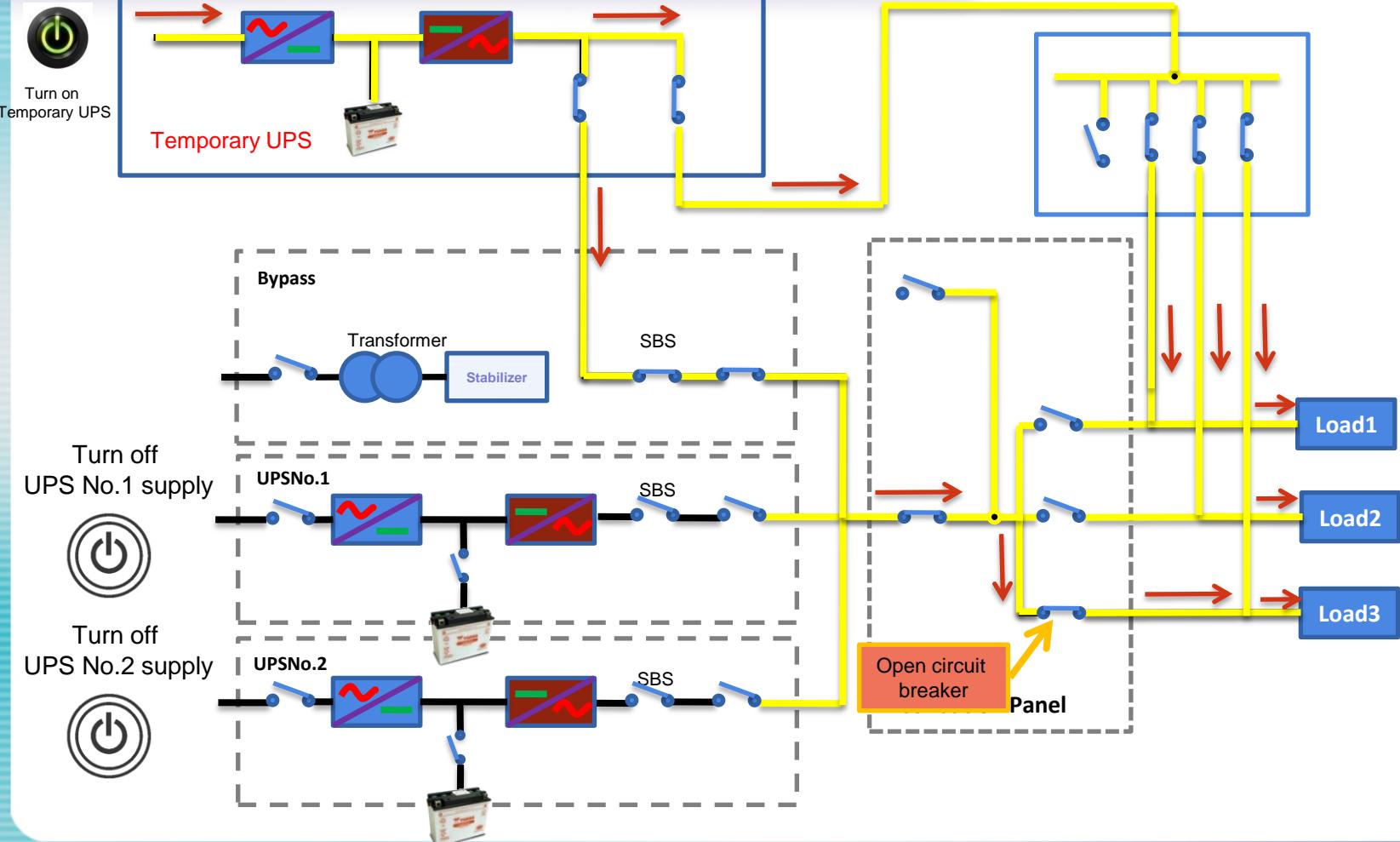
Distribution Panel



Switching Load from existing UPS to Temporary UPS.



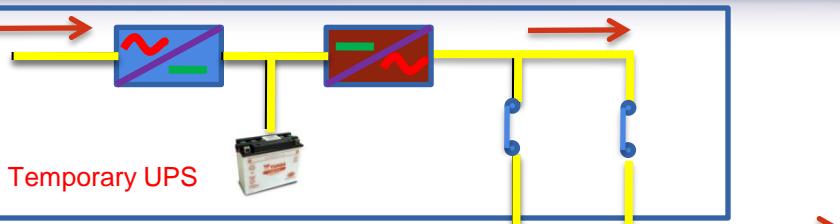
Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.



Turn on
Temporary UPS



Temporary Distribution panel

Bypass



Turn off
UPS No.1 supply



Turn off
UPS No.2 supply



SBS

SBS

SBS

SBS

Distribution Panel

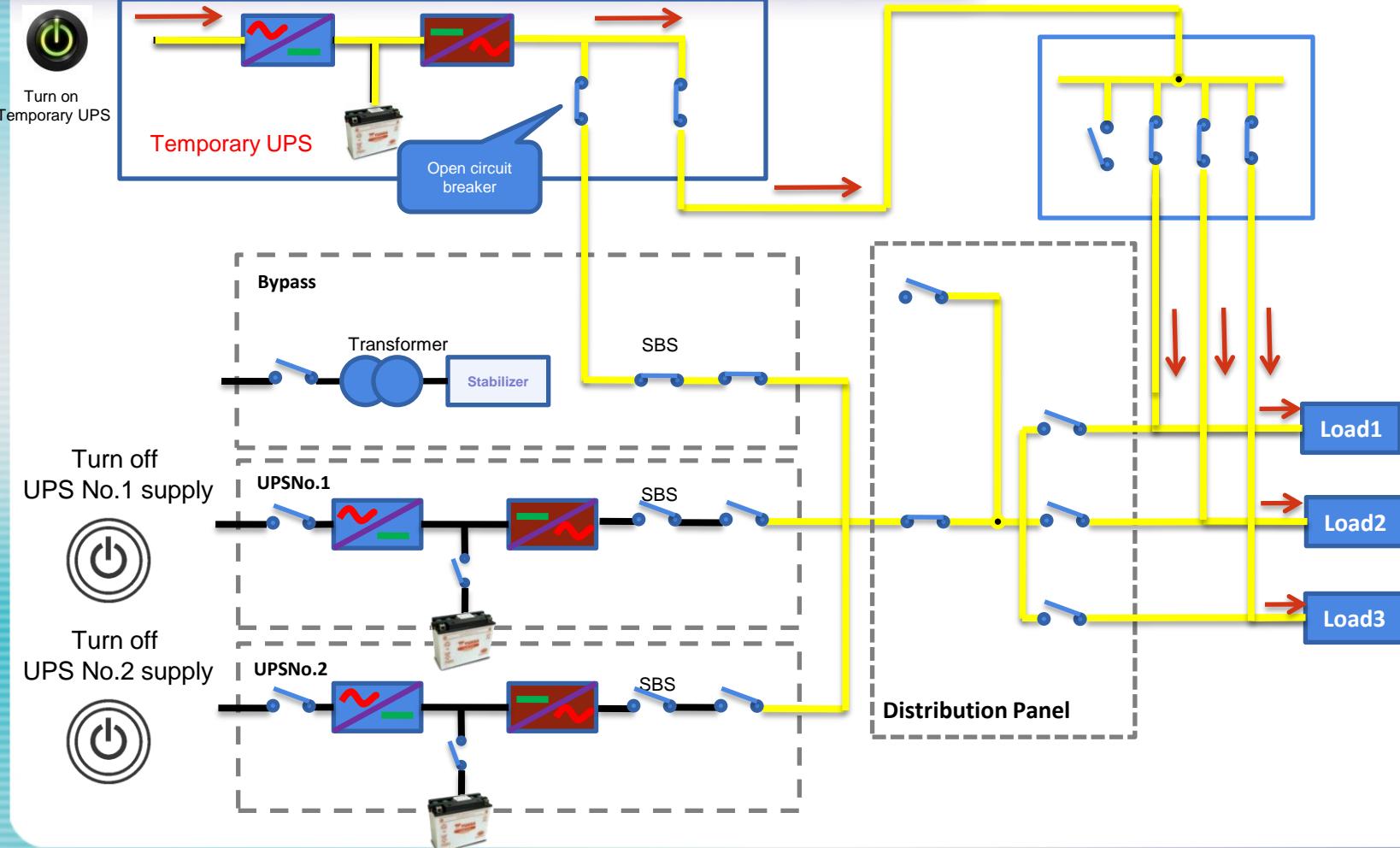
Load1

Load2

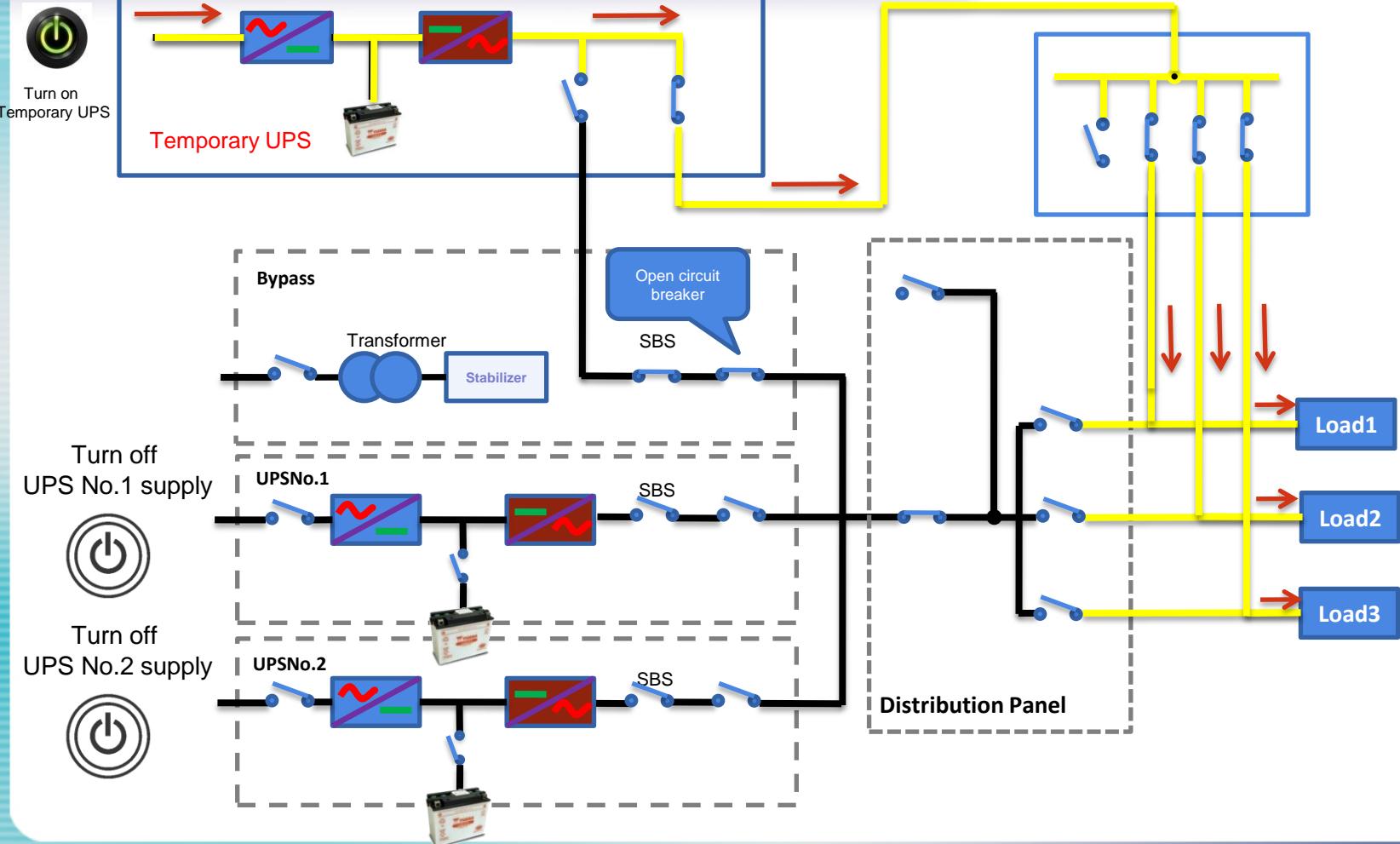
Load3

Supply power to Load 3 from
Temporary Distribution panel

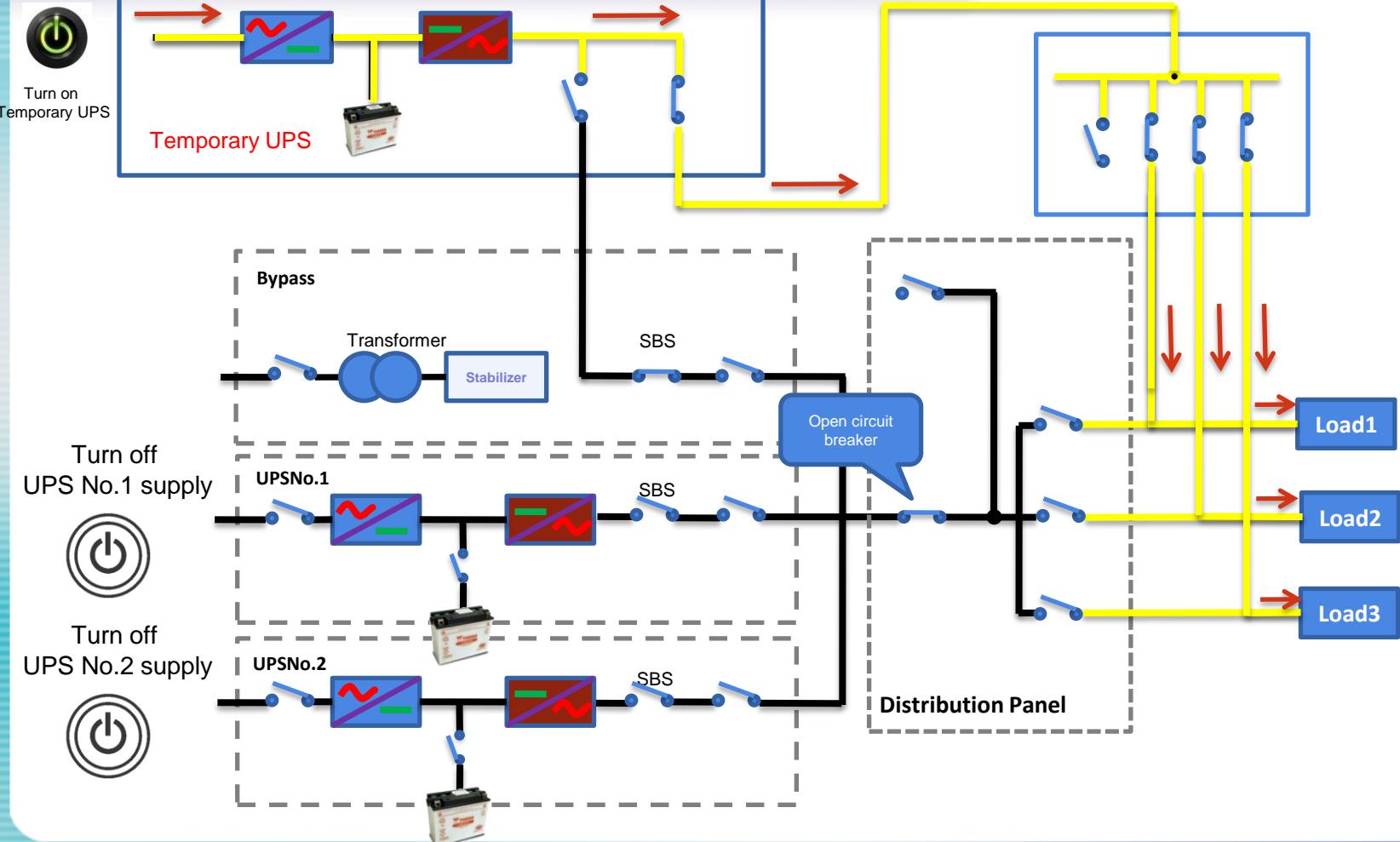
Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.

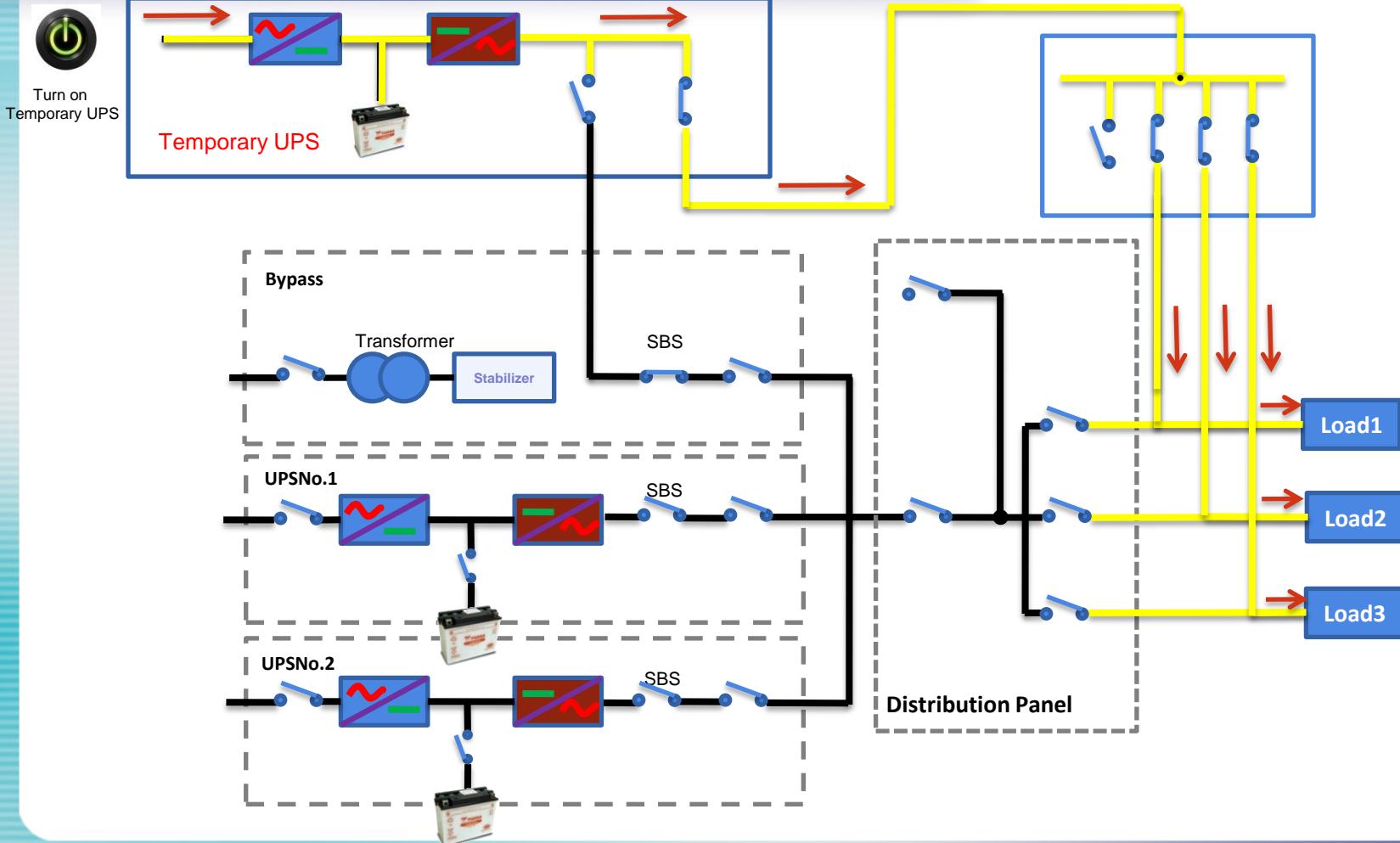


Switching Load from existing UPS to Temporary UPS.



Switching Load from existing UPS to Temporary UPS.

Temporary Distribution panel



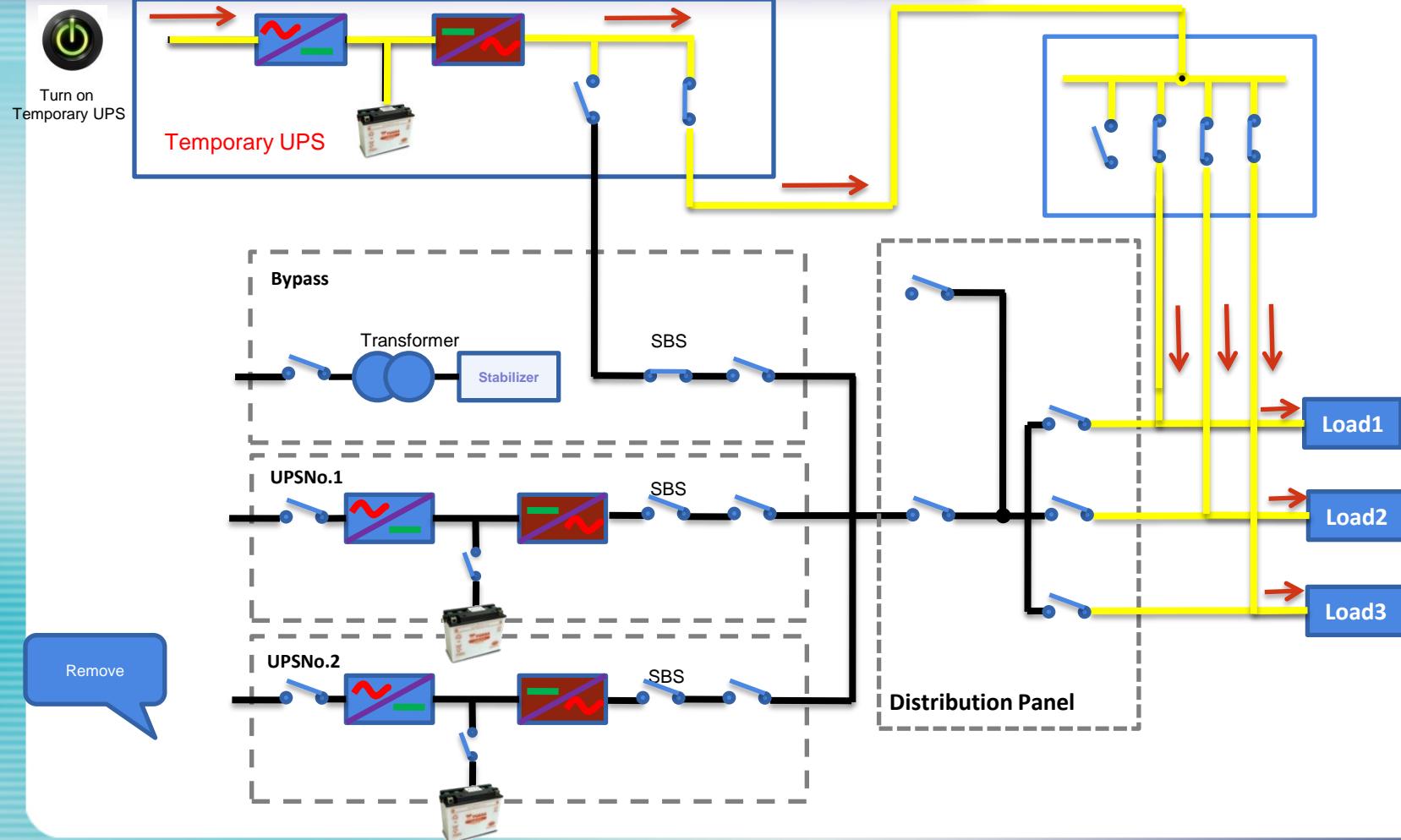


2

- **REMOVAL OF EXISTING UPS
FROM SITE**

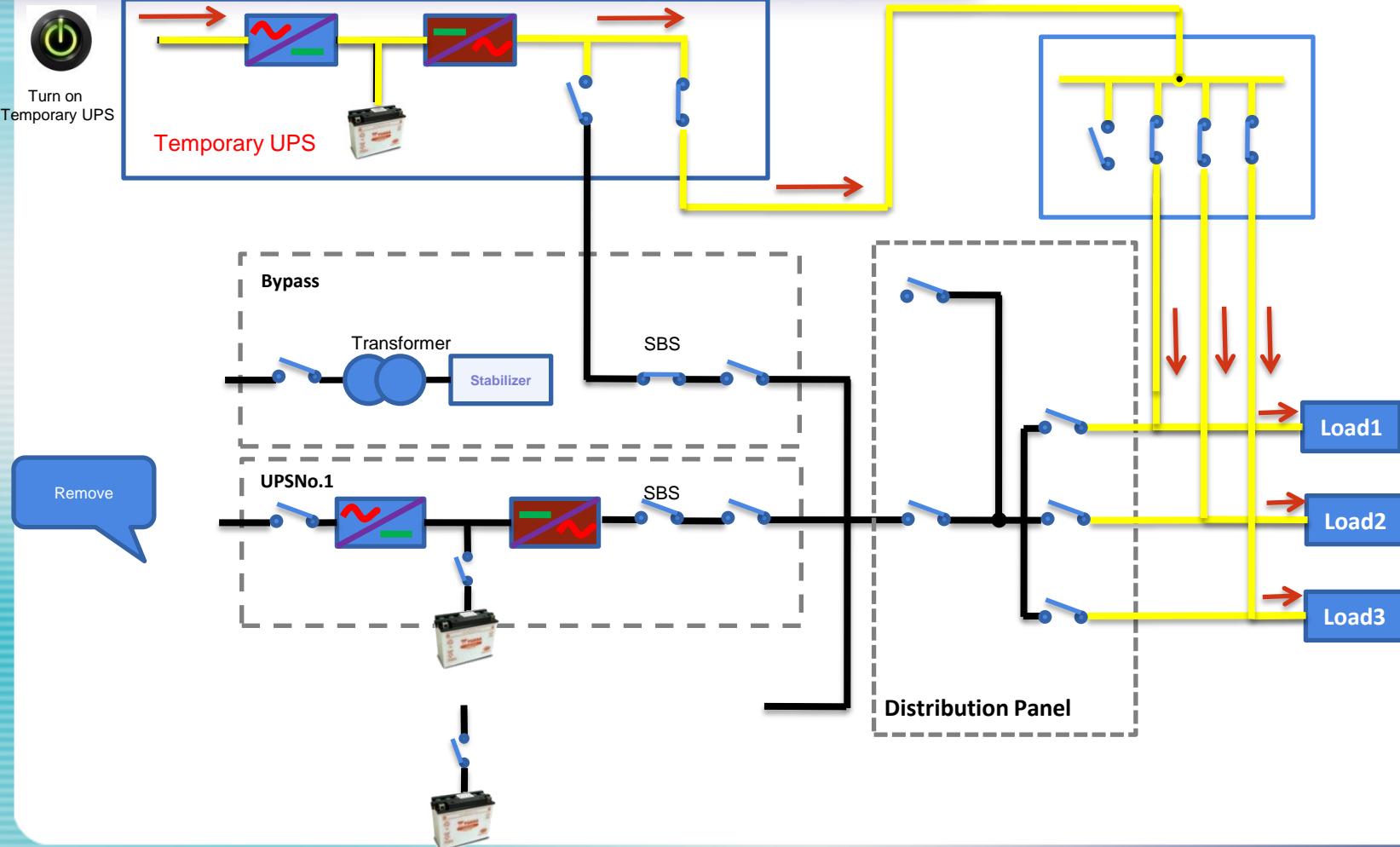
Removal of Existing UPS from site

Temporary Distribution panel



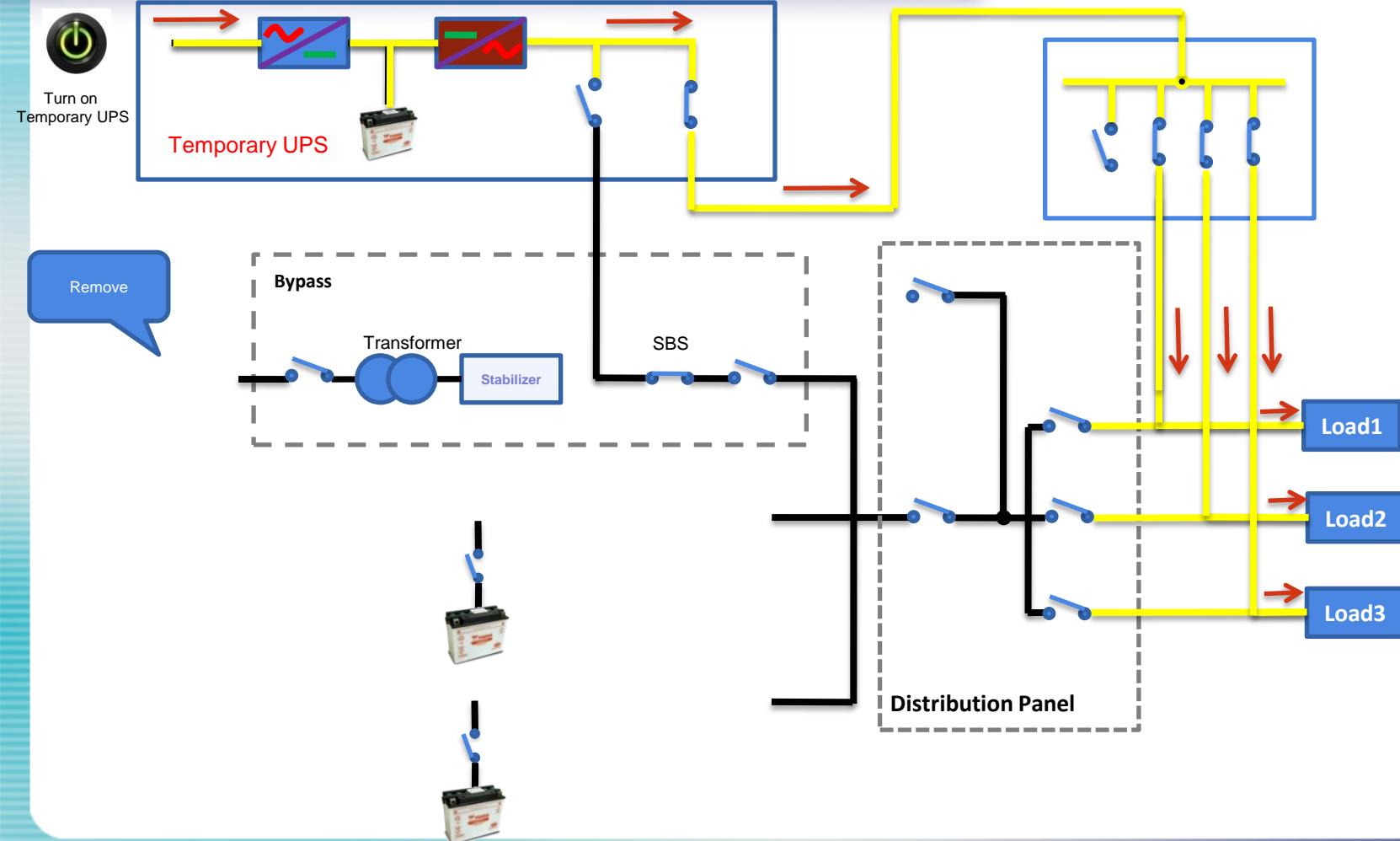
Removal of Existing UPS from site

Temporary Distribution panel



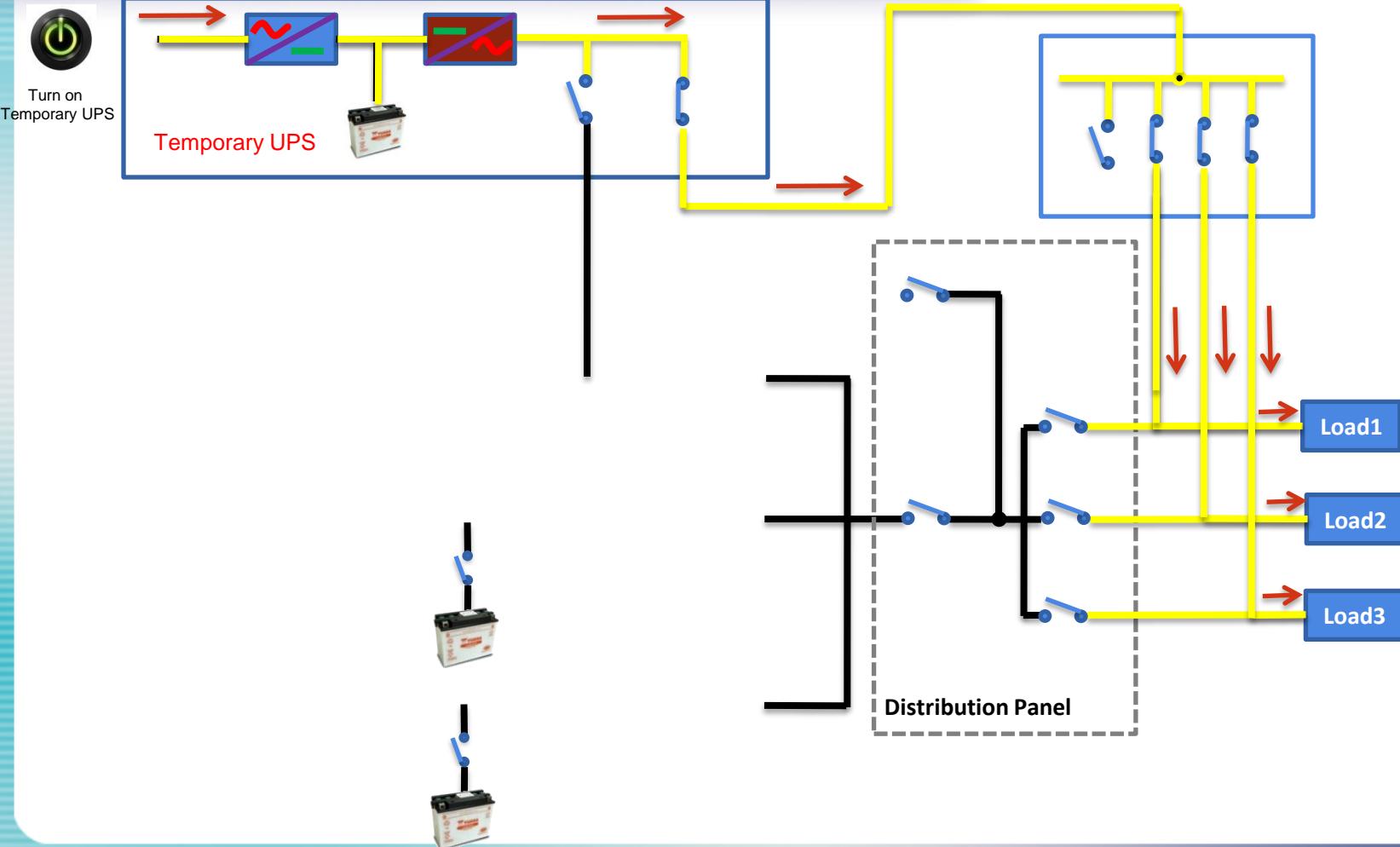
Removal of Existing UPS from site

Temporary Distribution panel



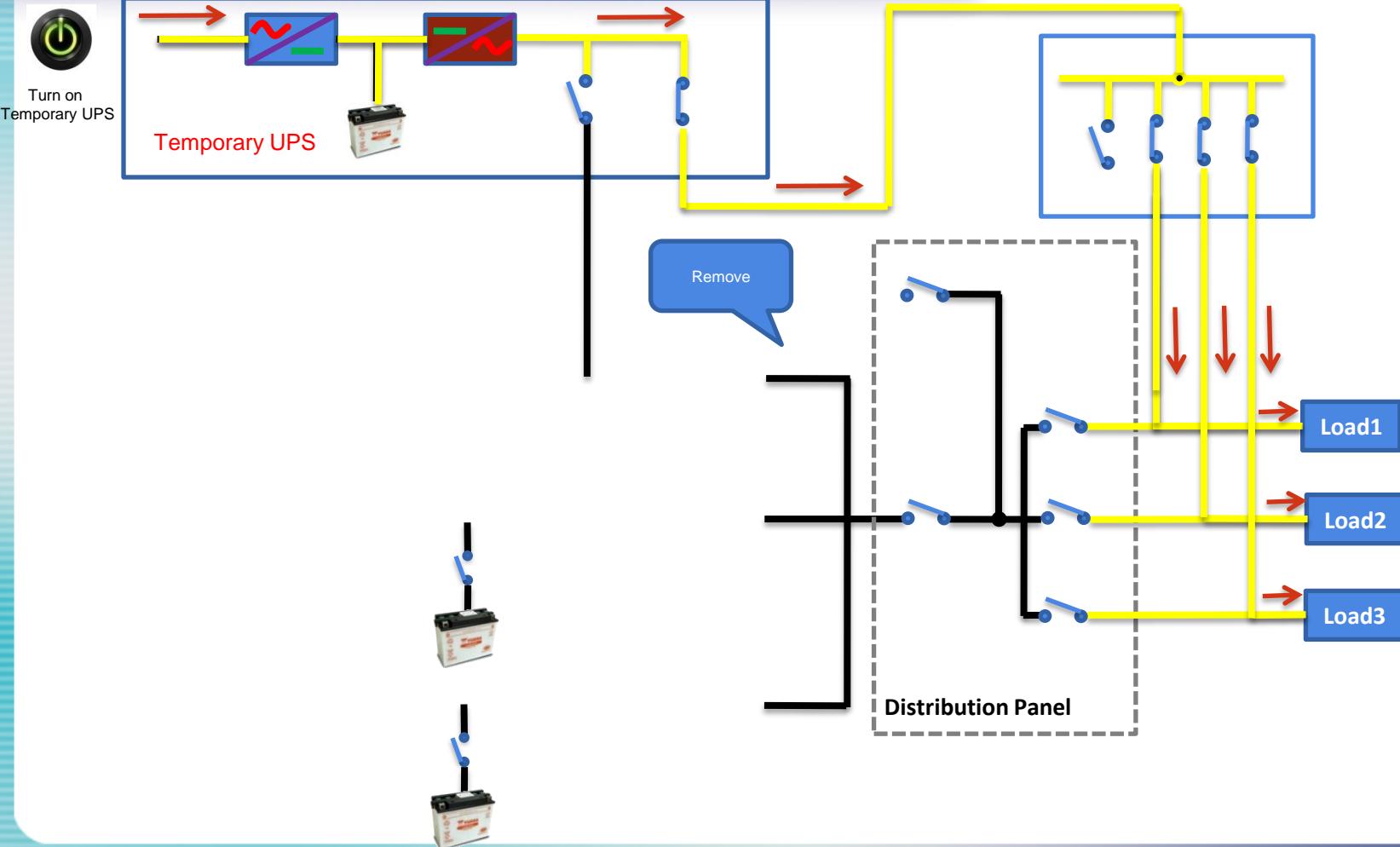
Removal of Existing UPS from site

Temporary Distribution panel



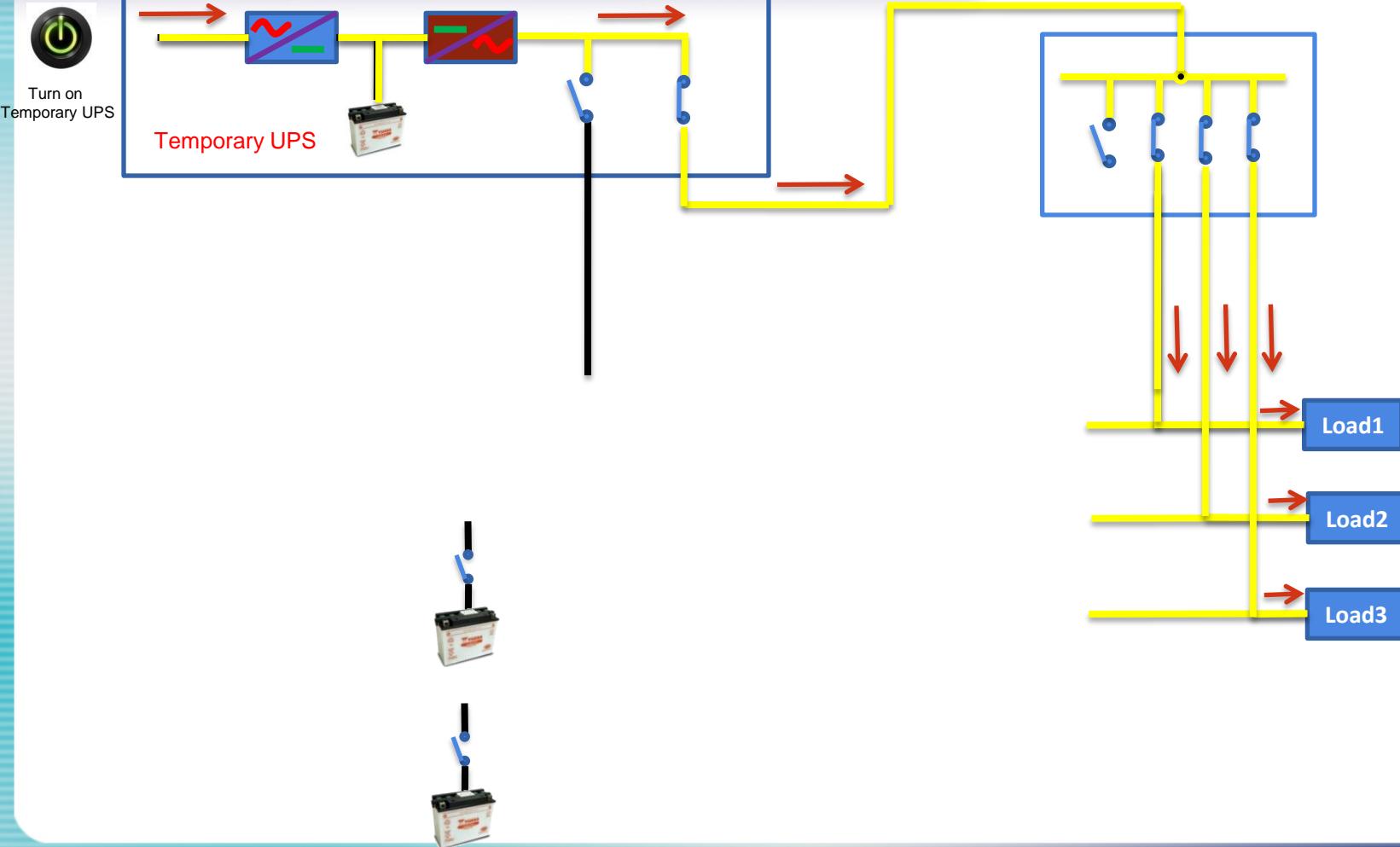
Removal of Existing UPS from site

Temporary Distribution panel



Removal of Existing UPS from site

Temporary Distribution panel





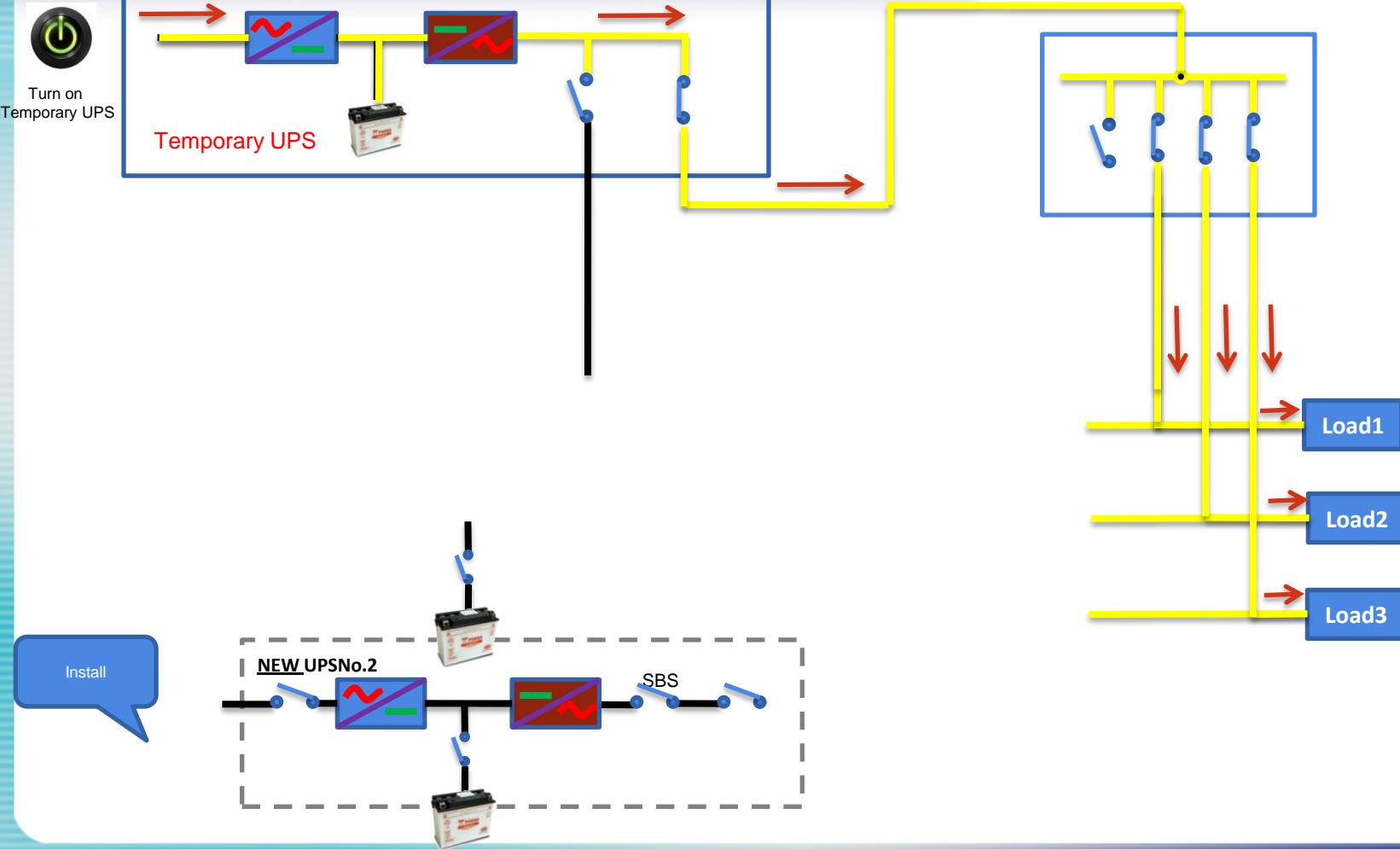
3

- **INSTALLATION OF NEW UPS.**

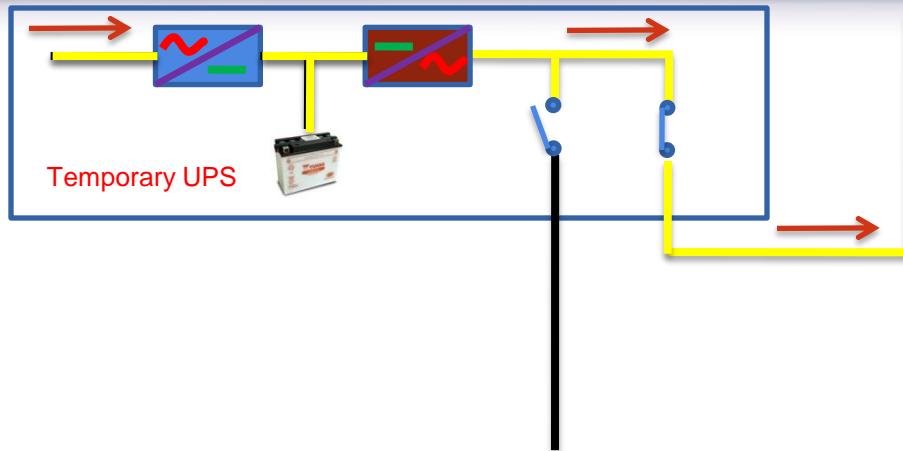
Installation of New UPS.



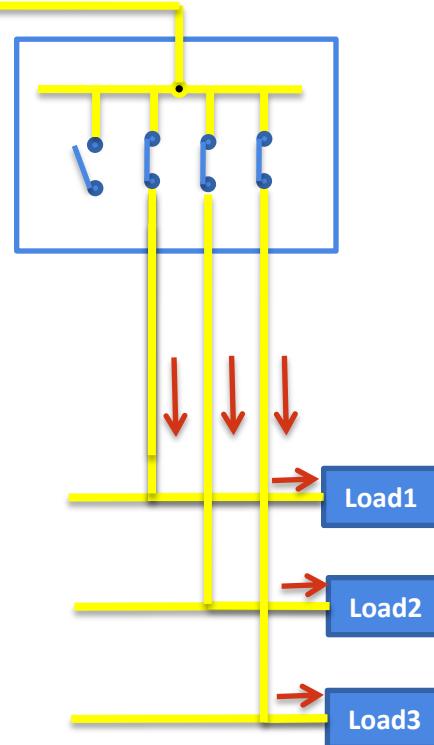
Temporary Distribution panel



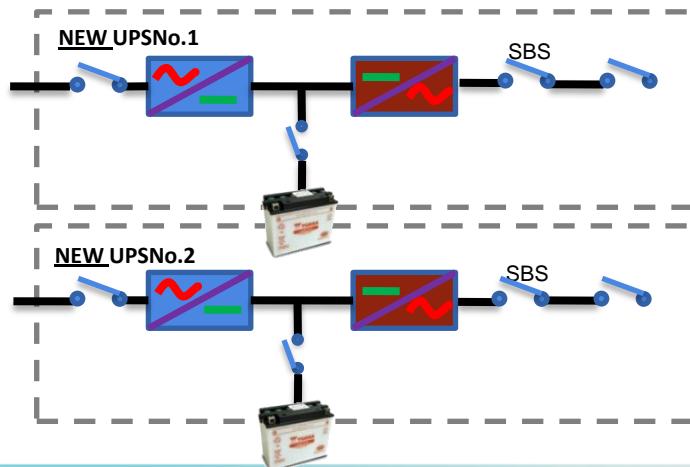
Installation of New UPS.



Temporary Distribution panel



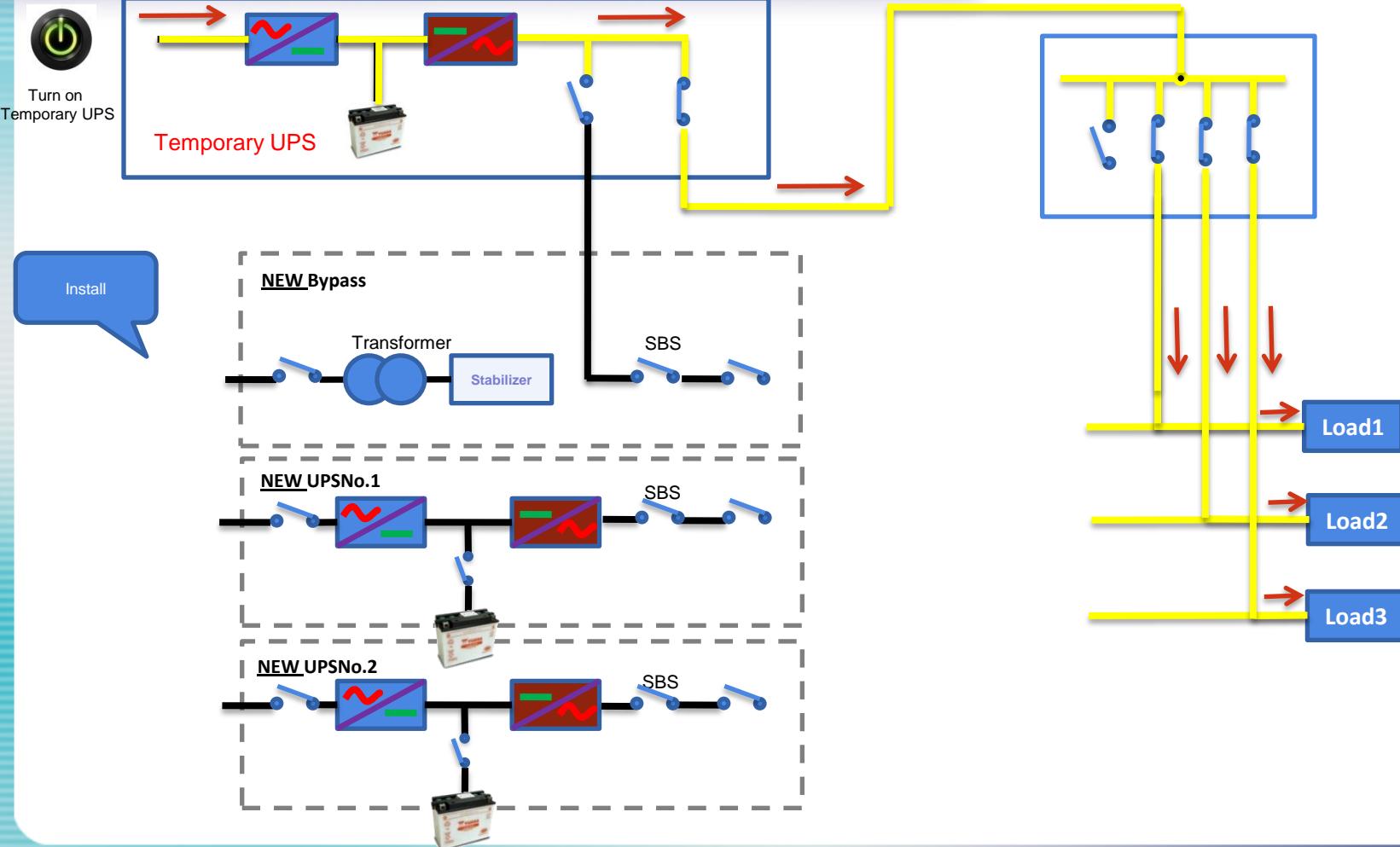
Install



Installation of New UPS.

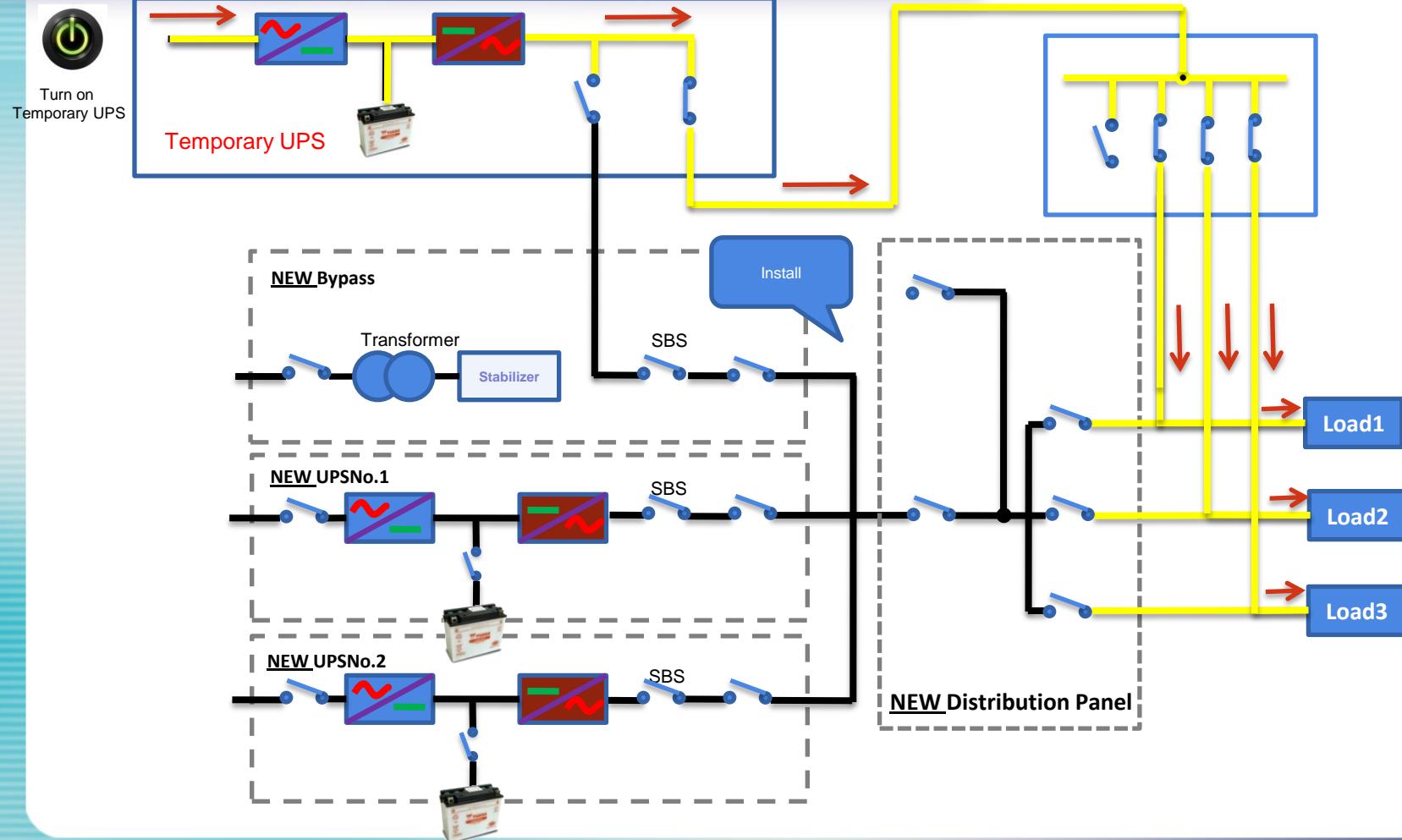


Temporary Distribution panel



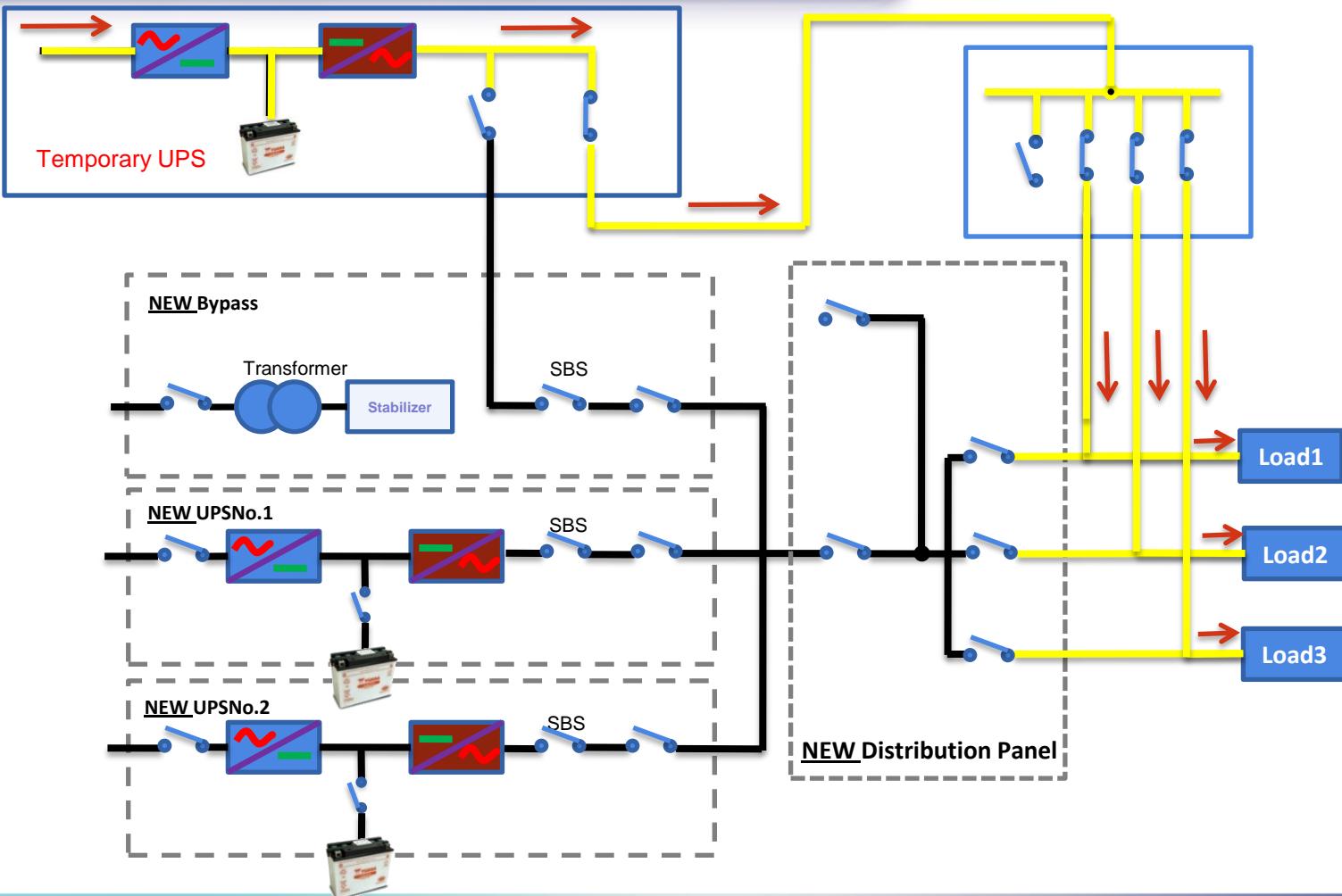
Installation of New UPS.

Temporary Distribution panel



Installation of New UPS.

Temporary Distribution panel

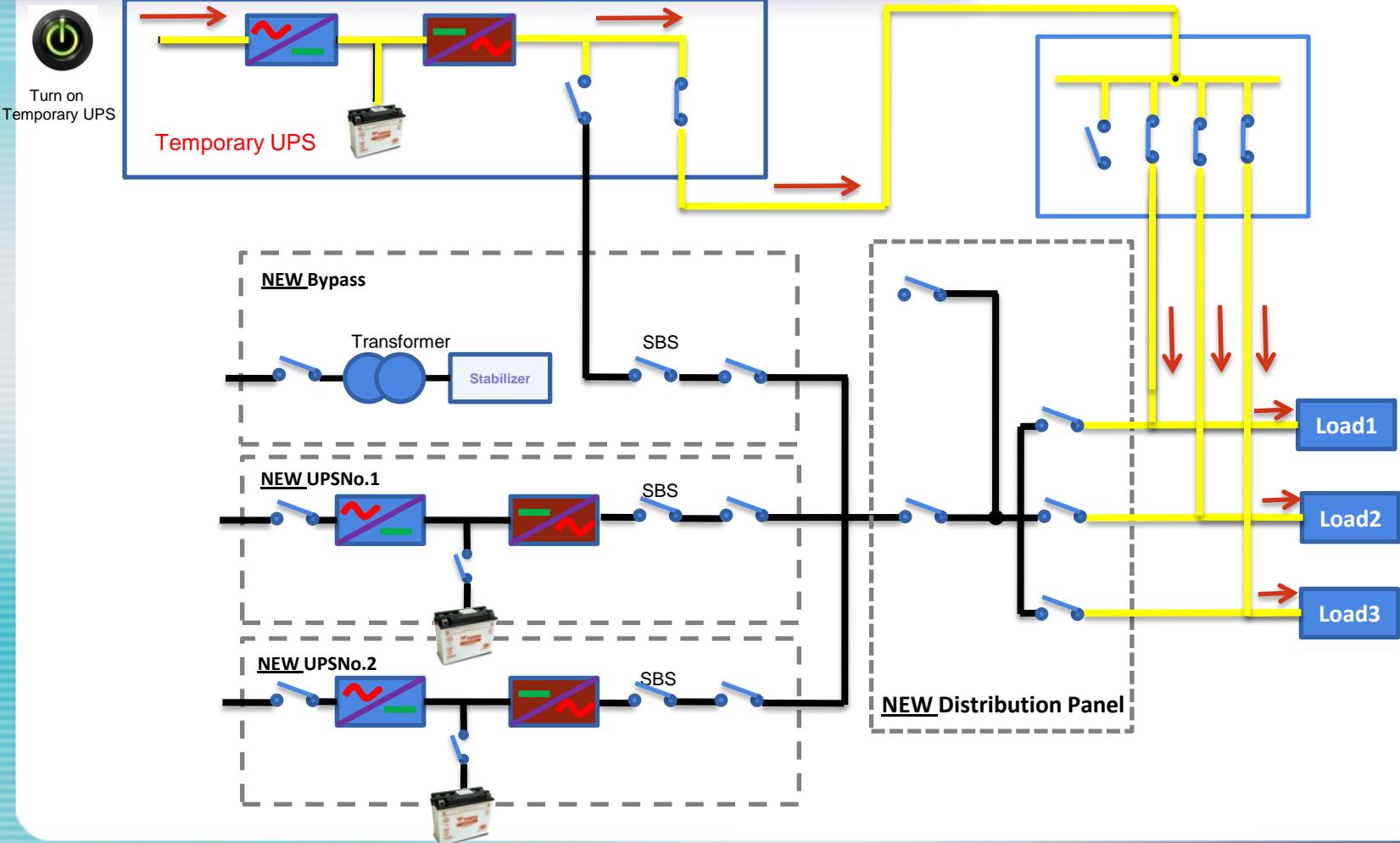




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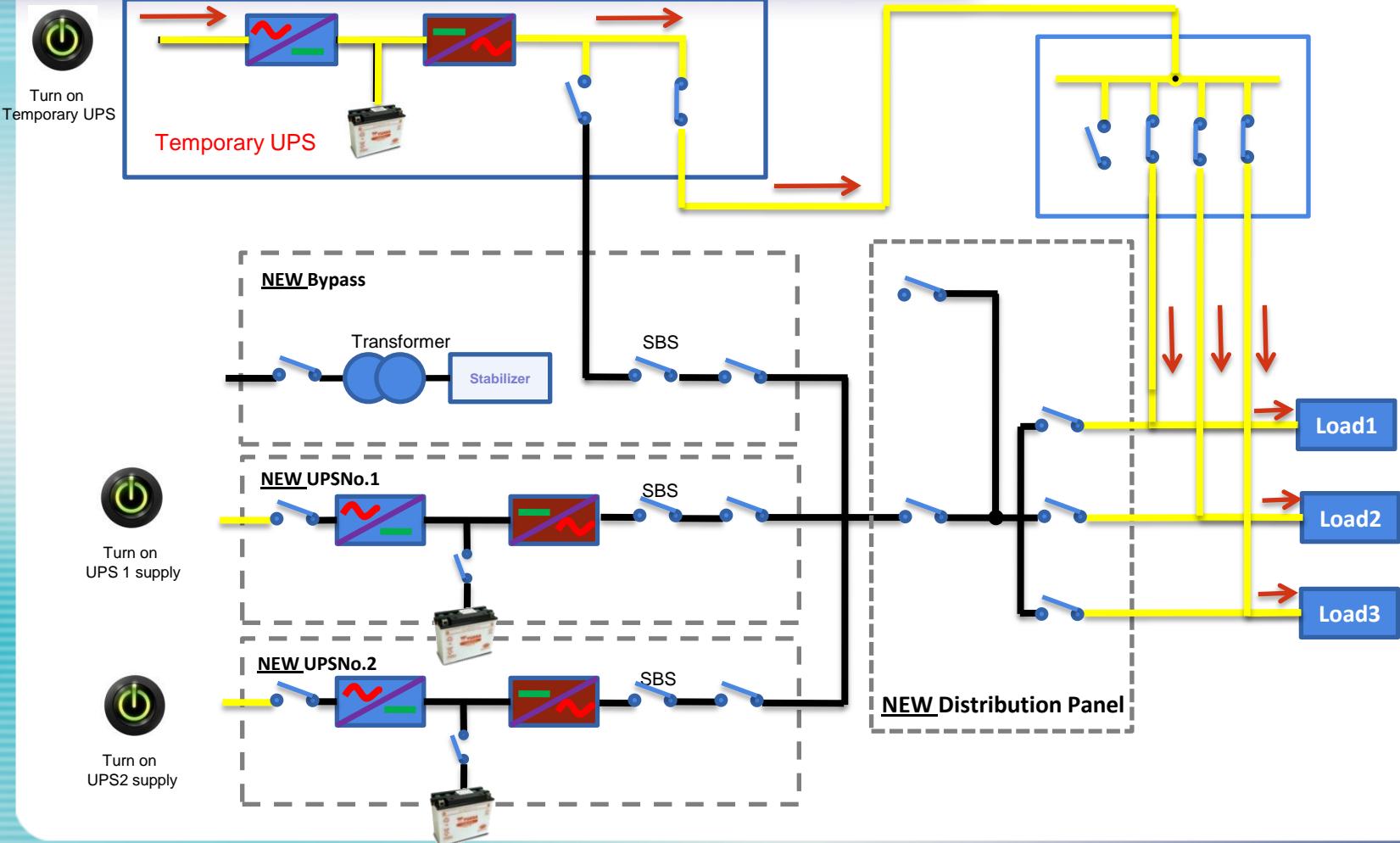
- **SWITCHING LOAD FROM TEMPORARY UPS TO NEW UPS**

Switching load from Temporary UPS to New UPS



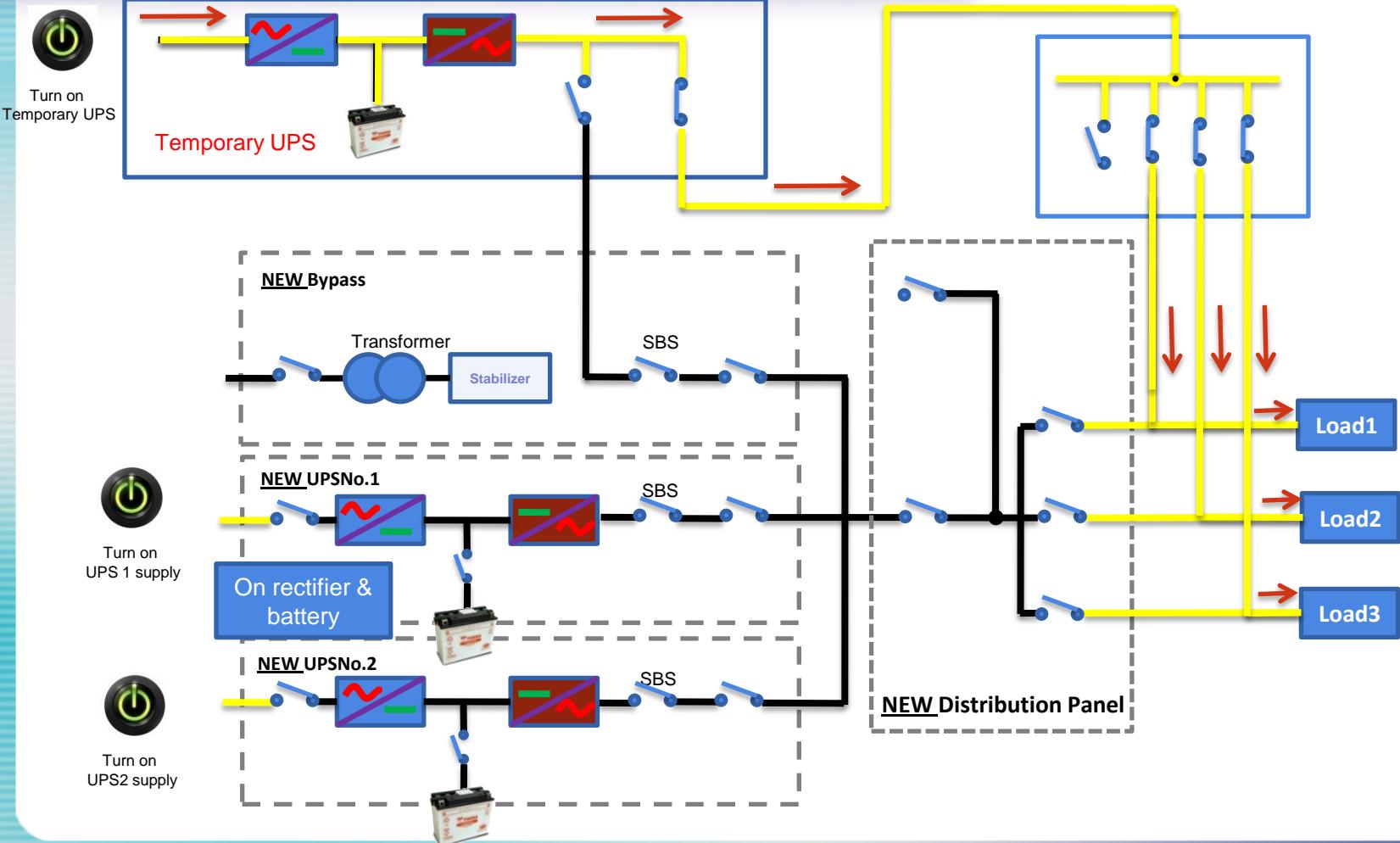
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



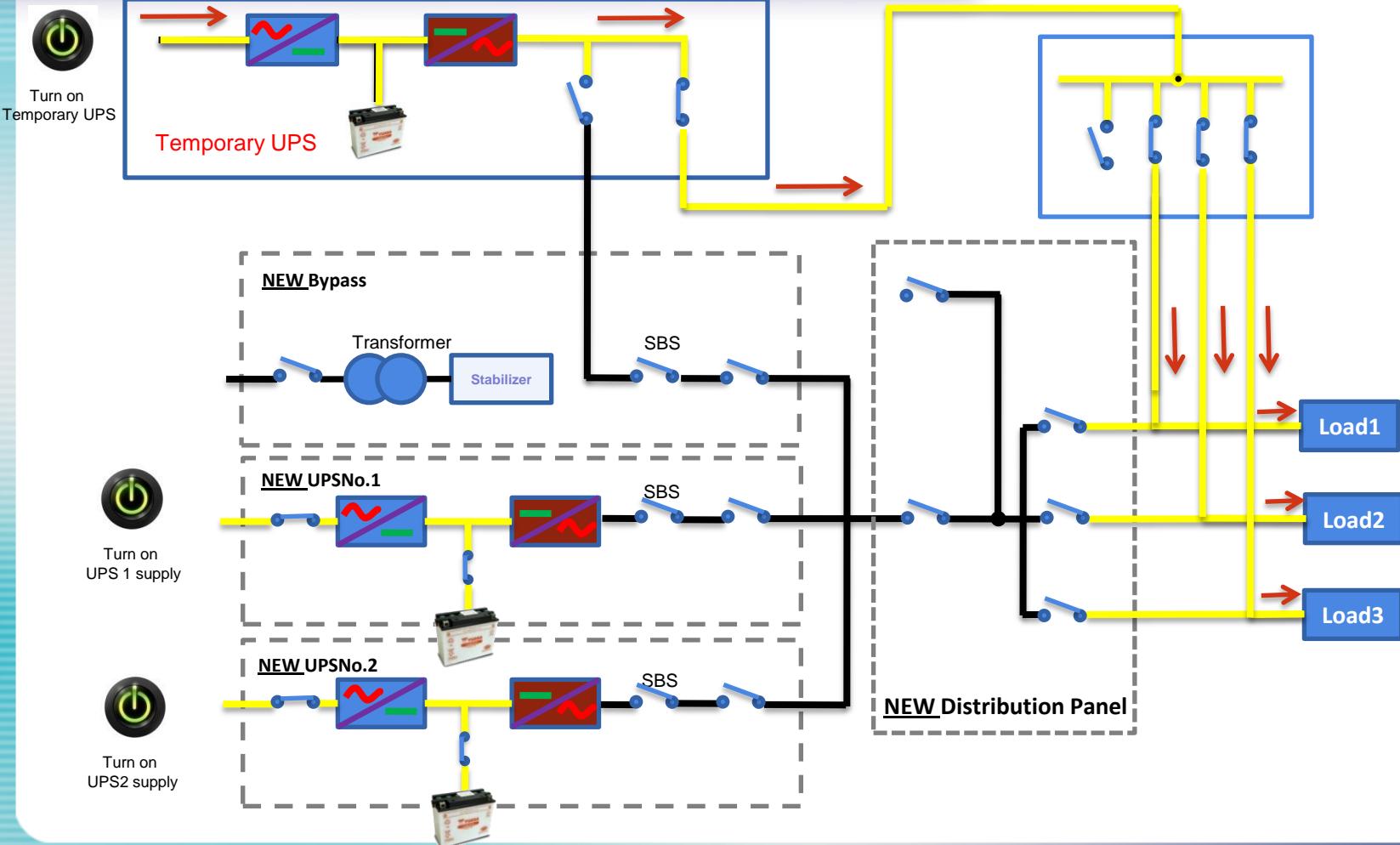
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



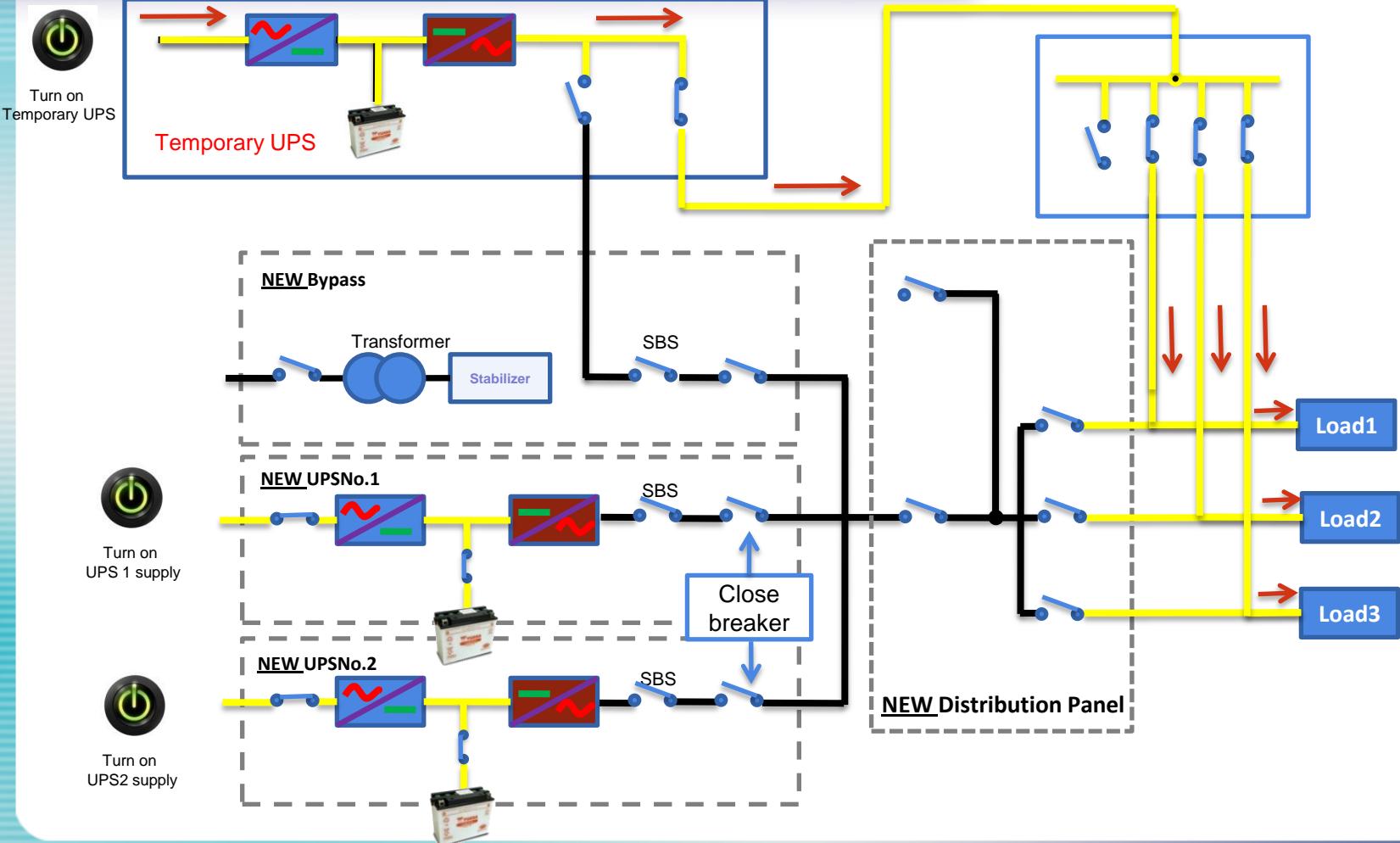
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



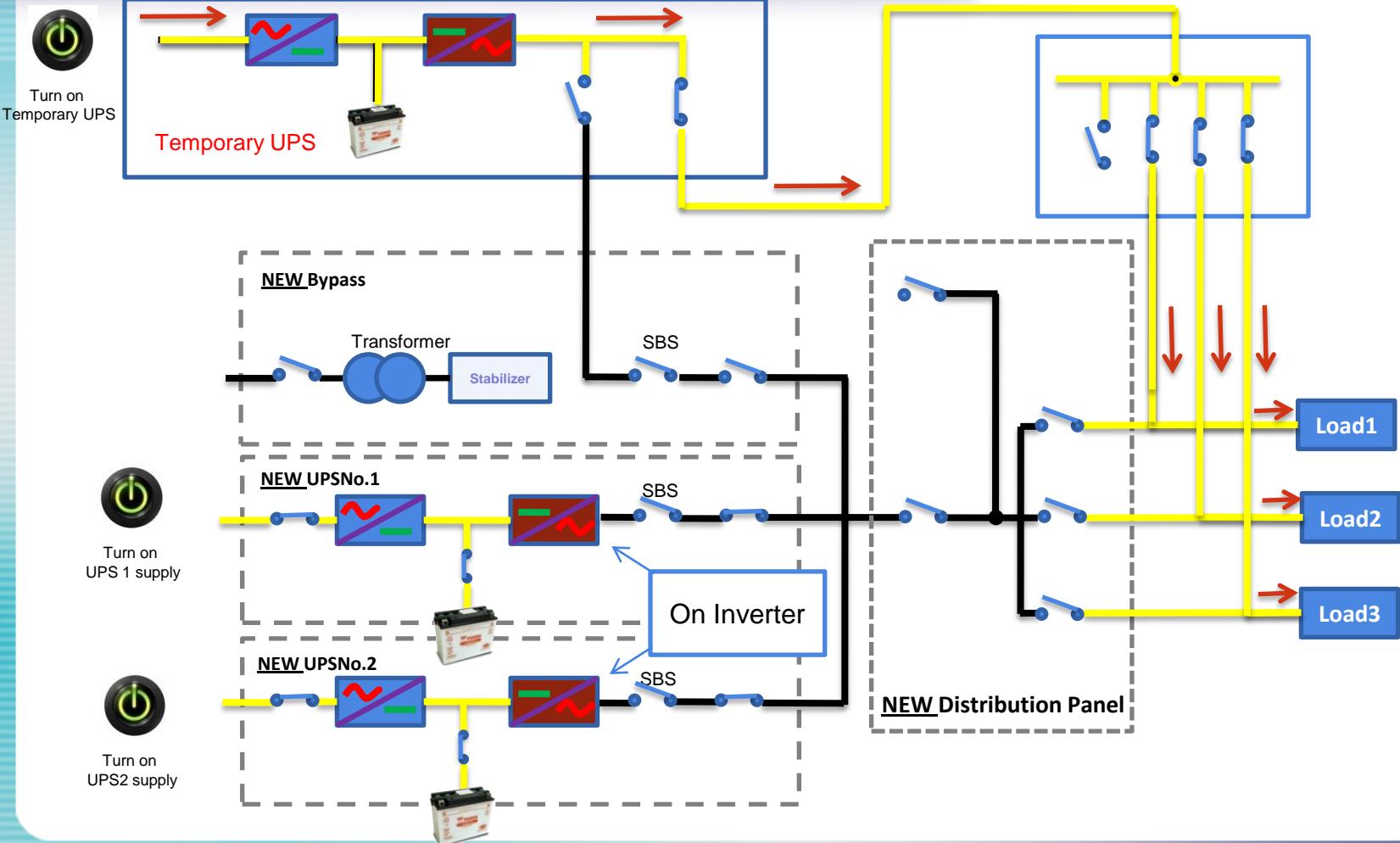
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



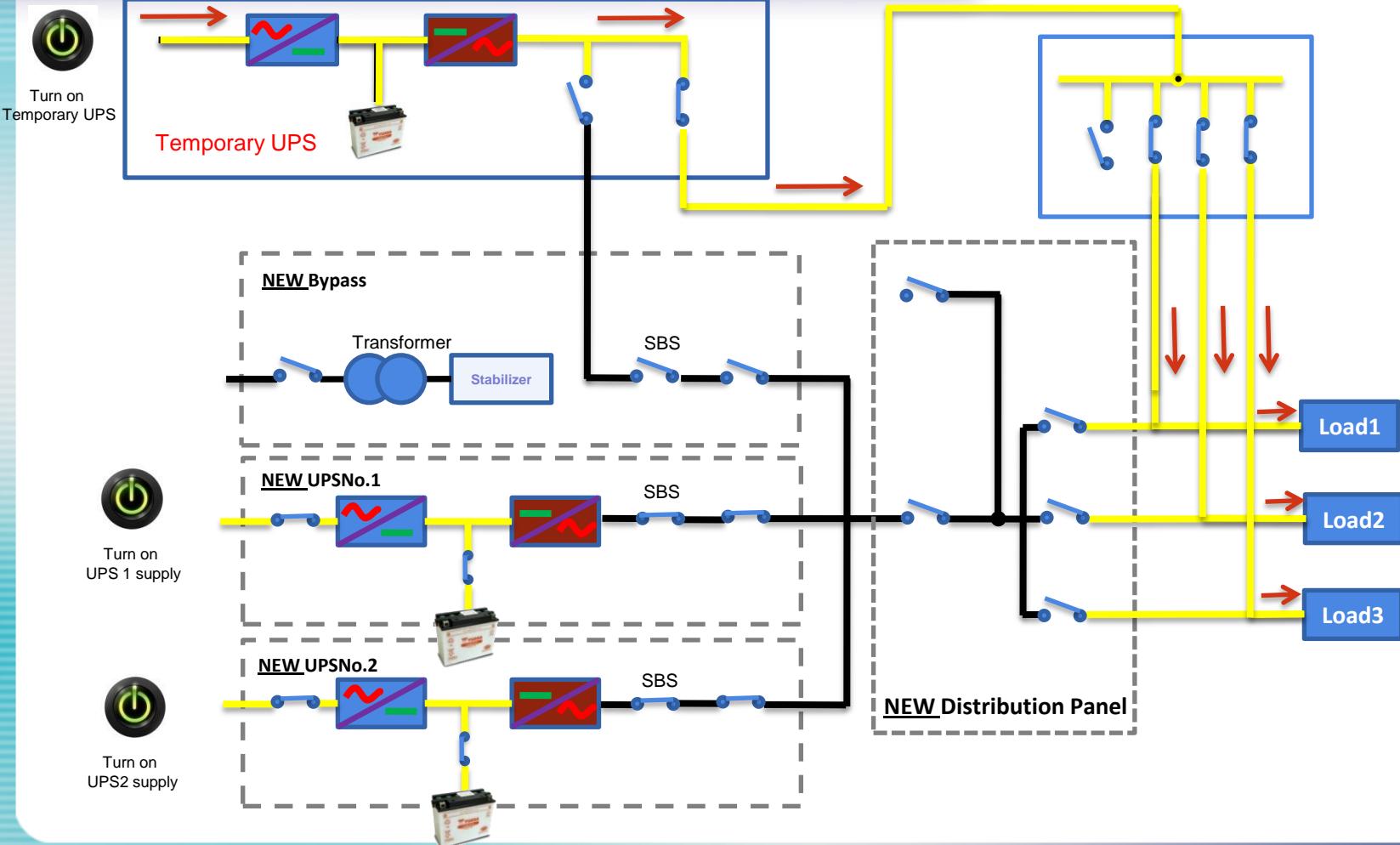
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



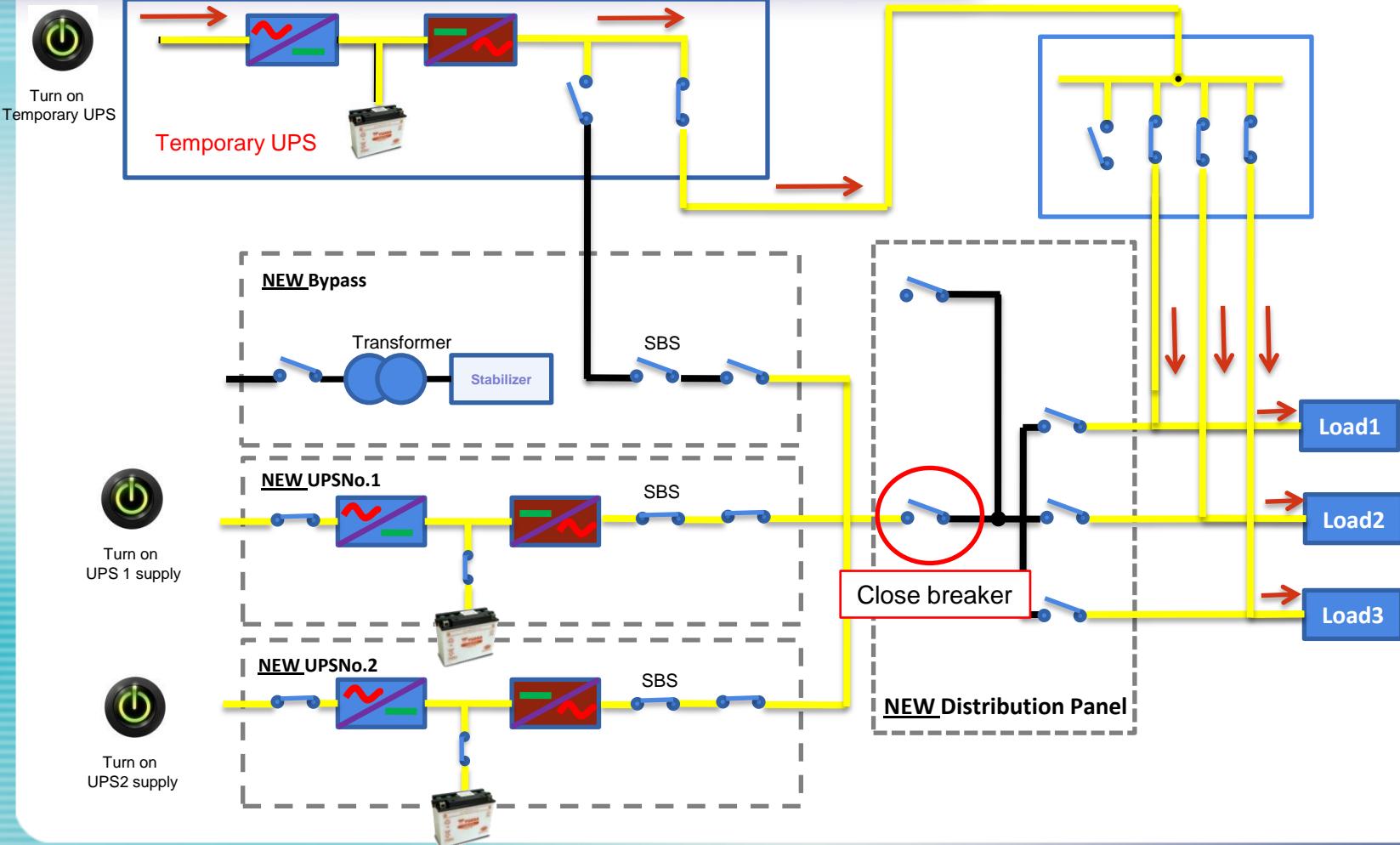
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



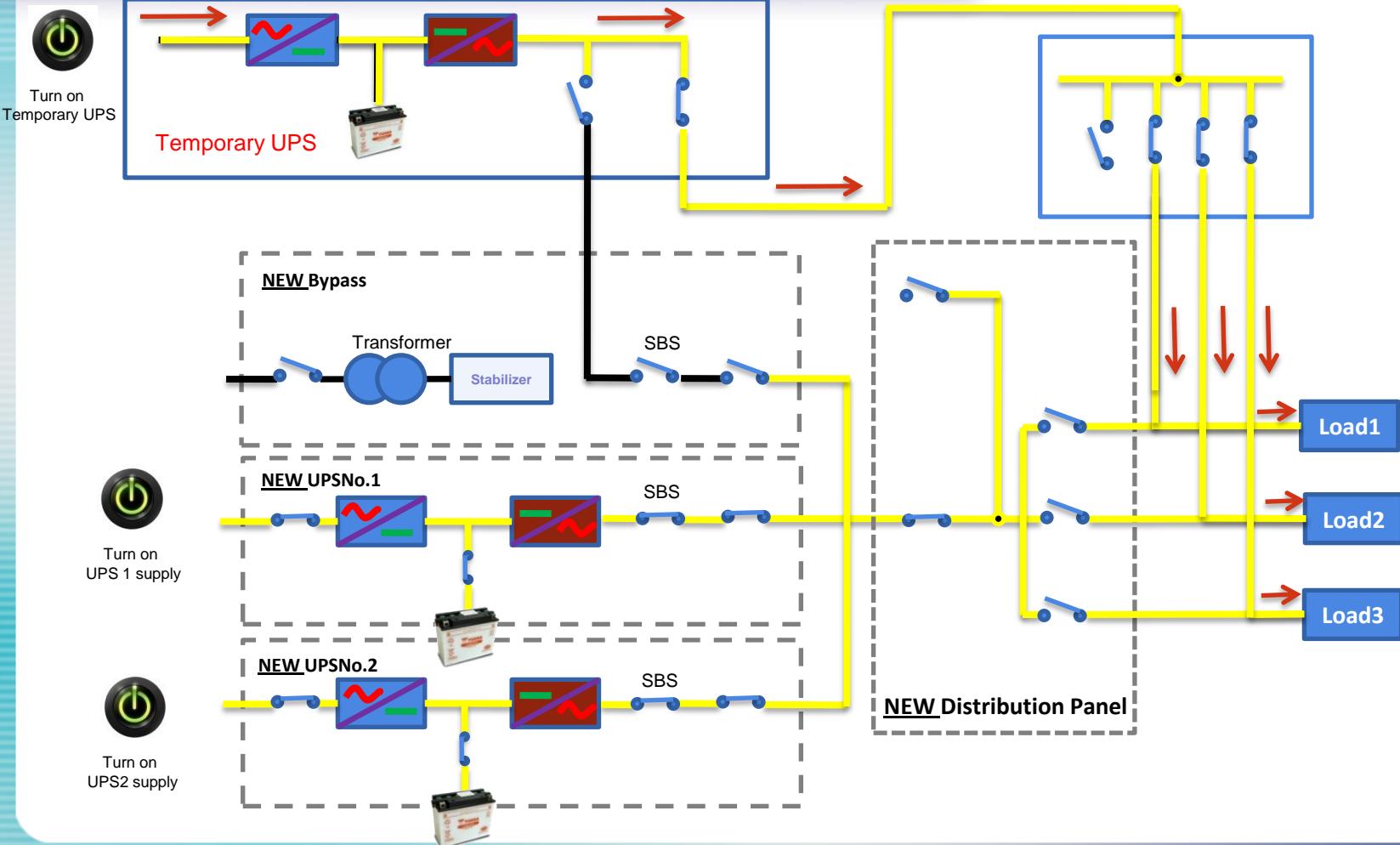
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



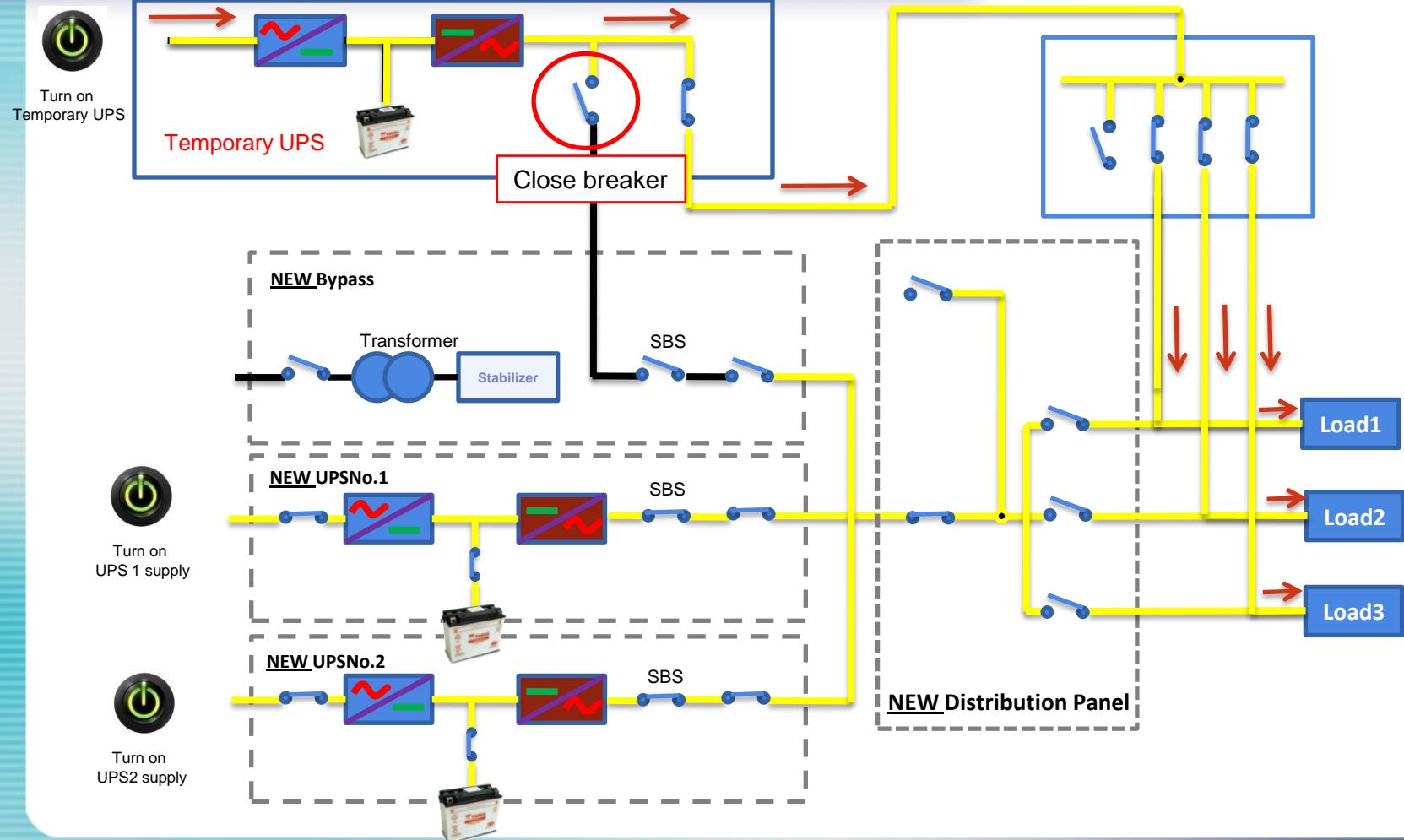
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



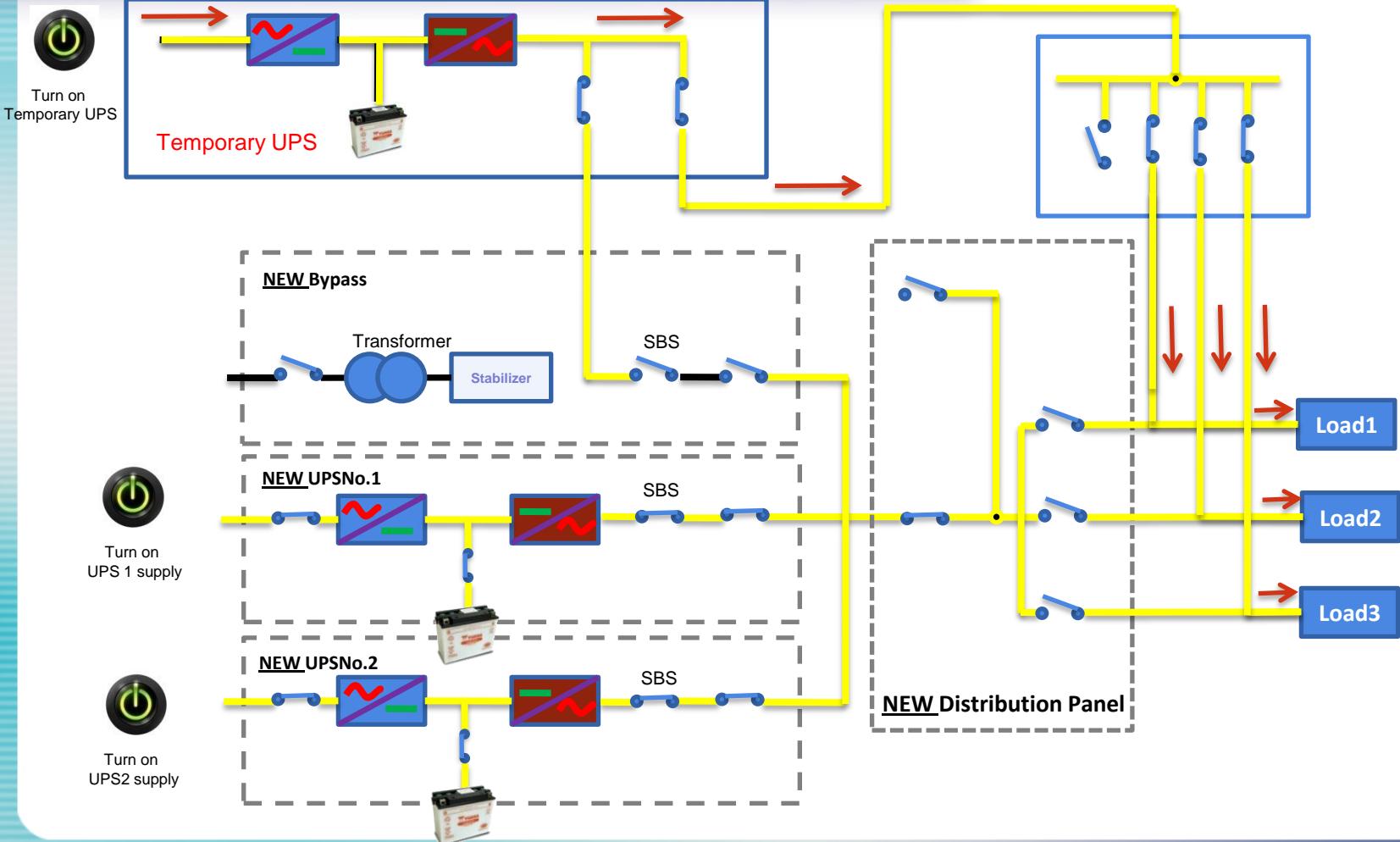
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



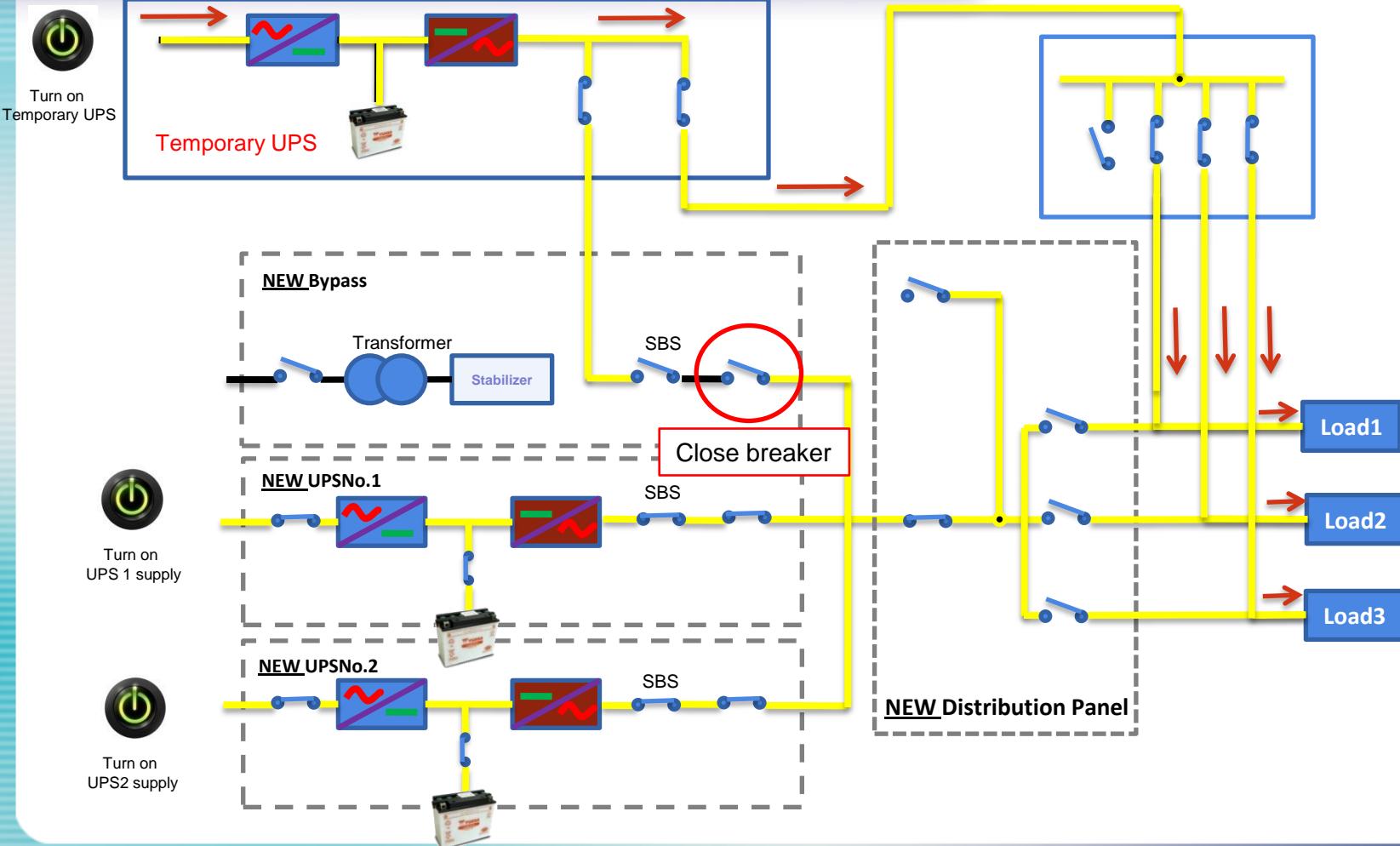
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



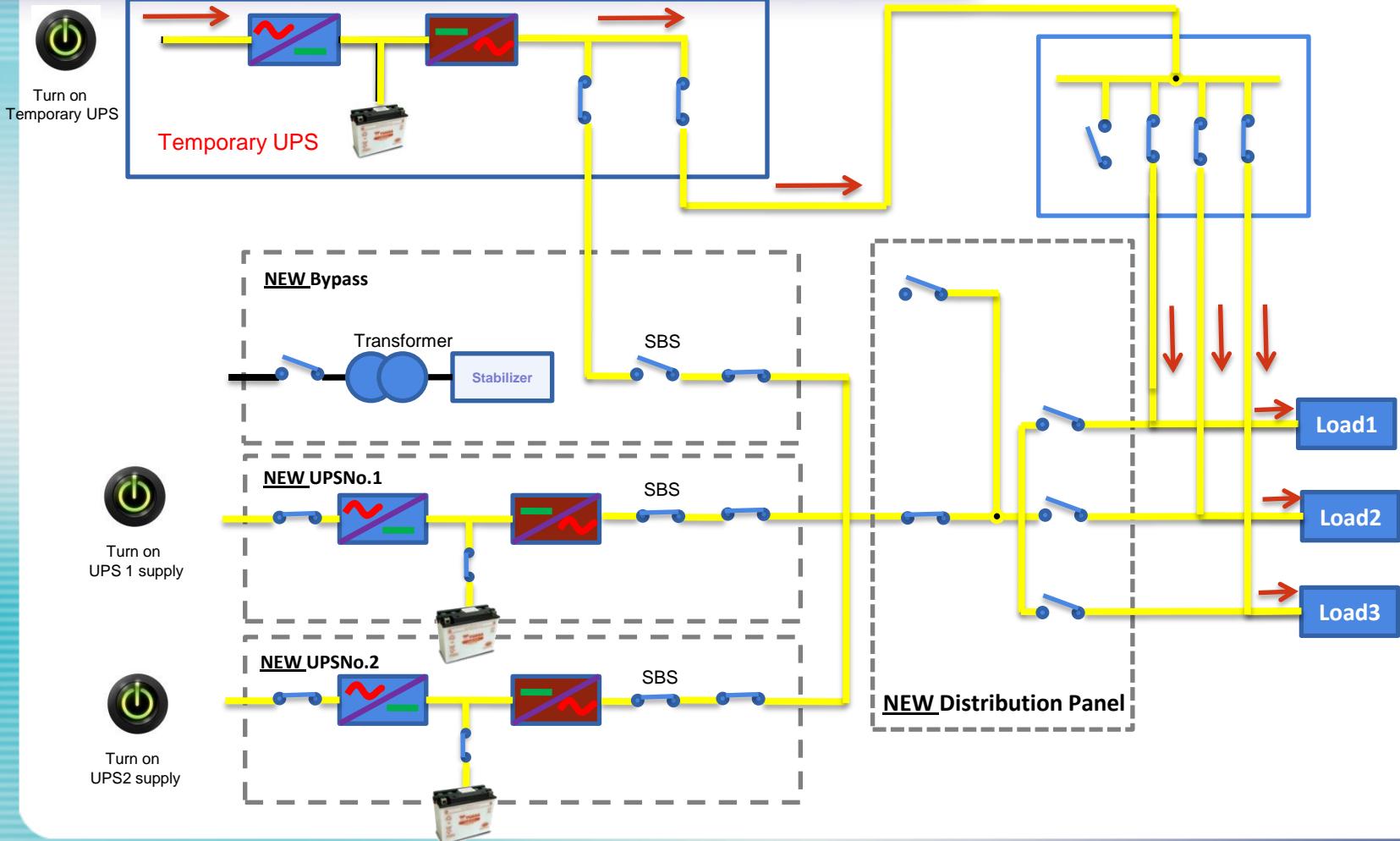
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



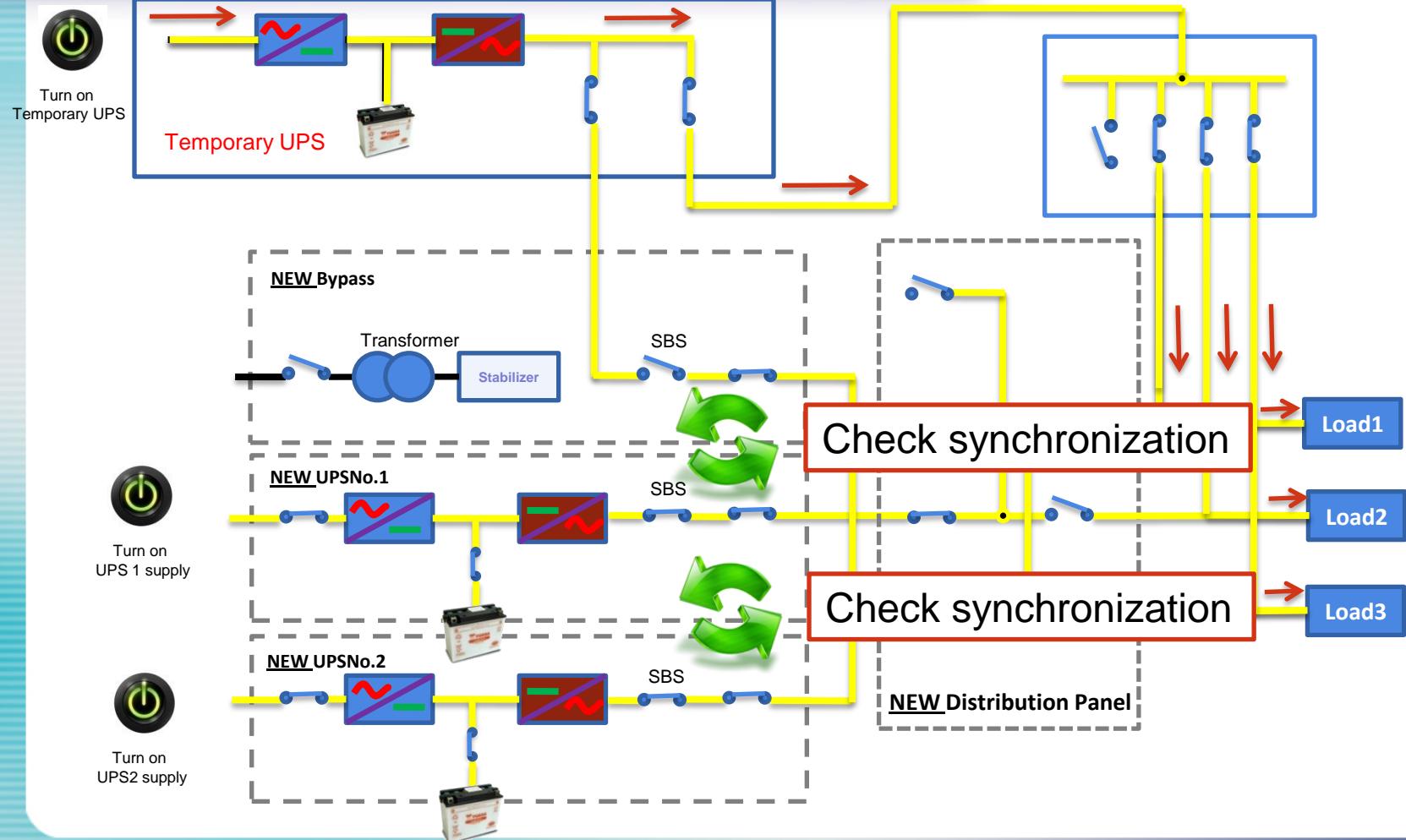
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



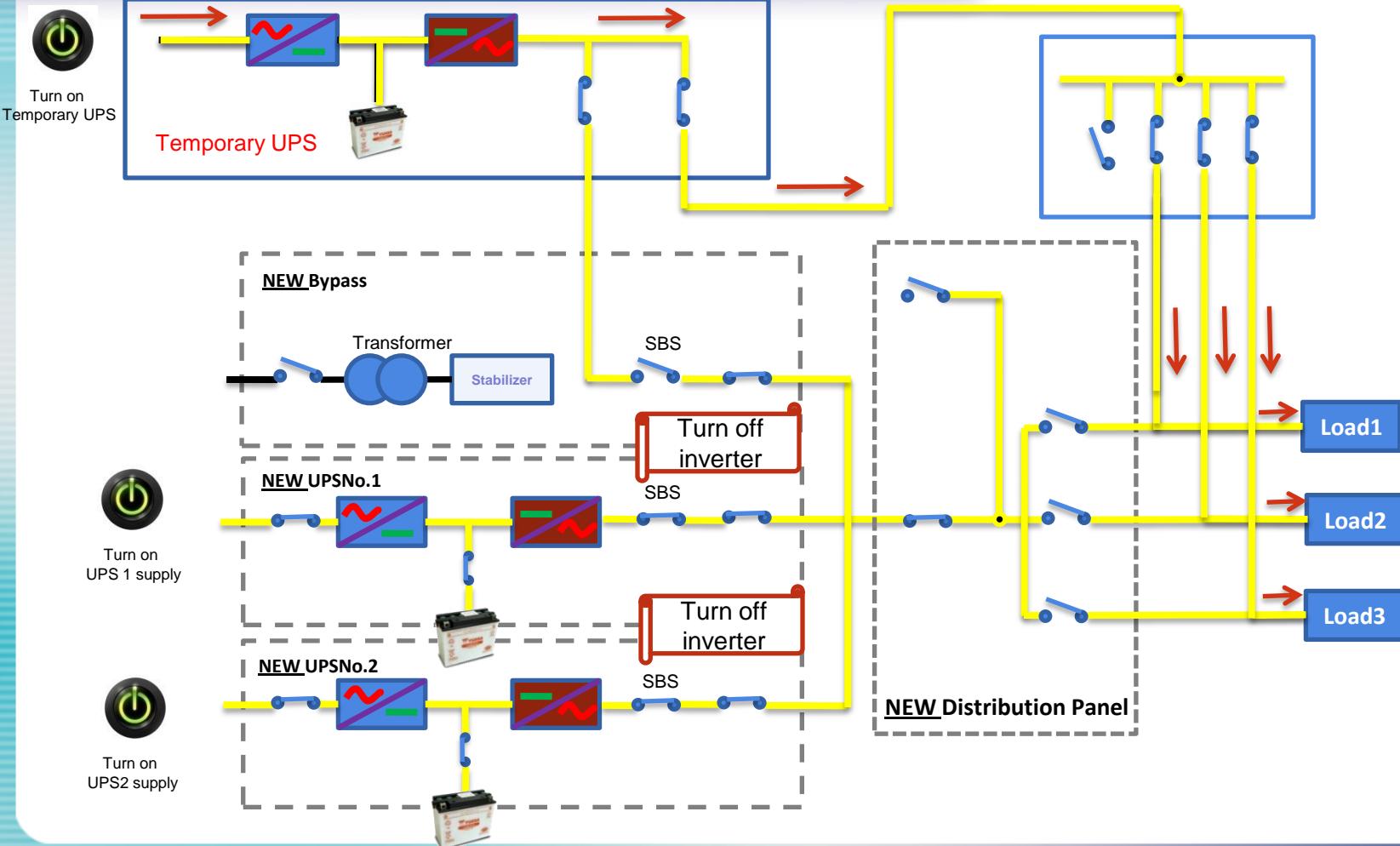
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



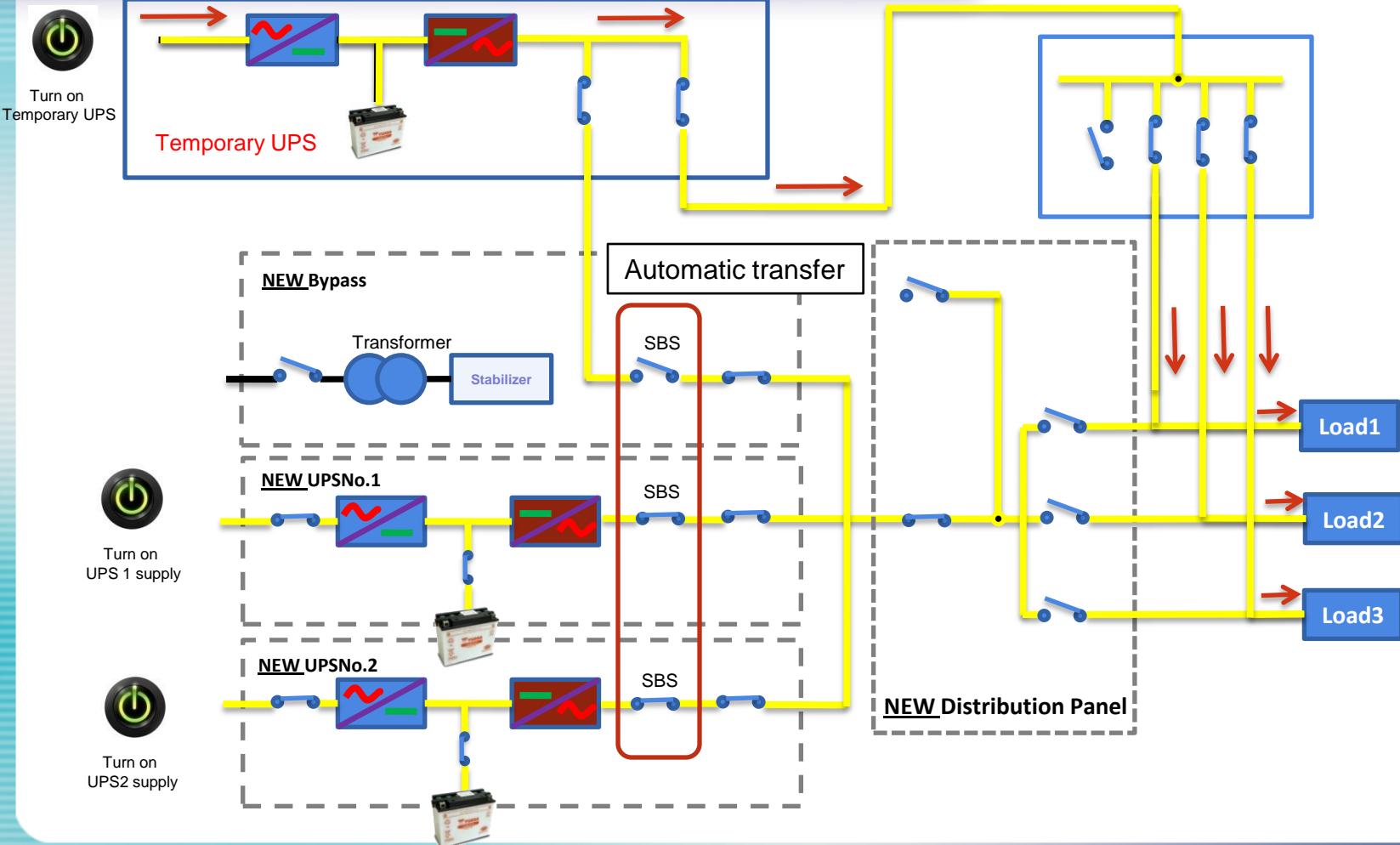
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



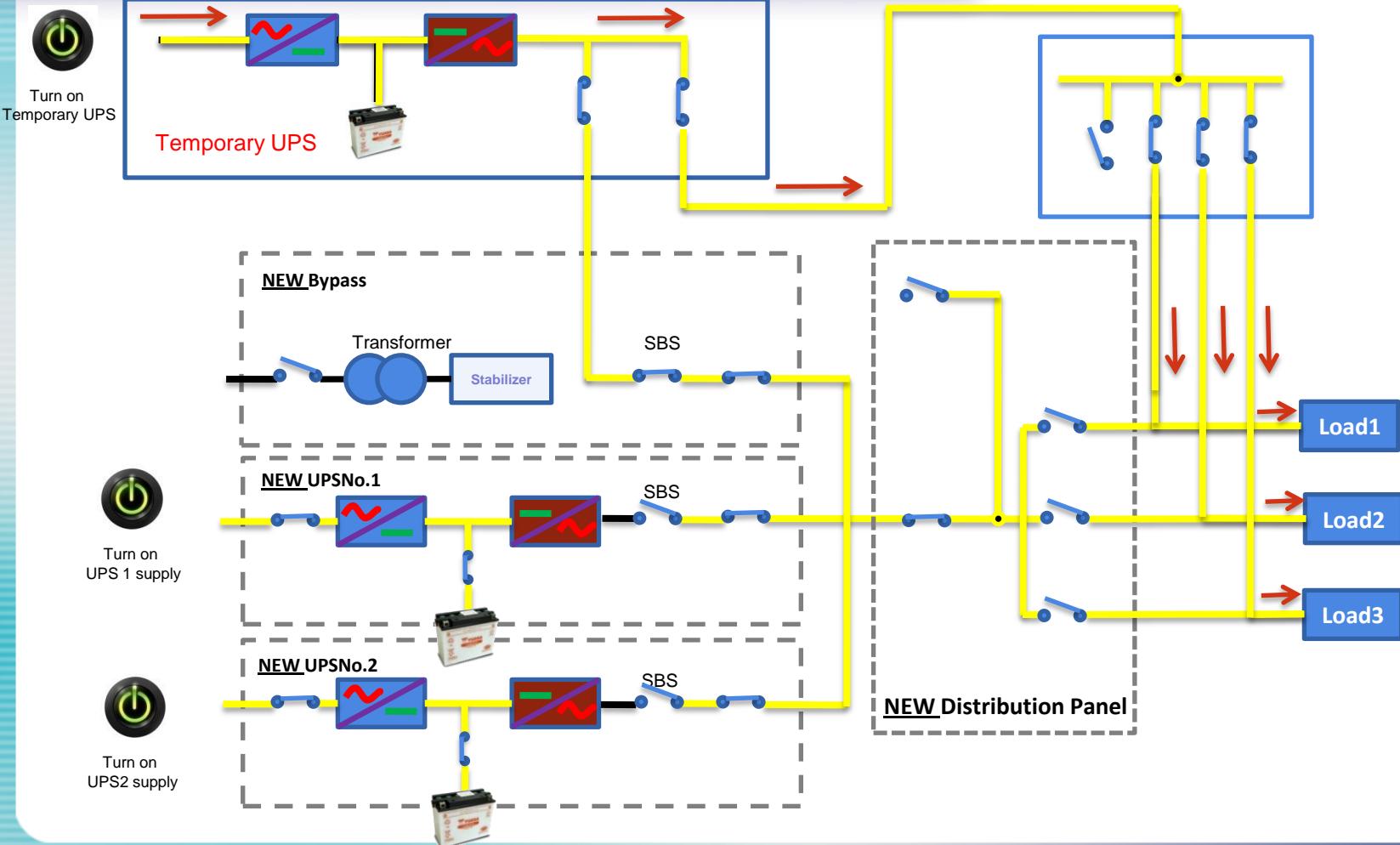
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



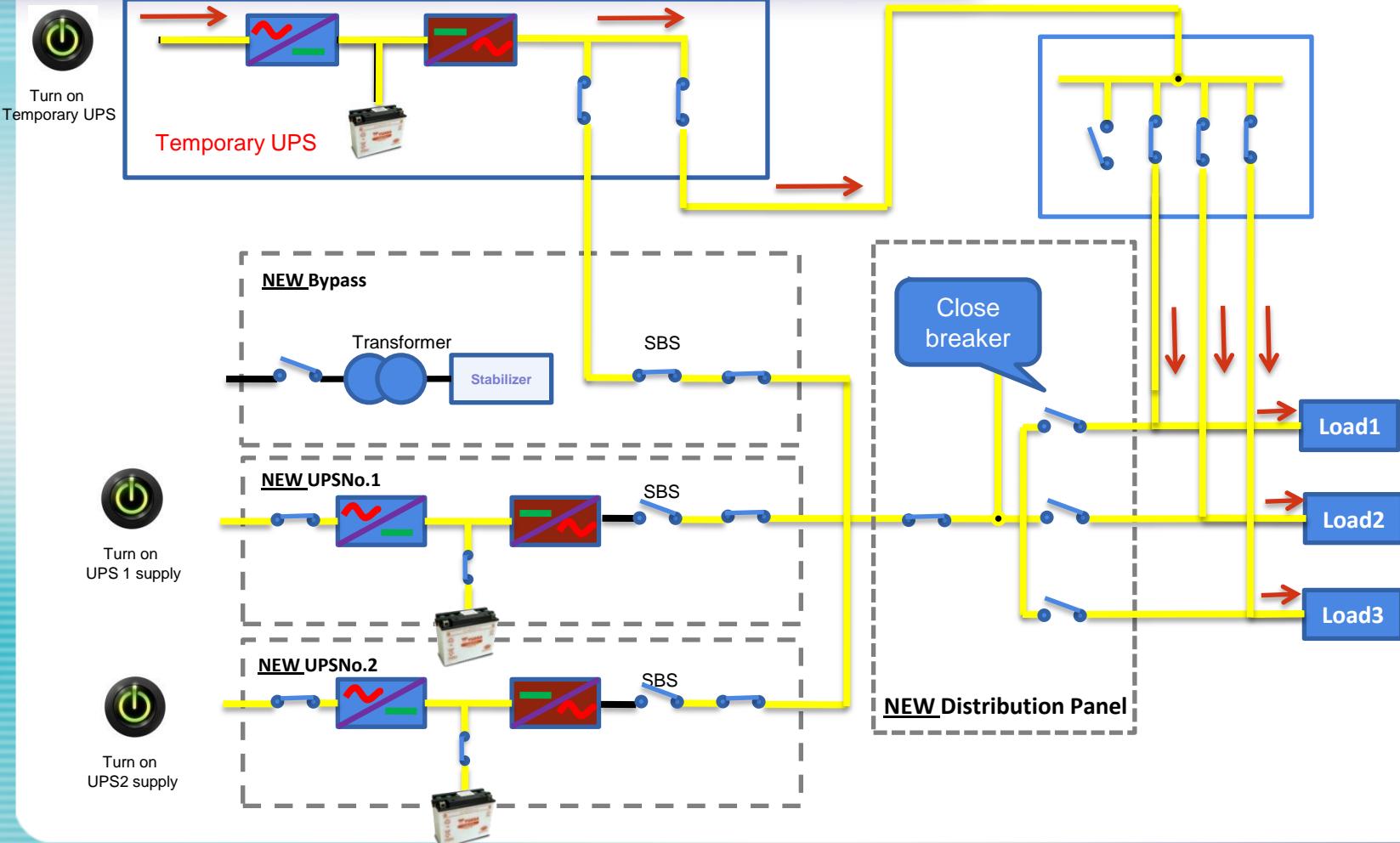
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



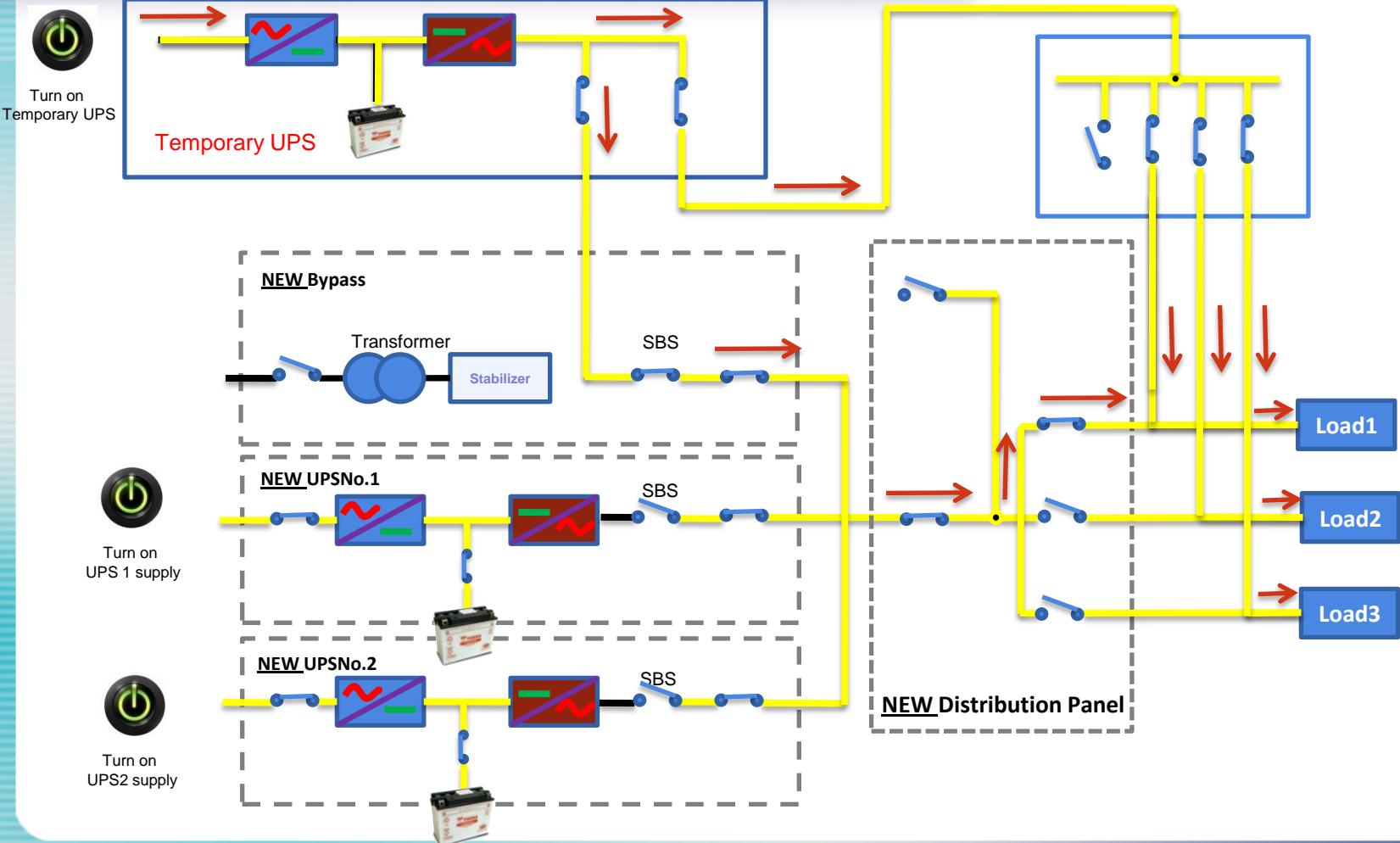
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



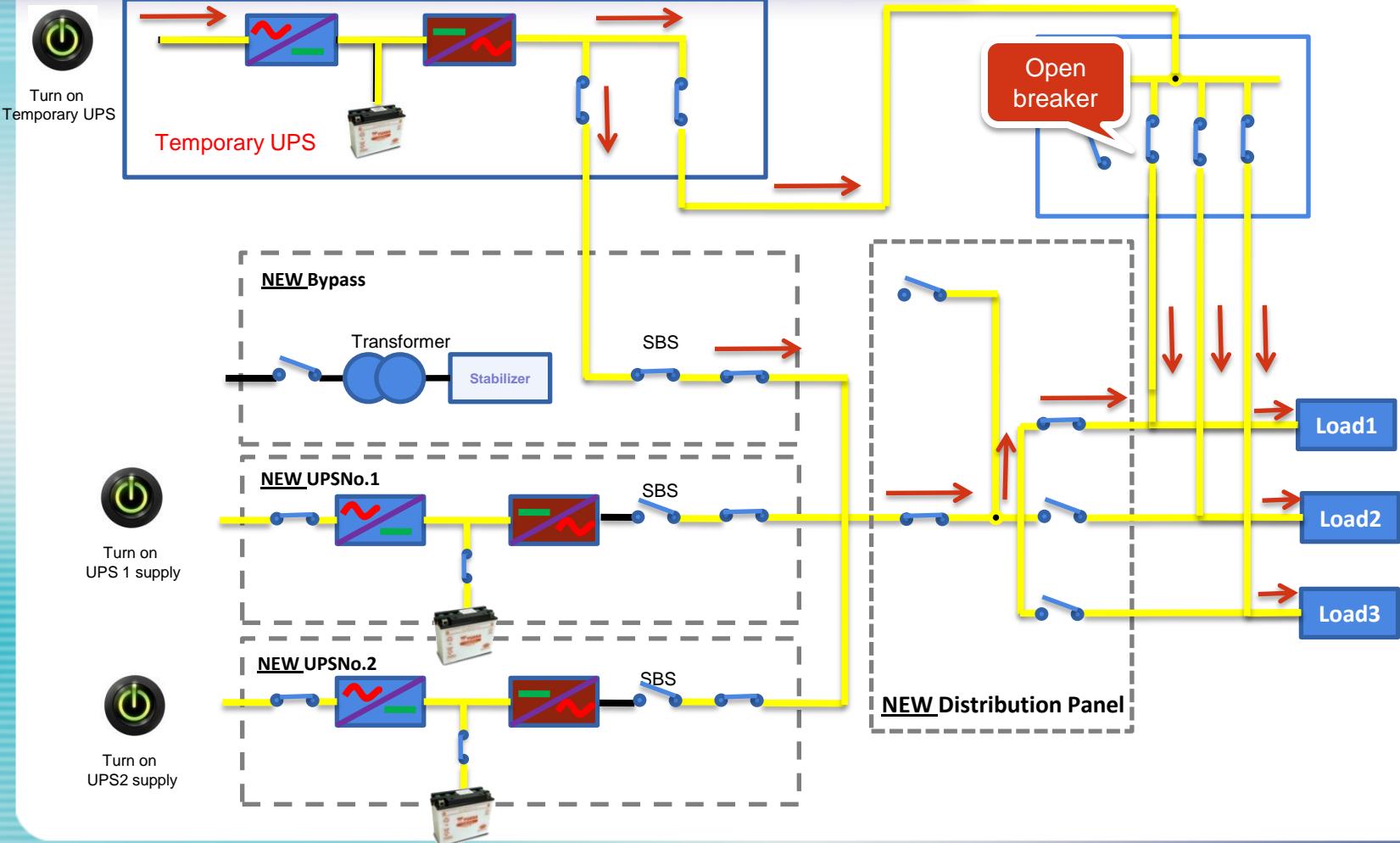
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



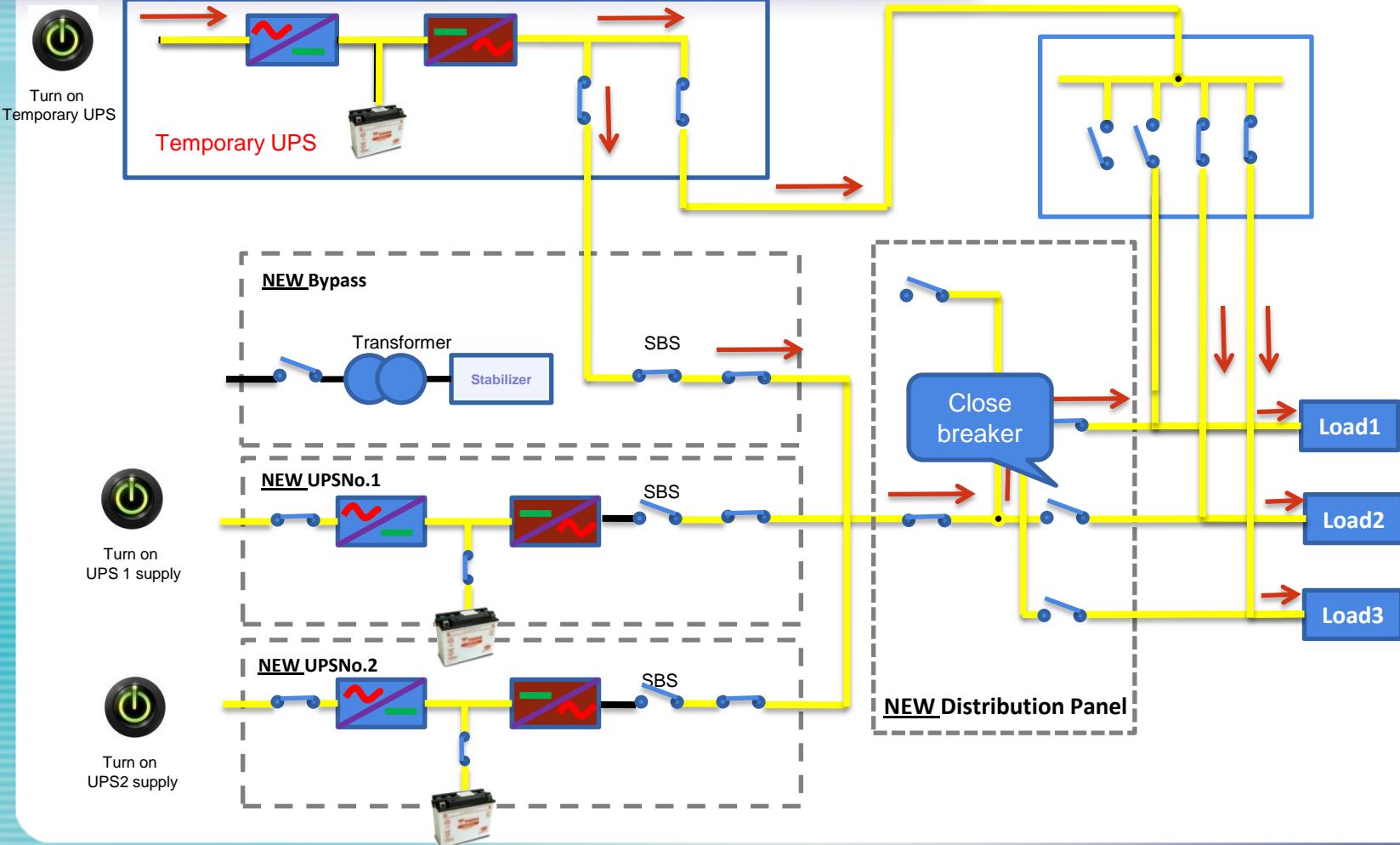
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



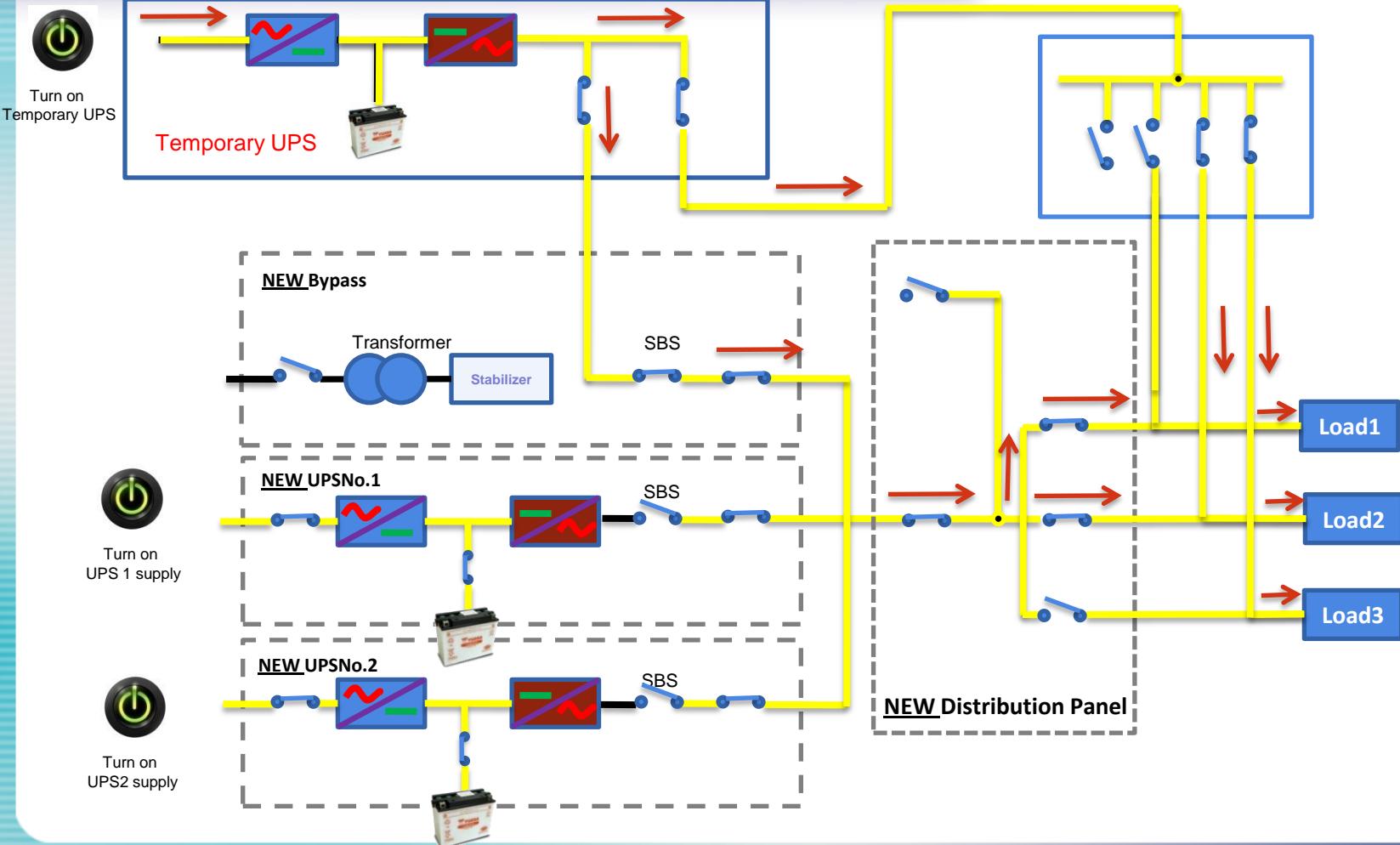
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



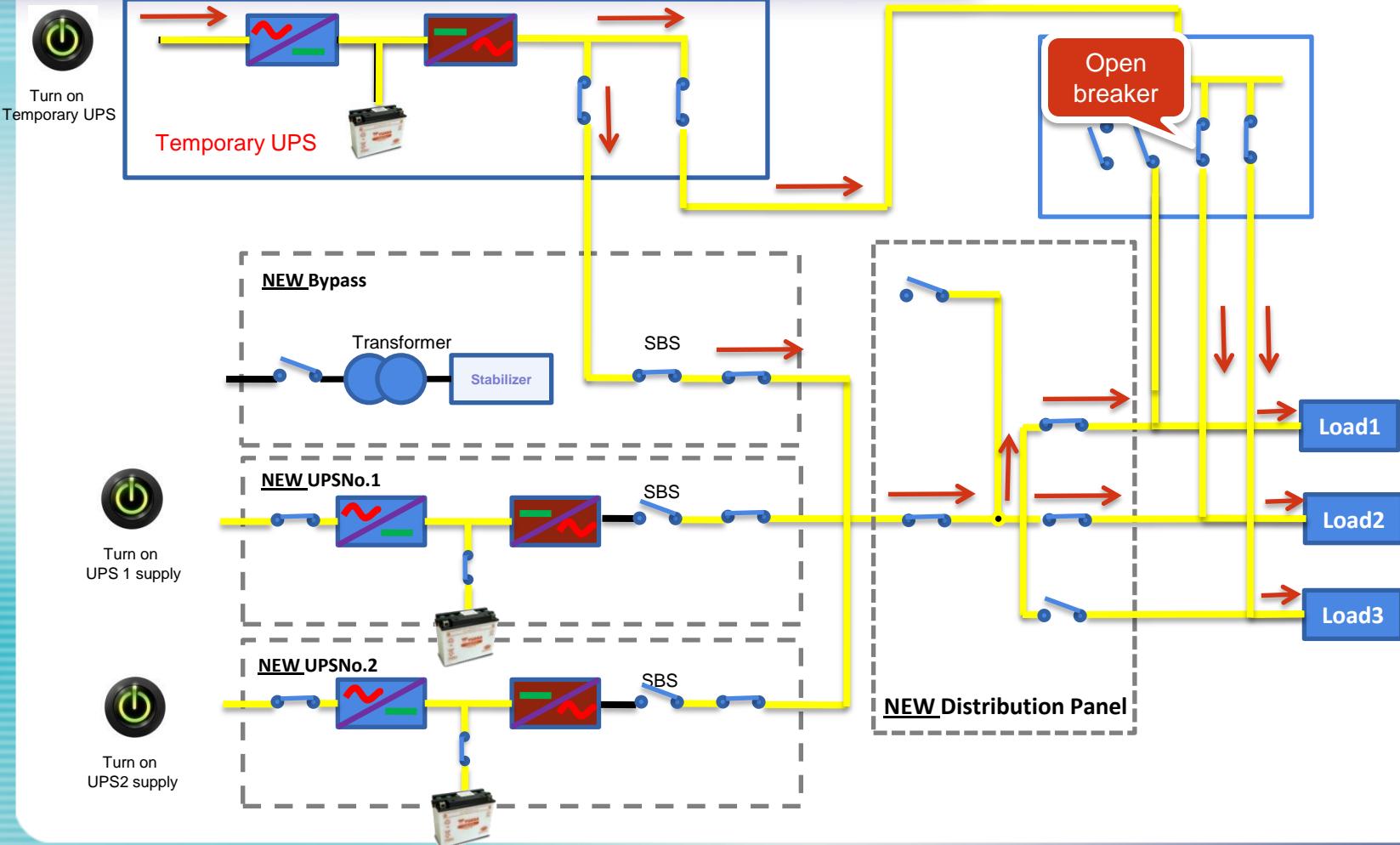
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



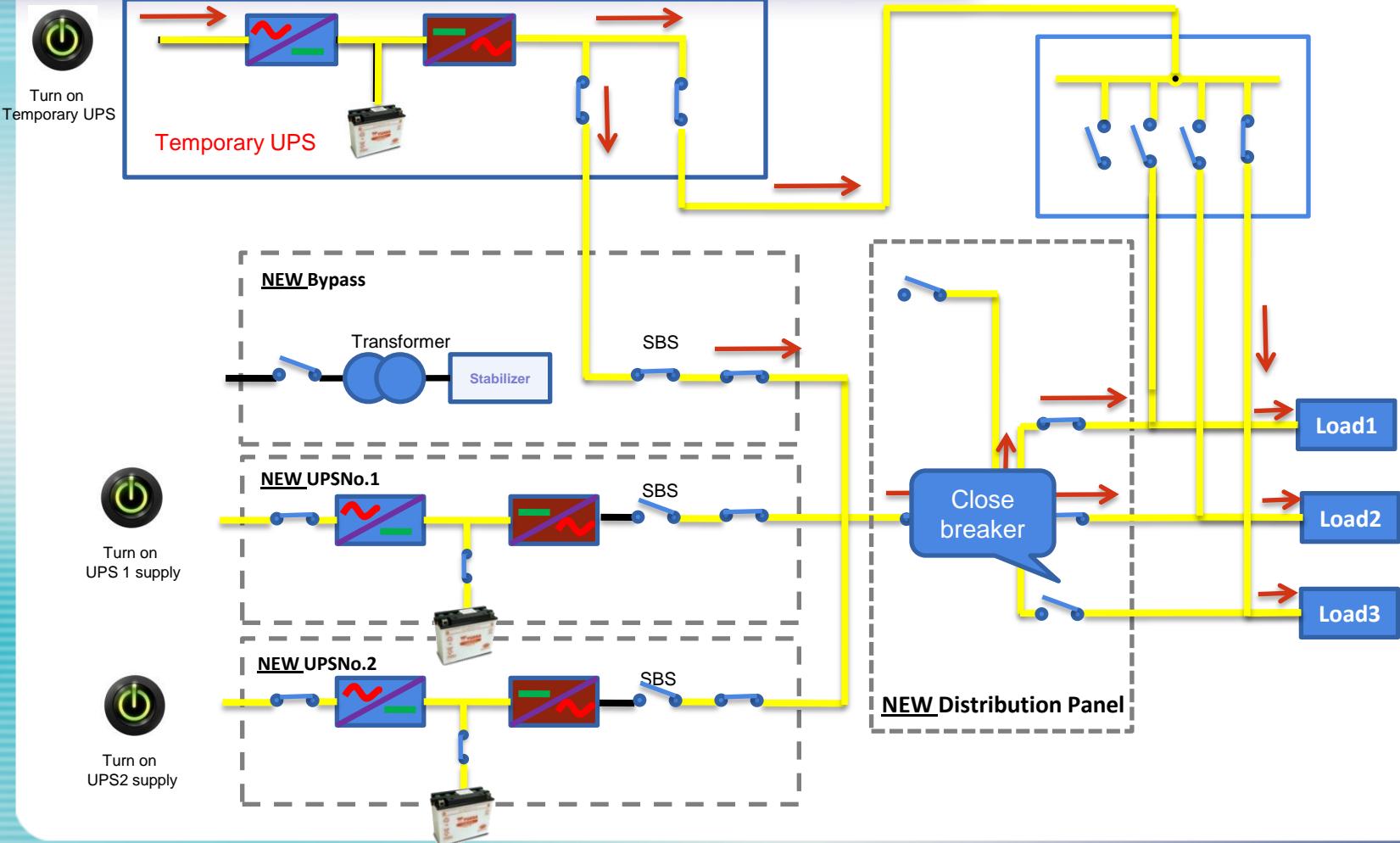
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



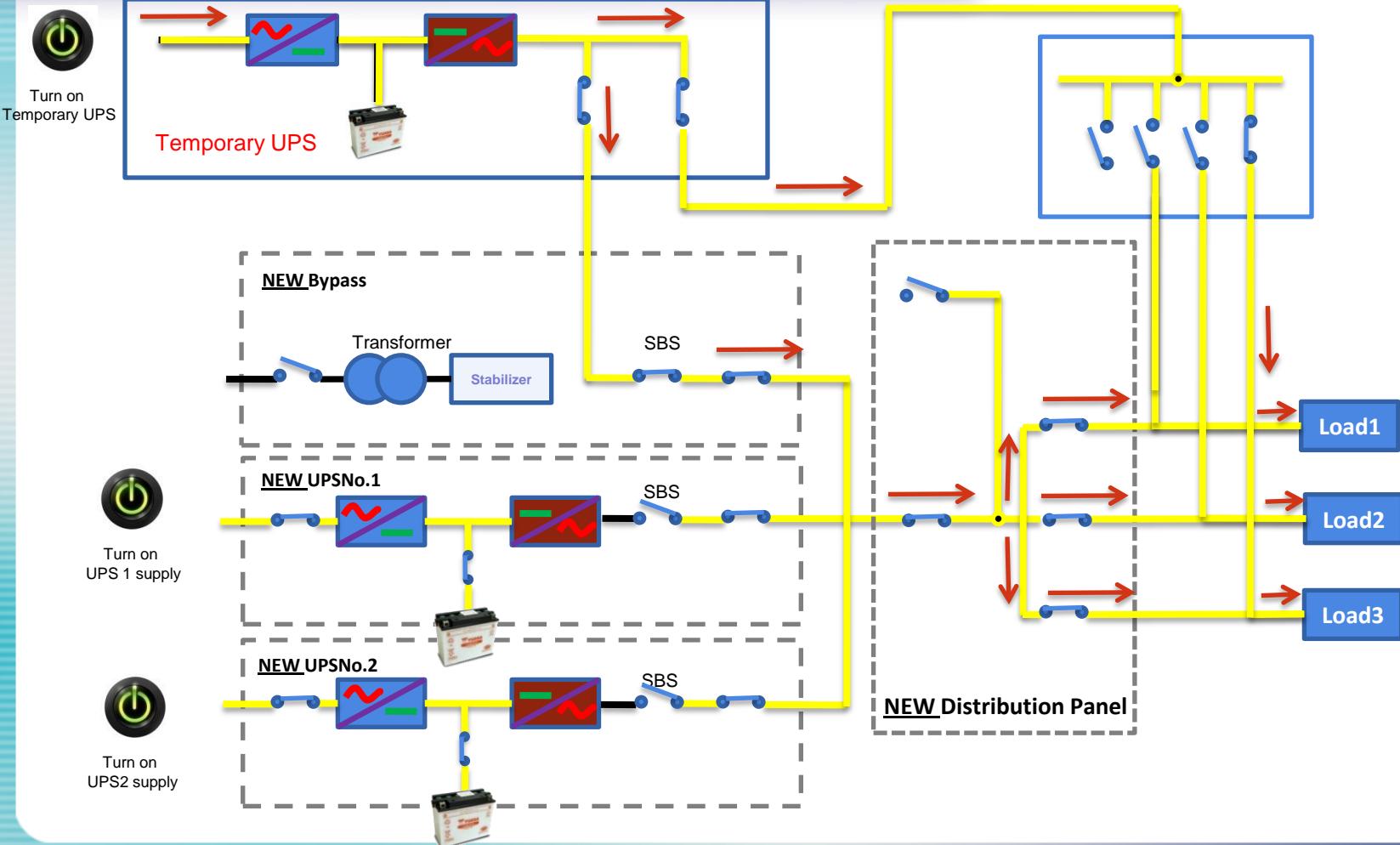
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



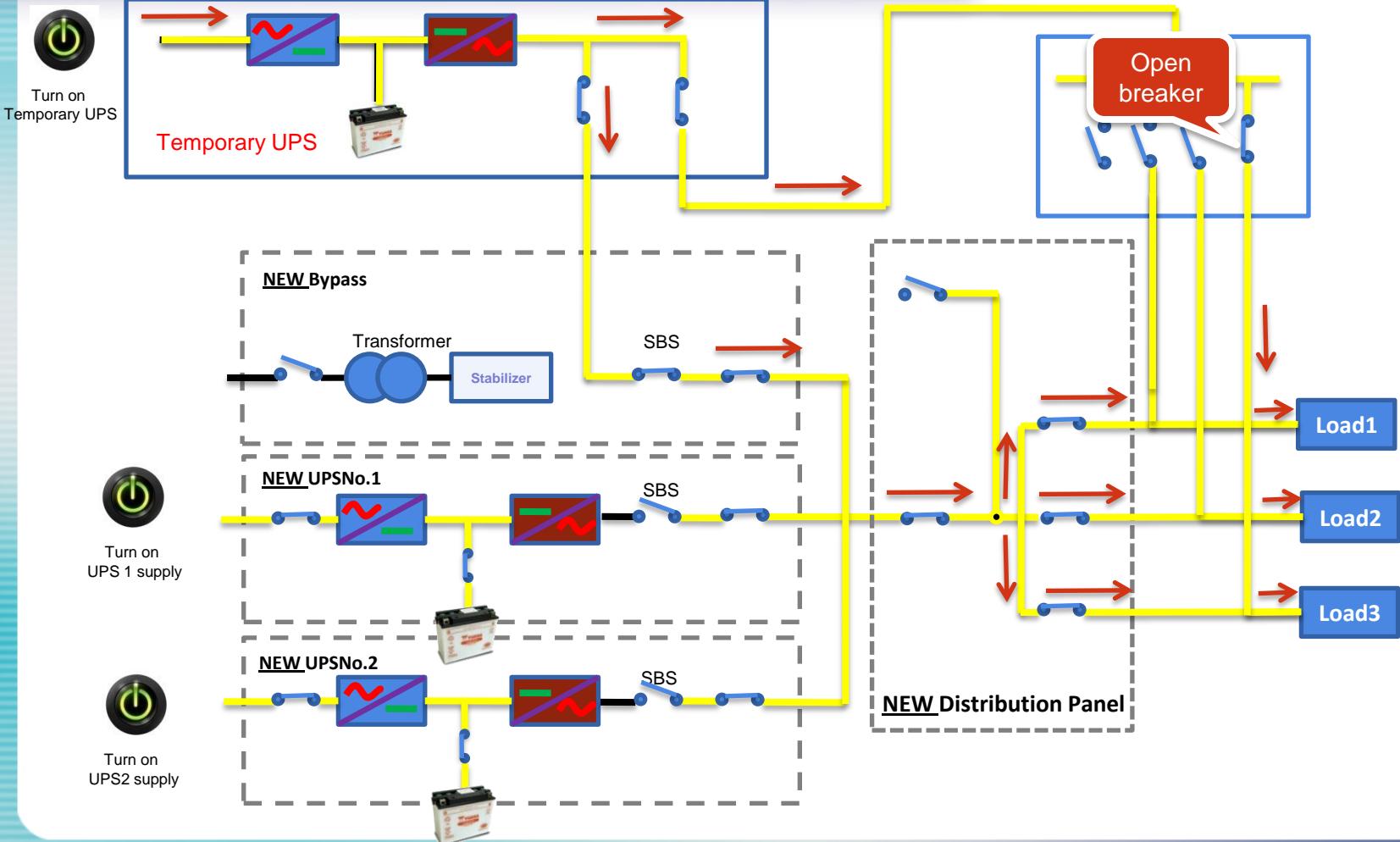
Switching load from Temporary UPS to New UPS

Temporary Distribution panel

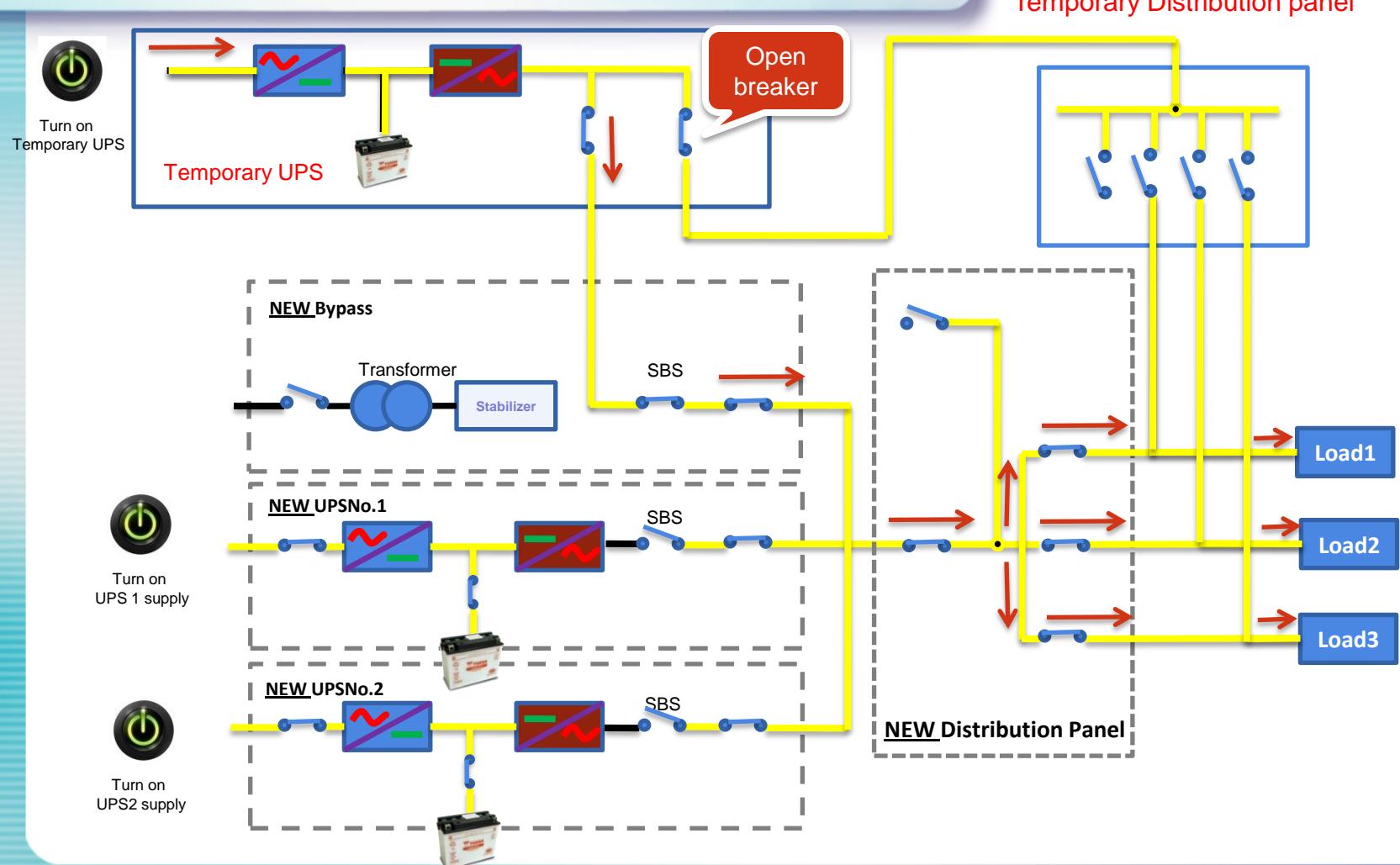


Switching load from Temporary UPS to New UPS

Temporary Distribution panel

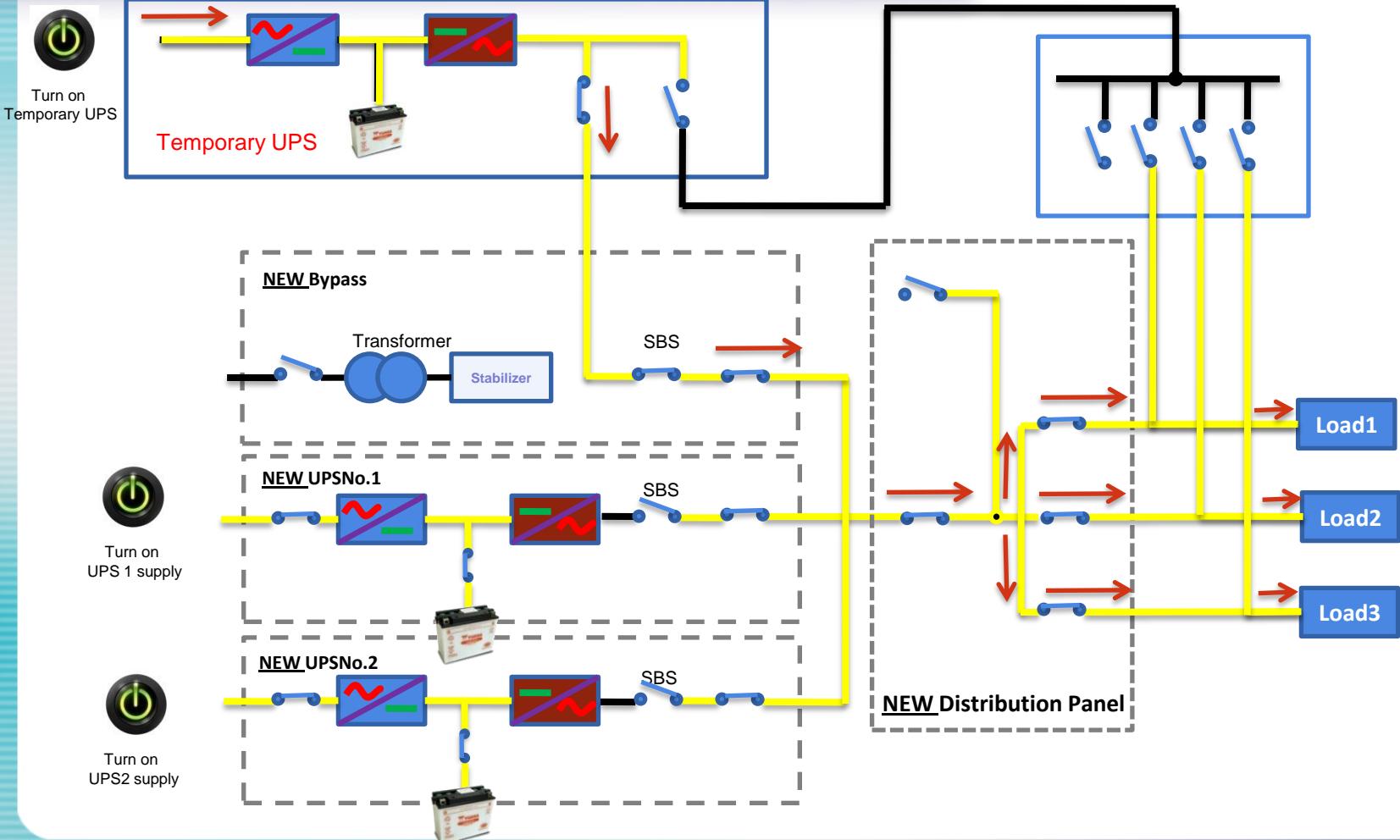


Switching load from Temporary UPS to New UPS



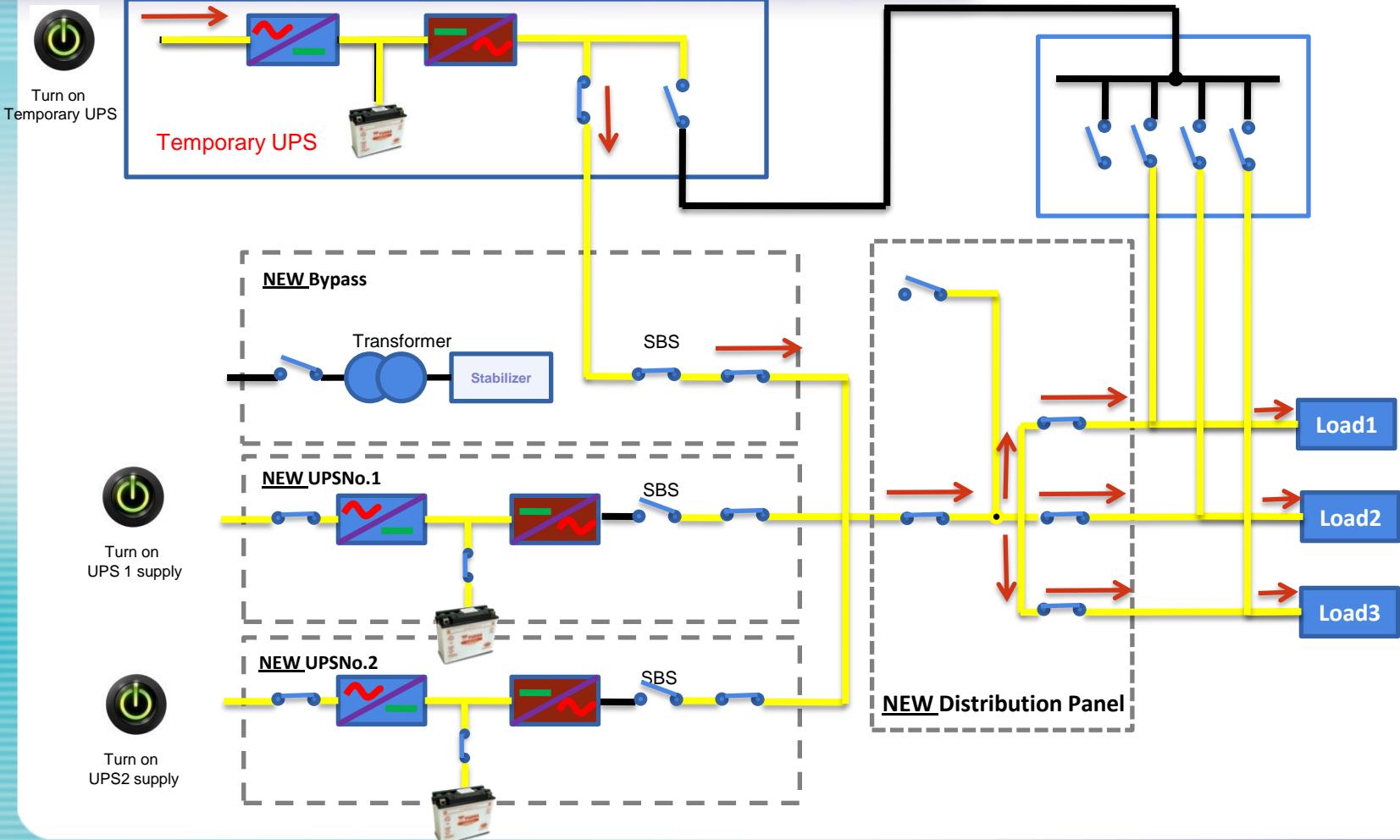
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



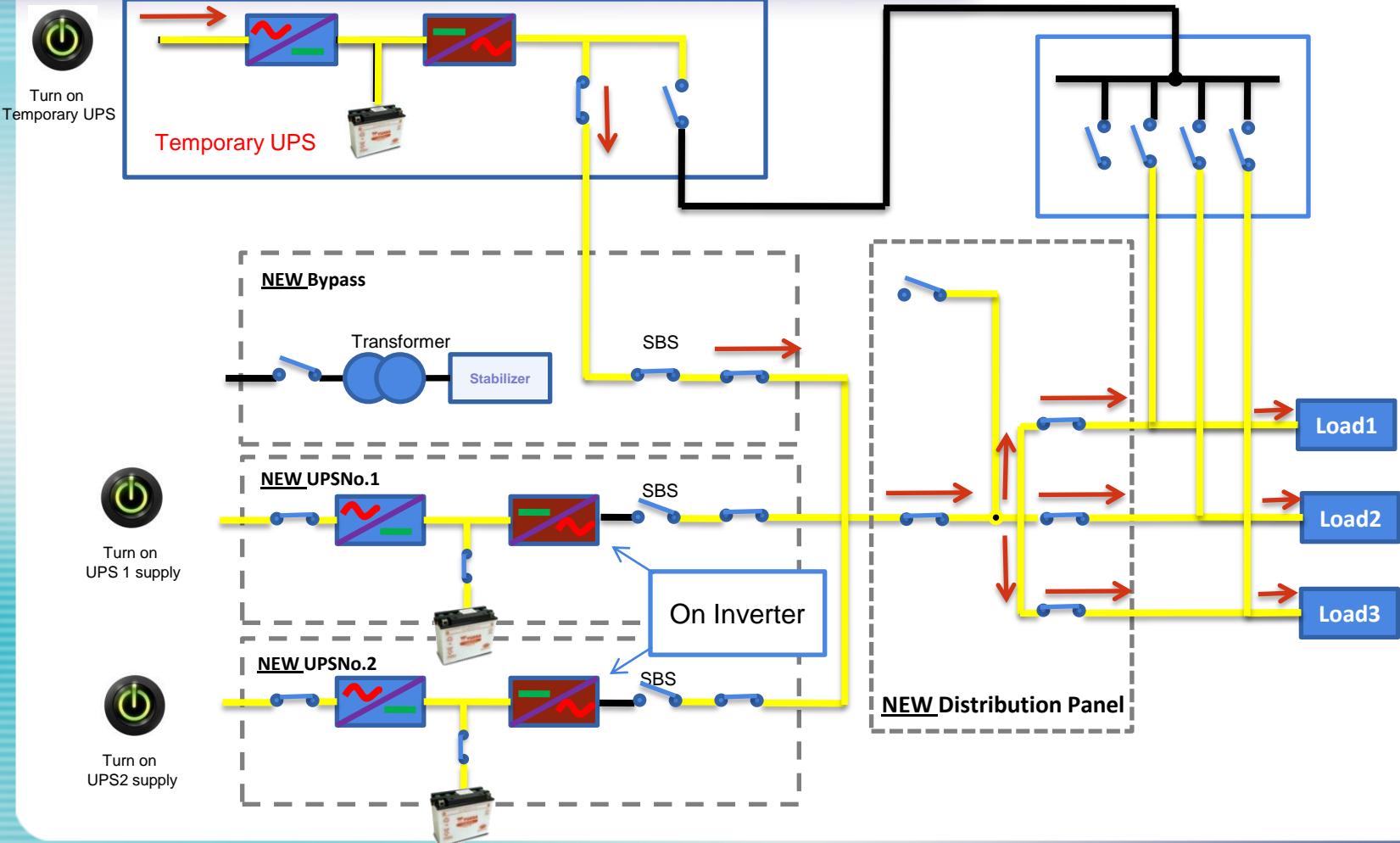
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



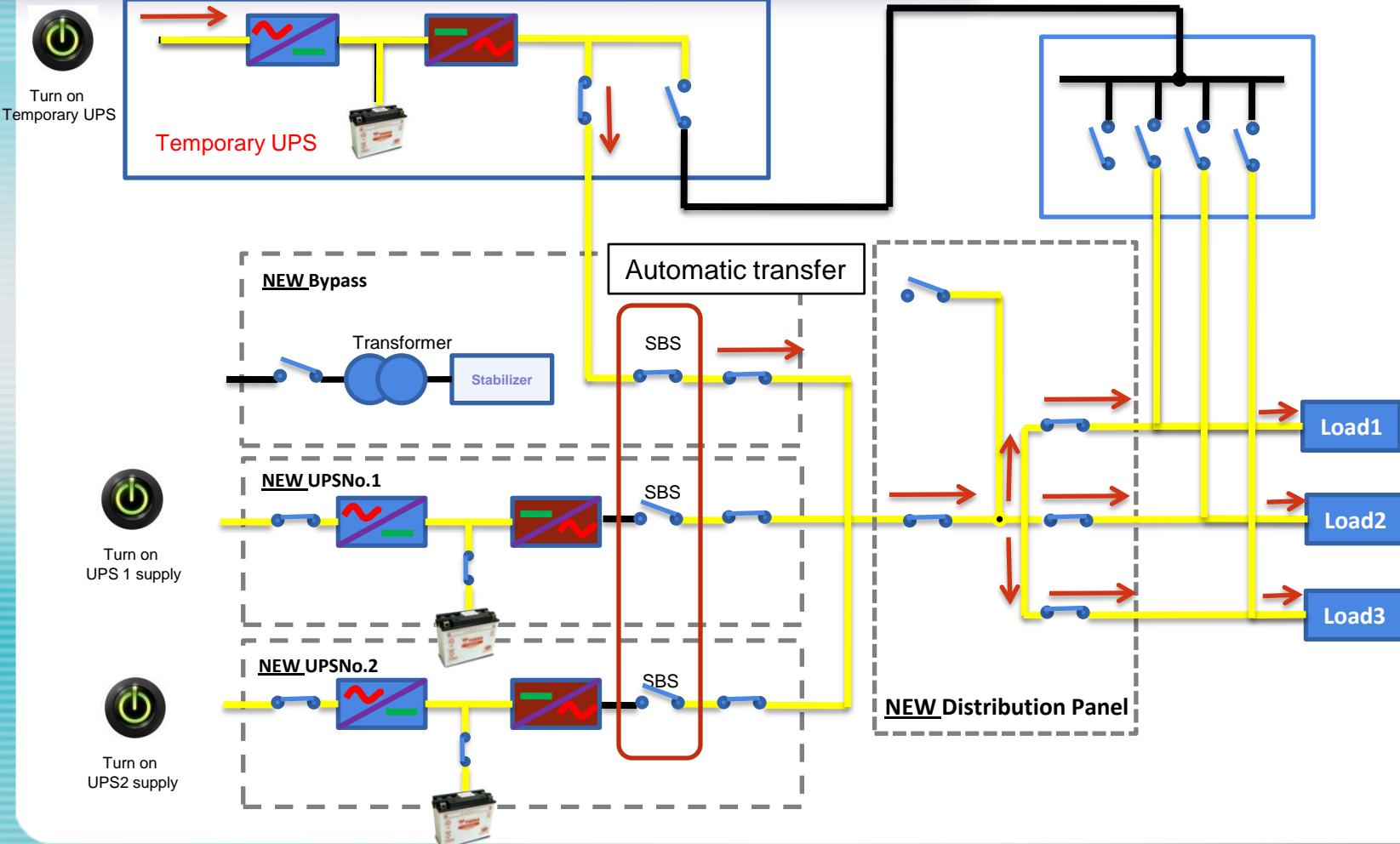
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



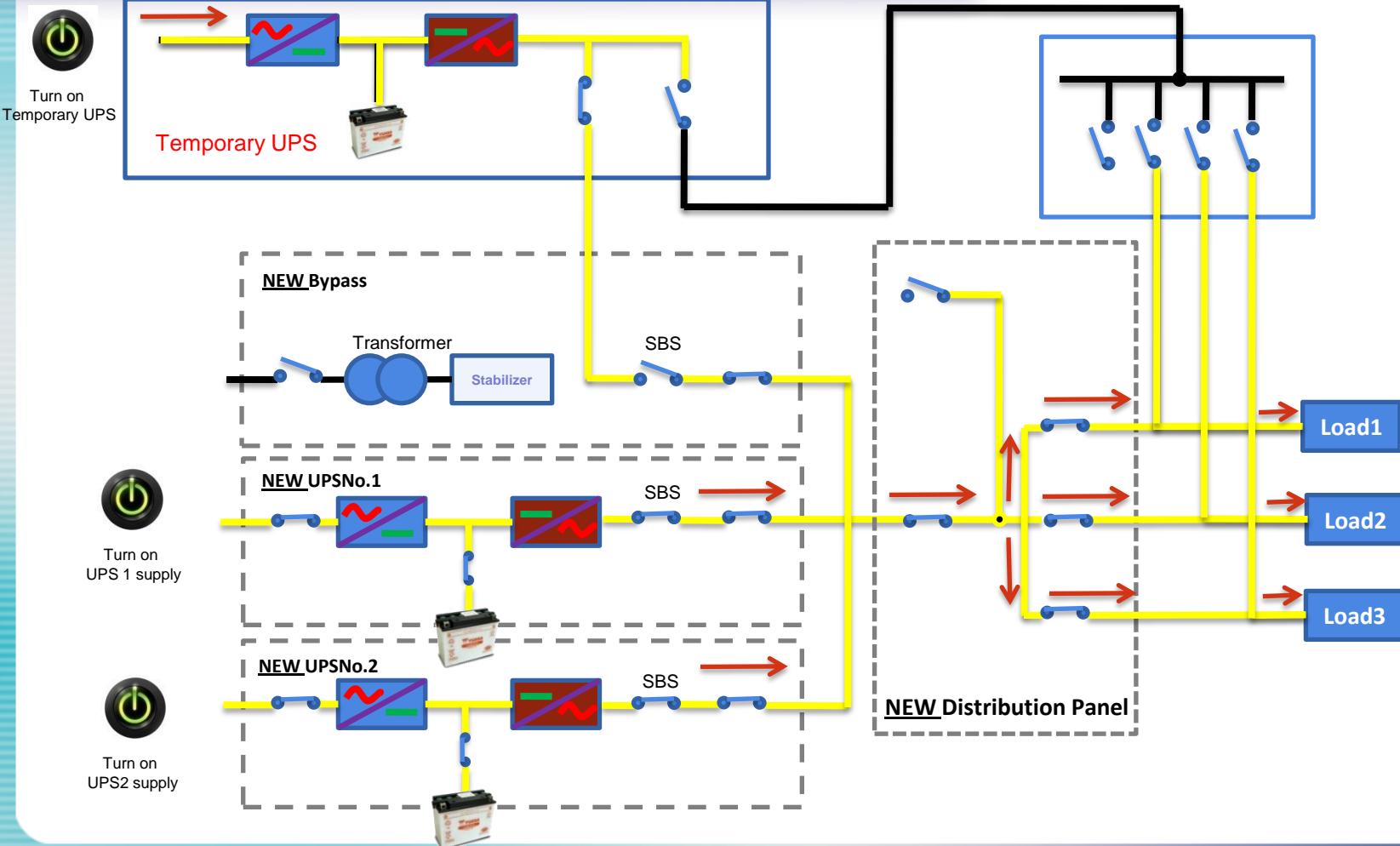
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



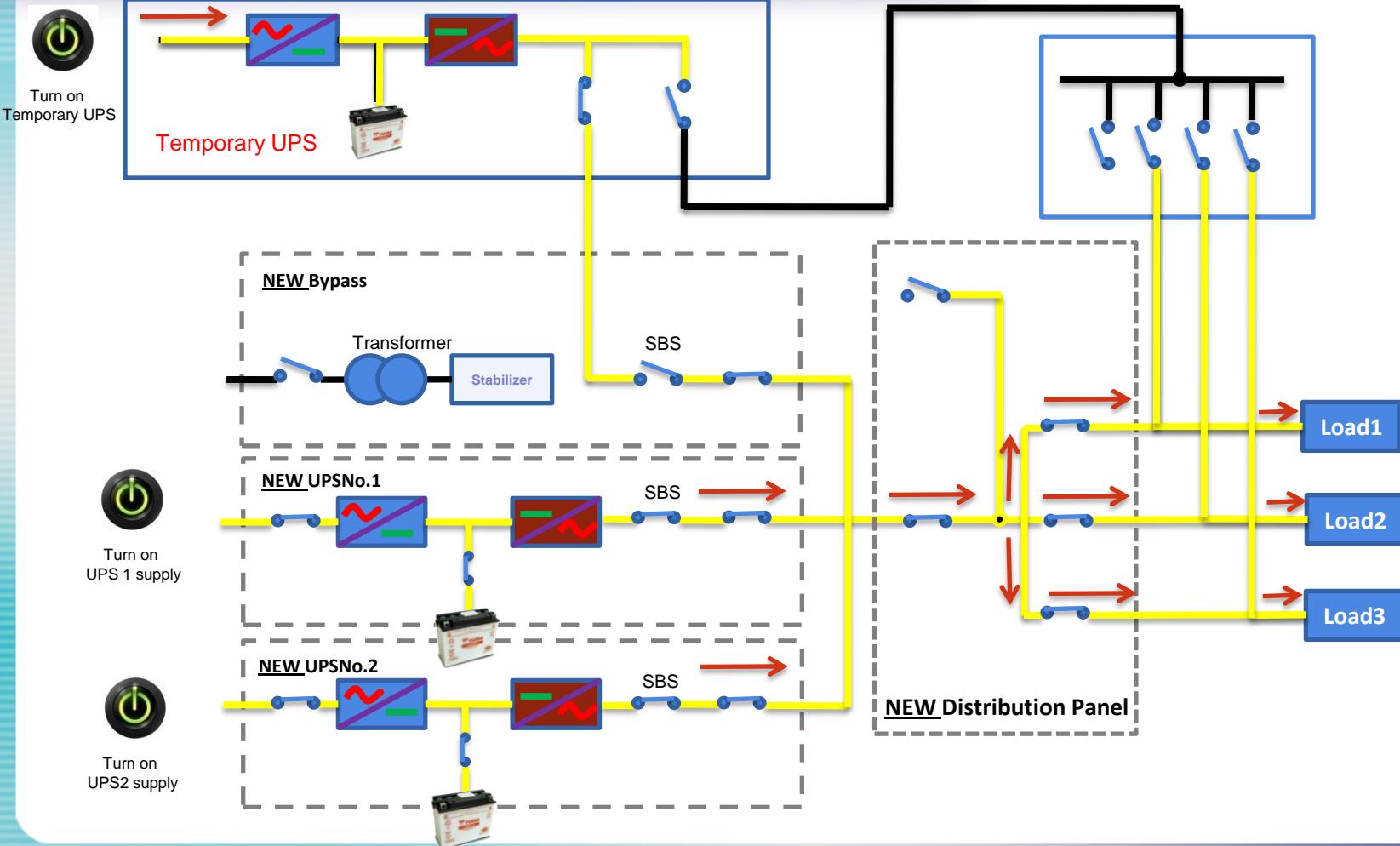
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



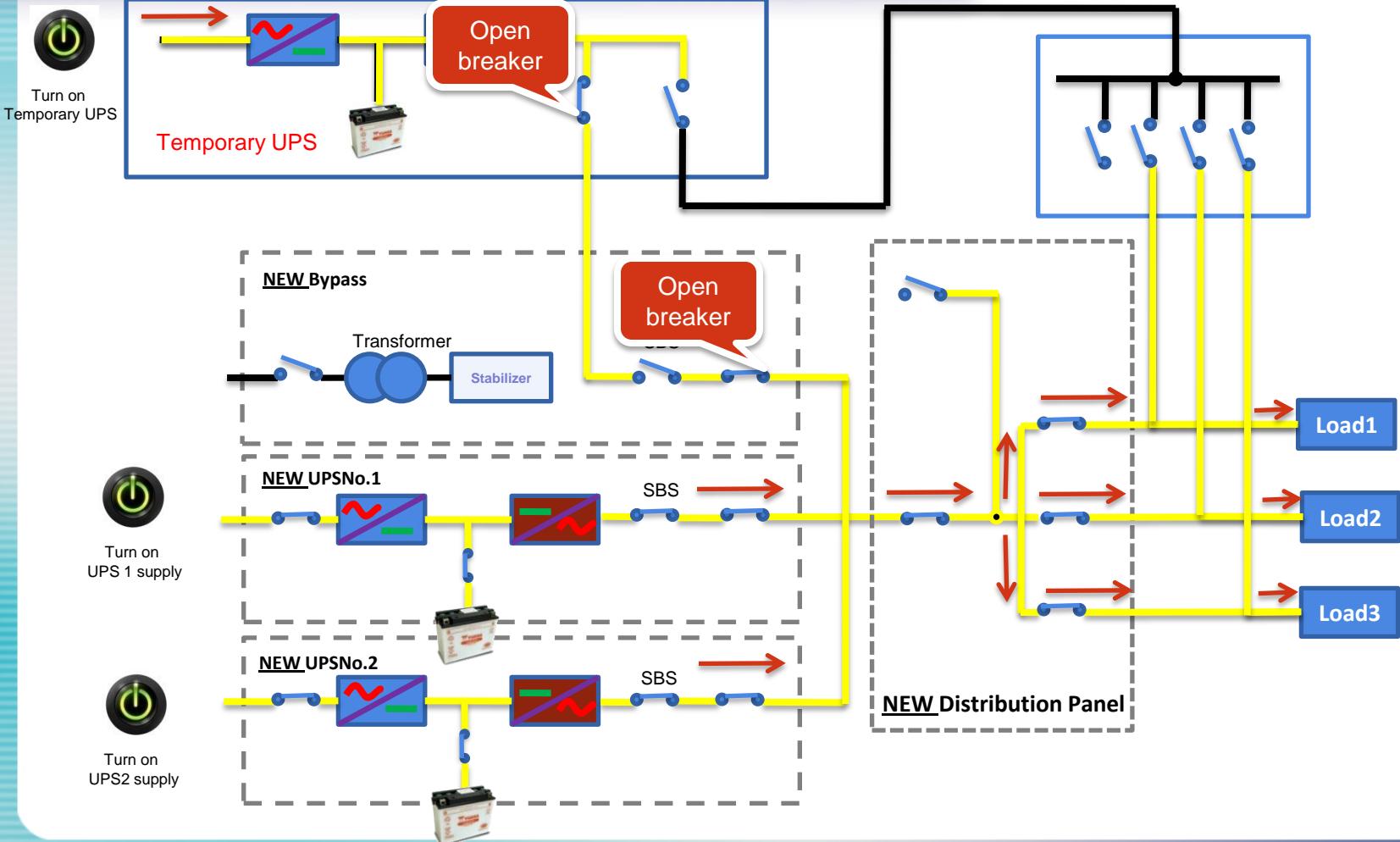
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



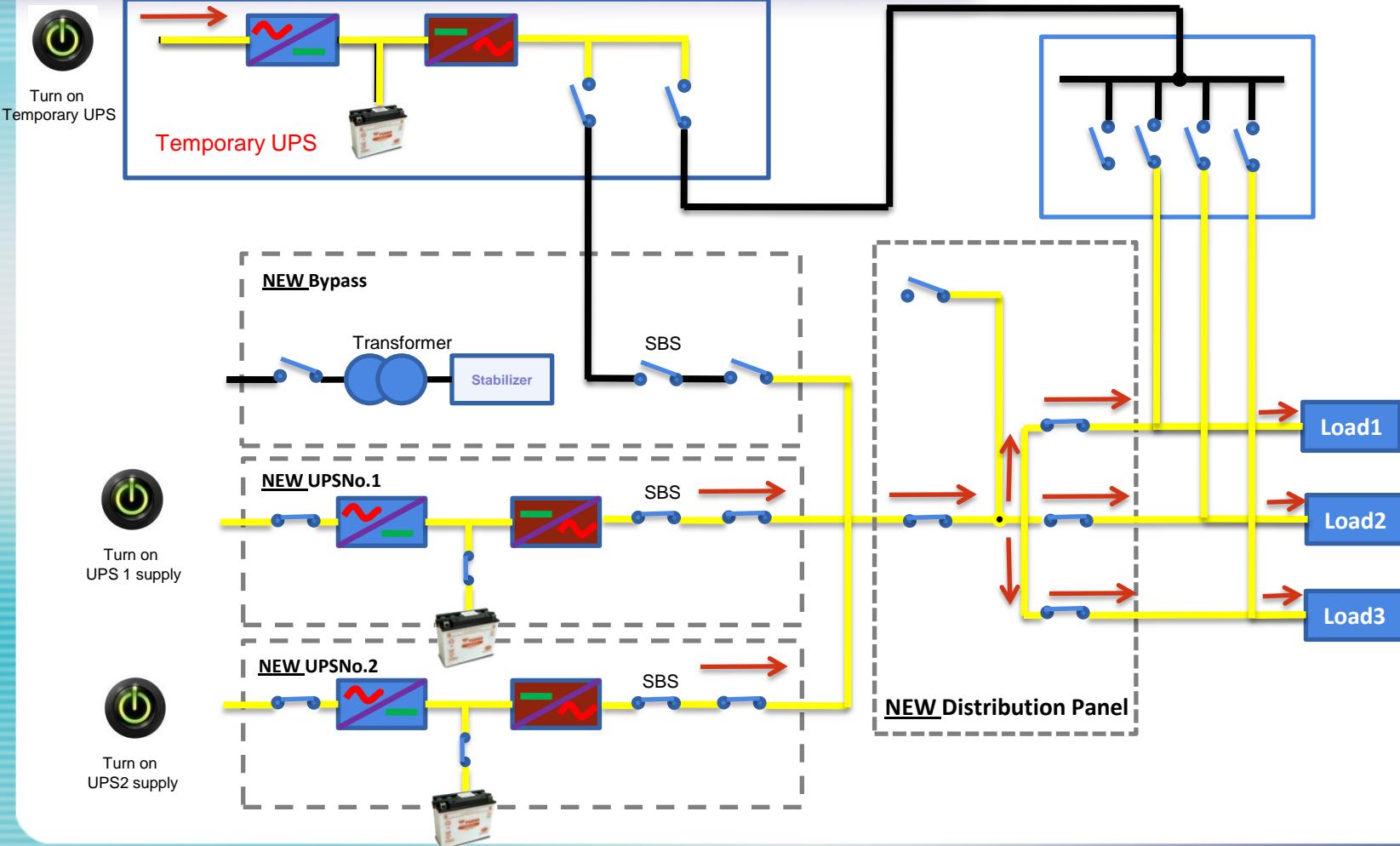
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



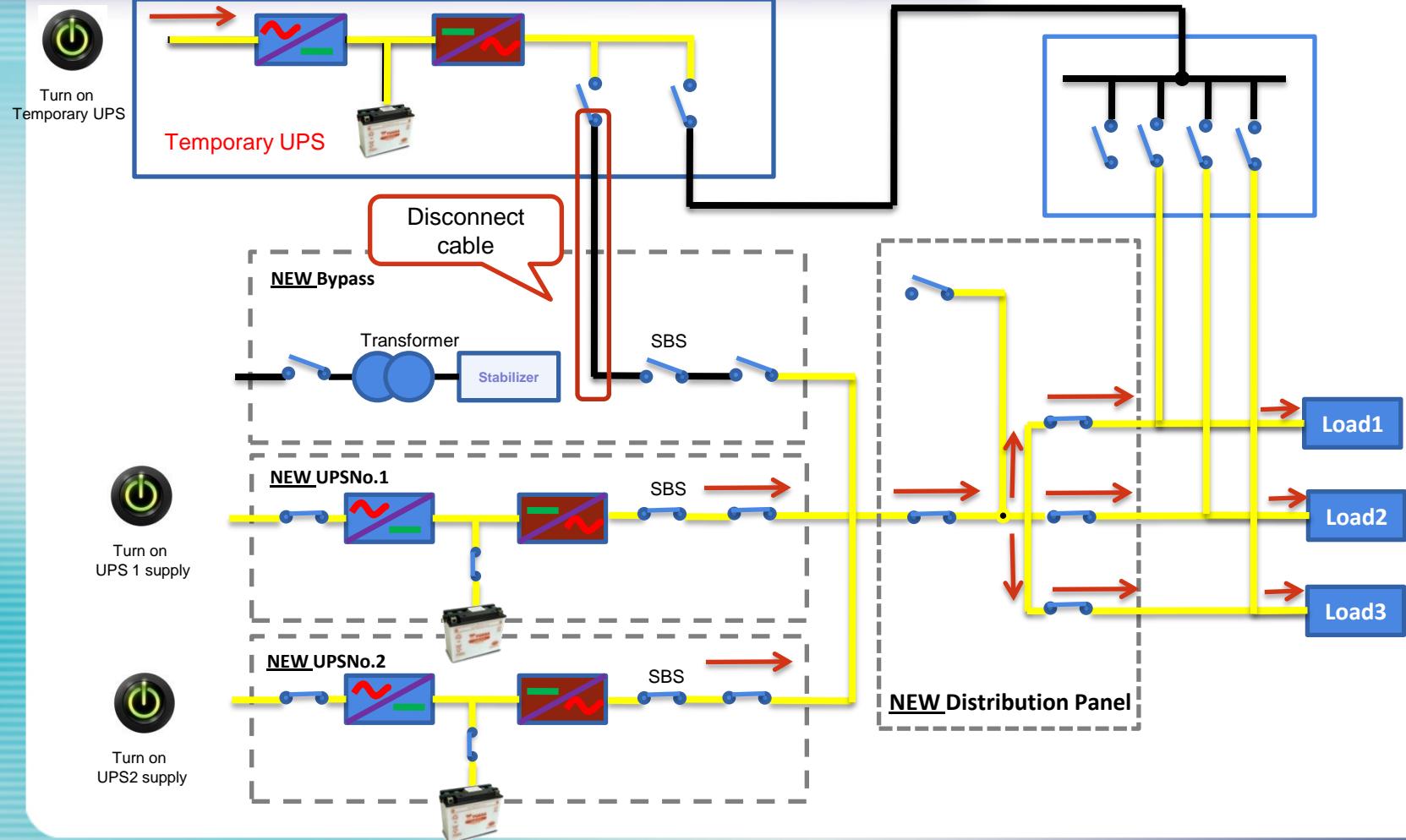
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



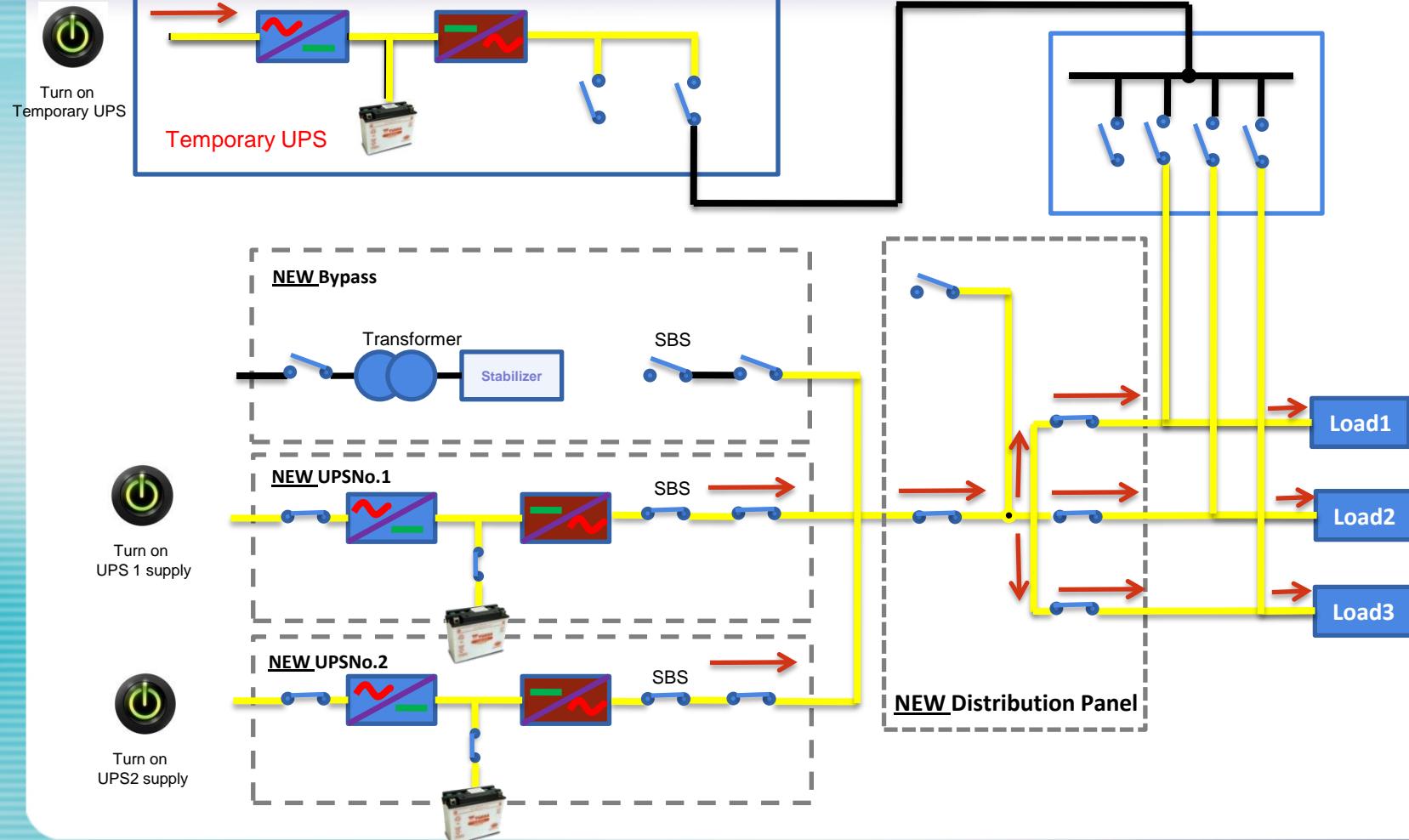
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



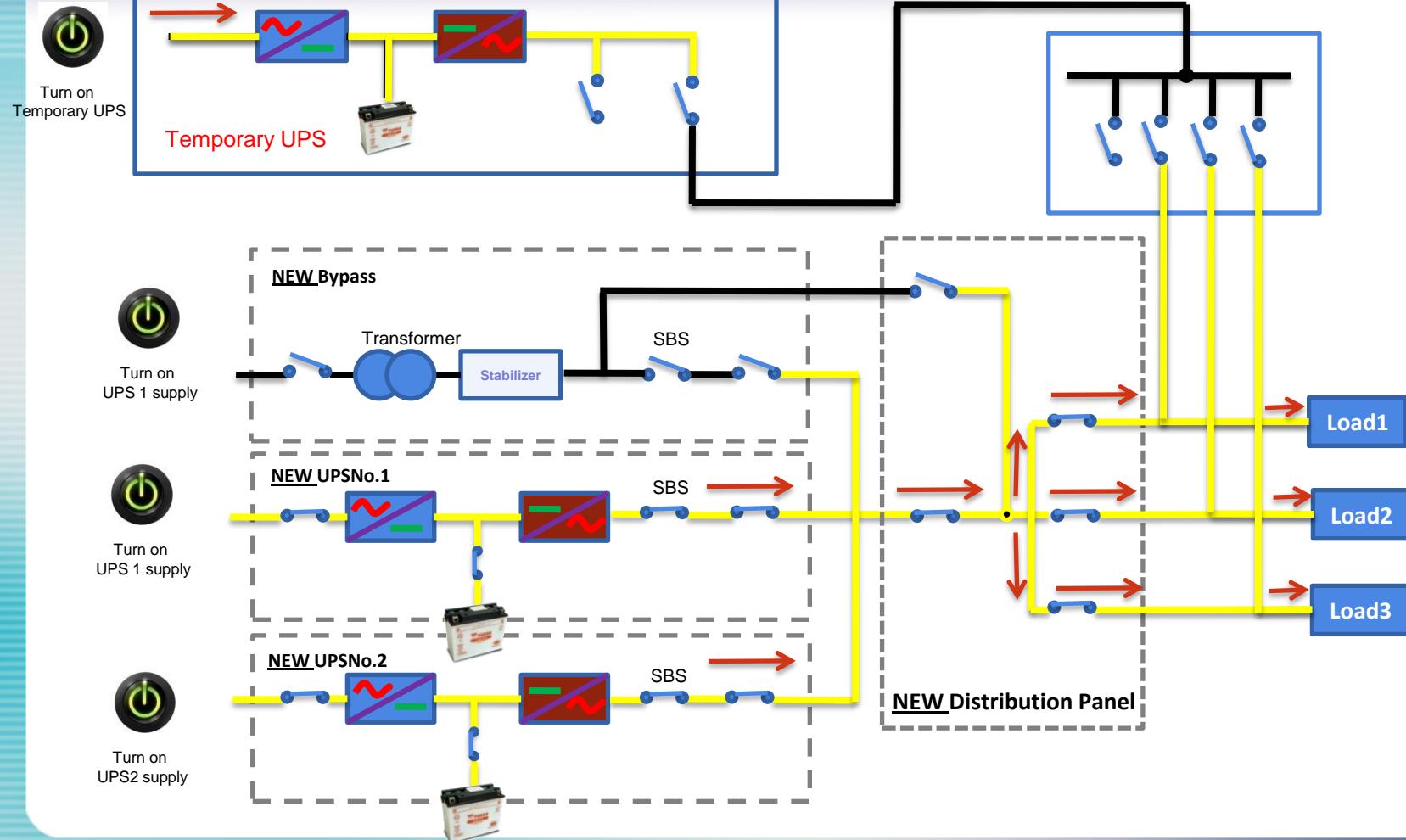
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



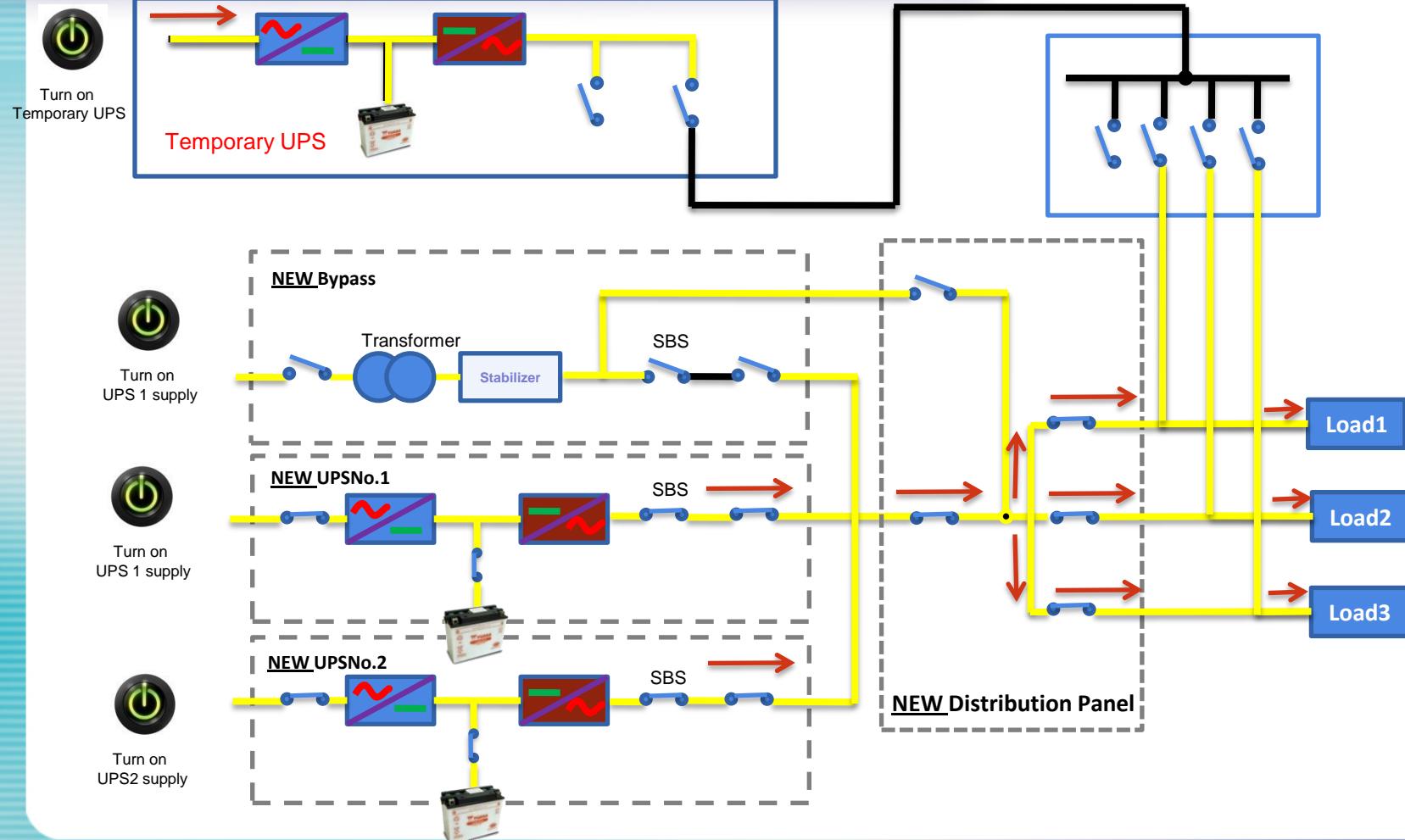
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



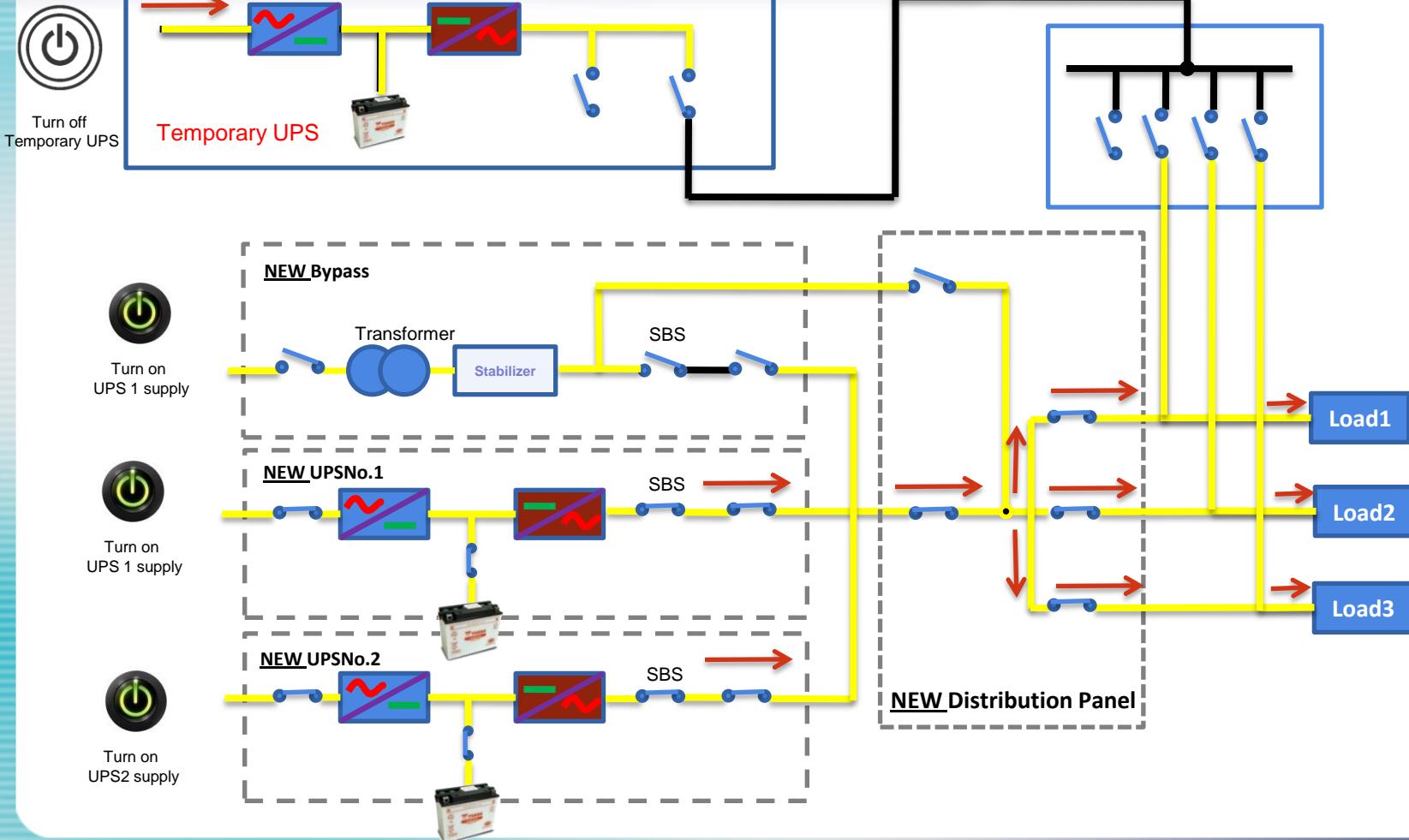
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



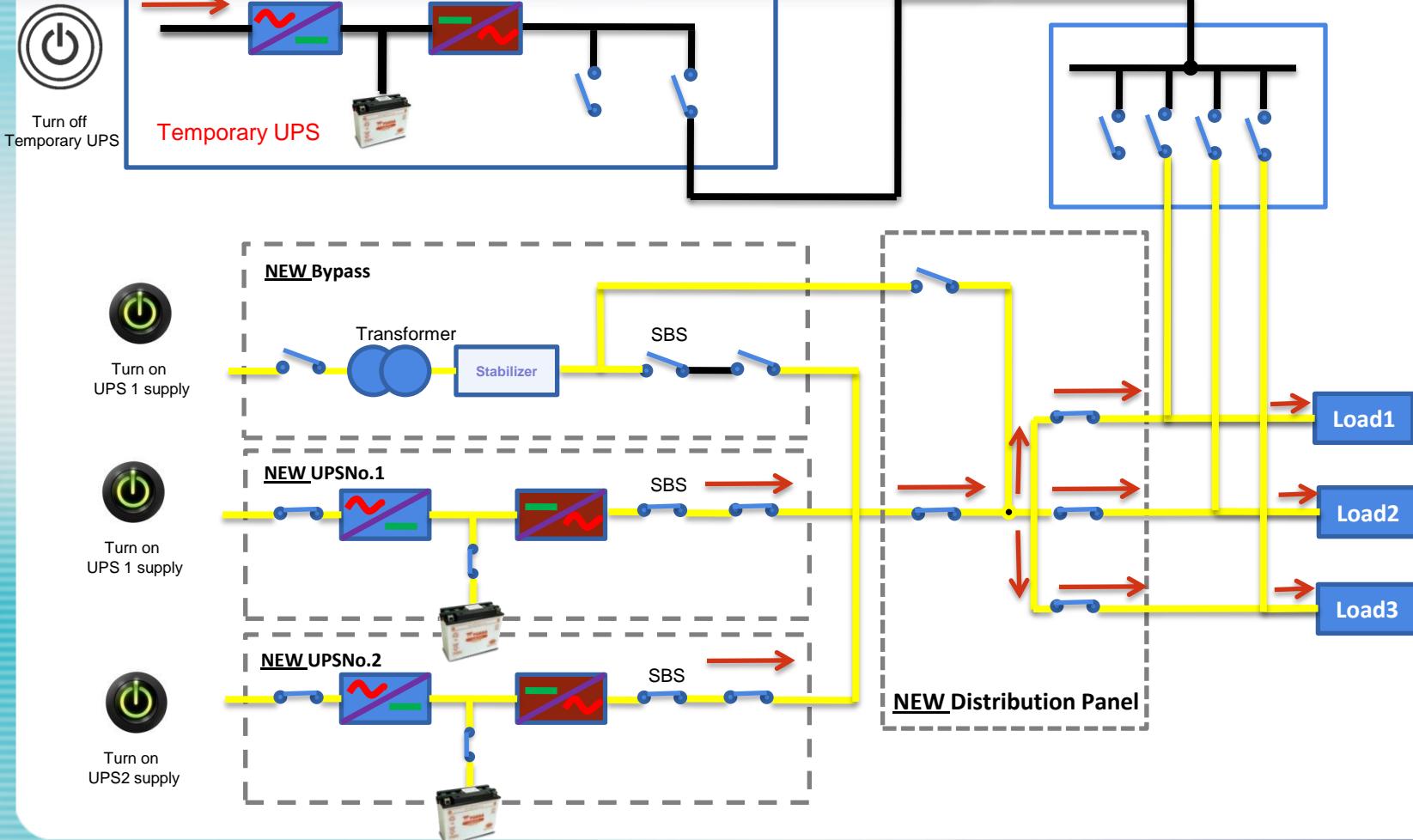
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



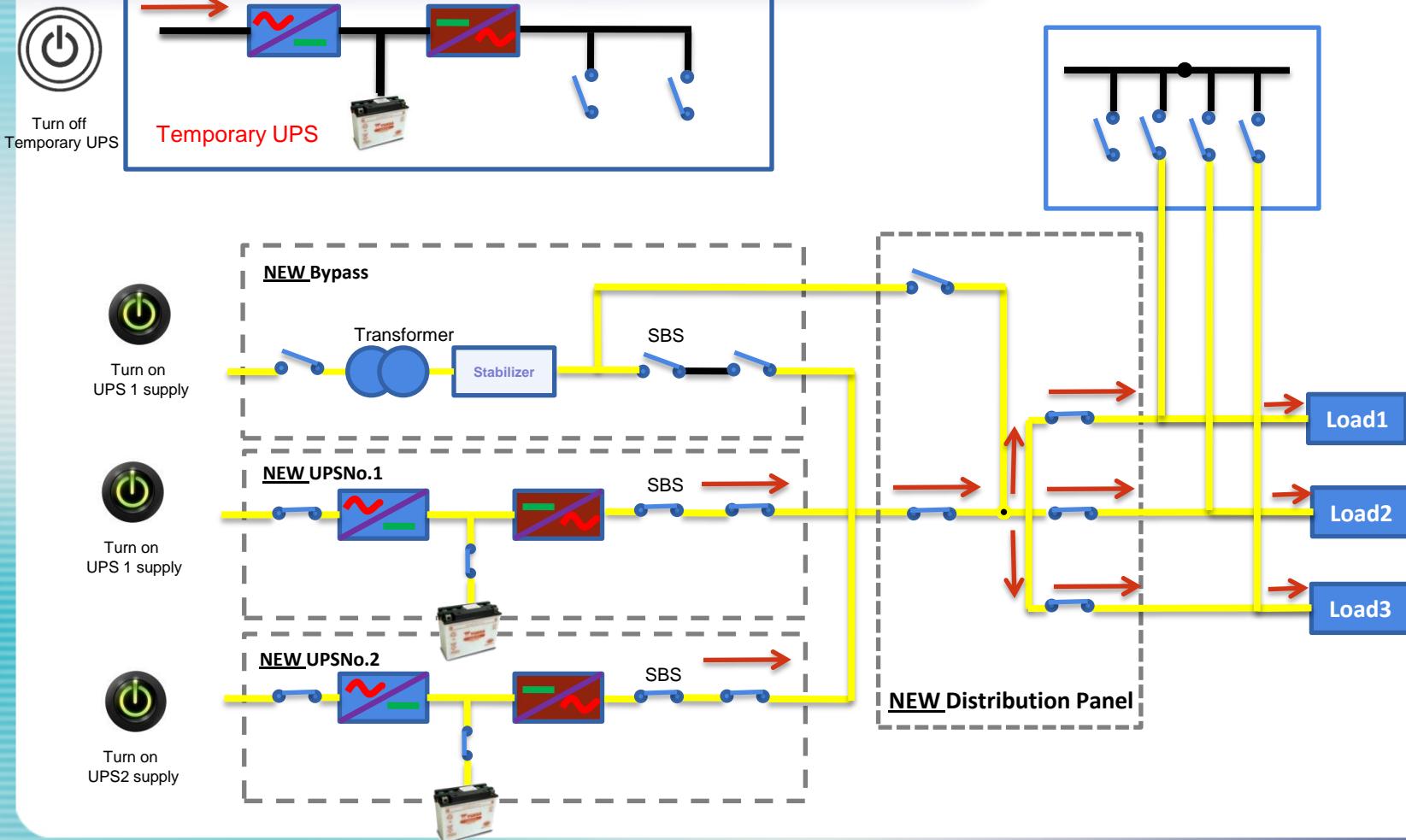
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



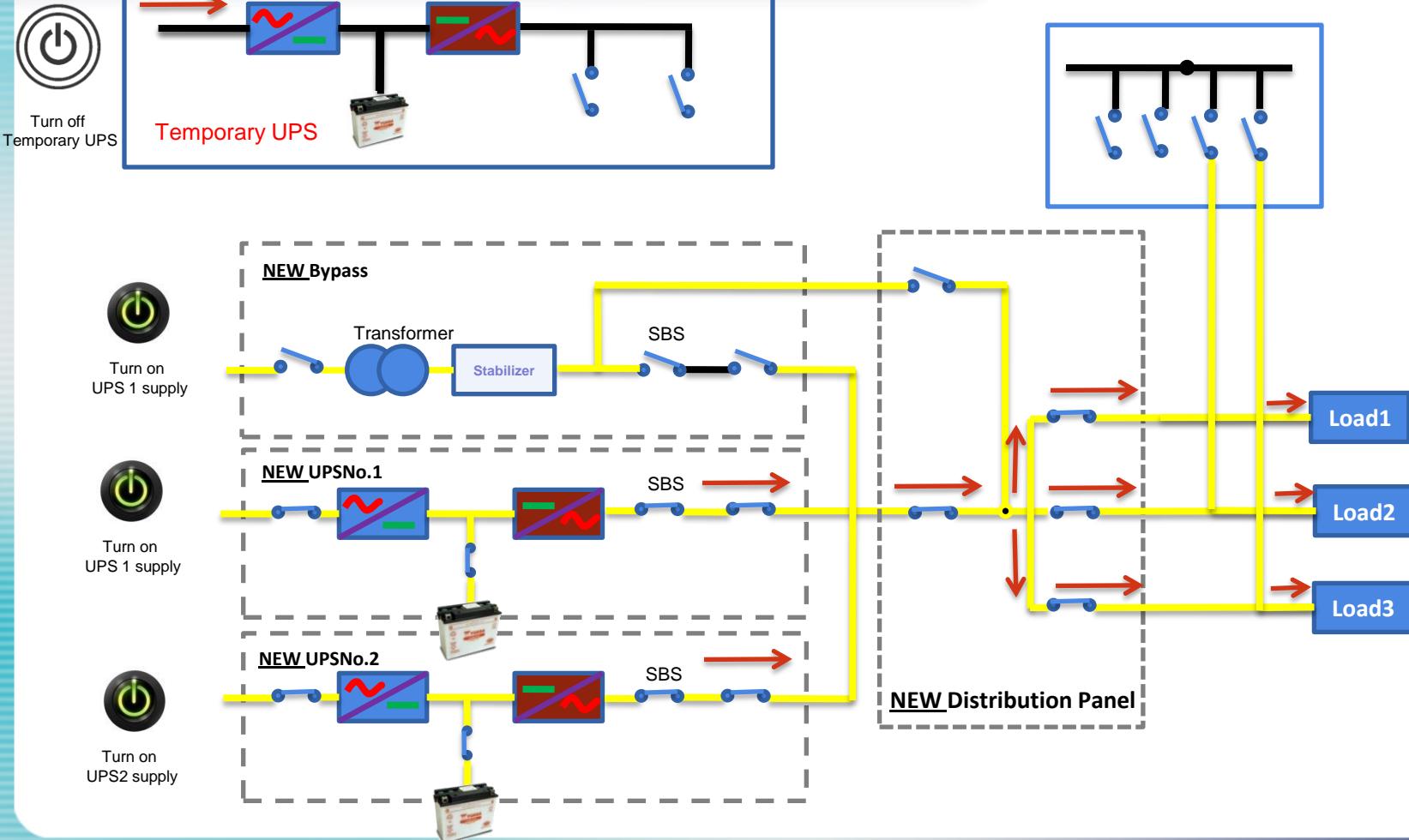
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



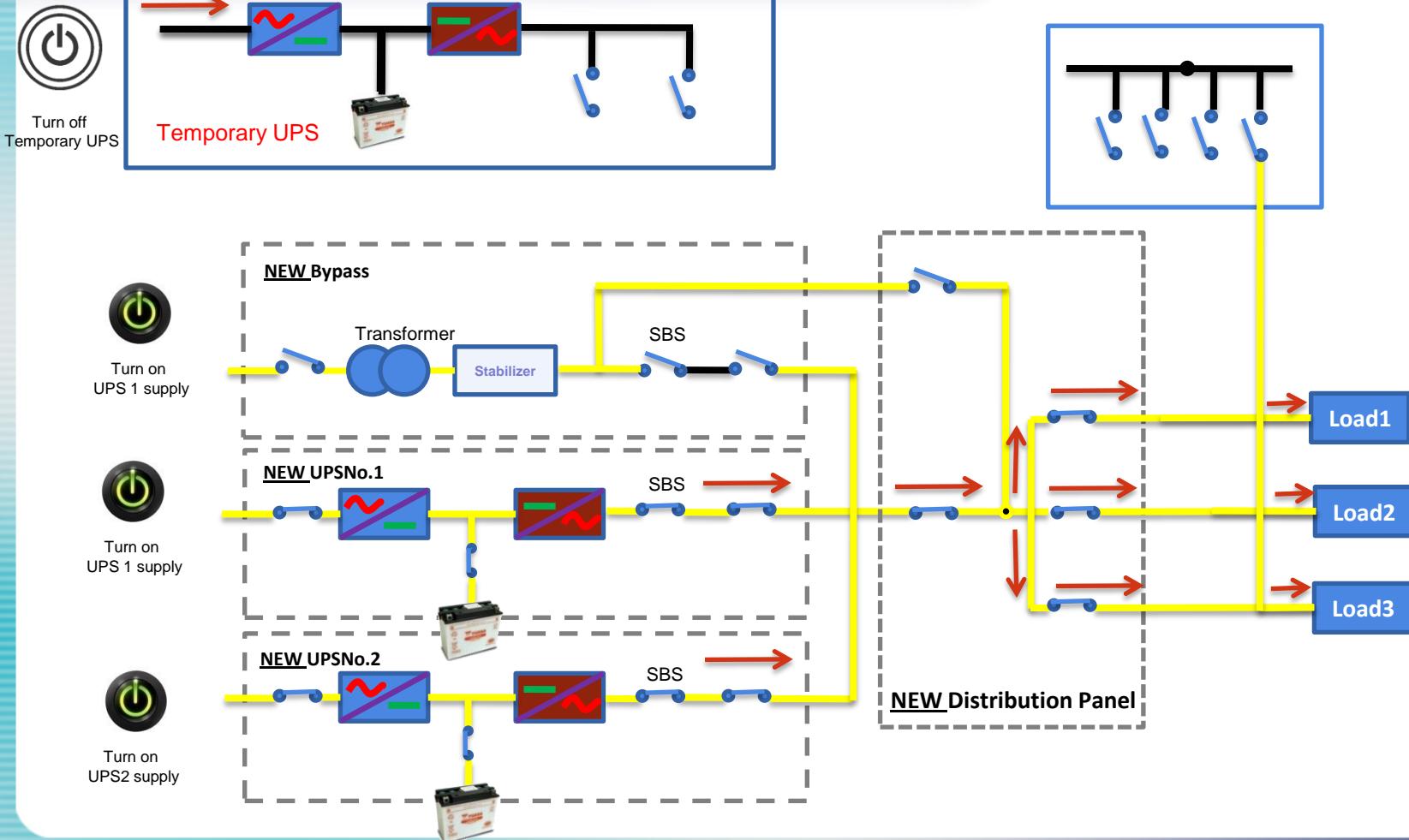
Installation of New UPS.

Temporary Distribution panel



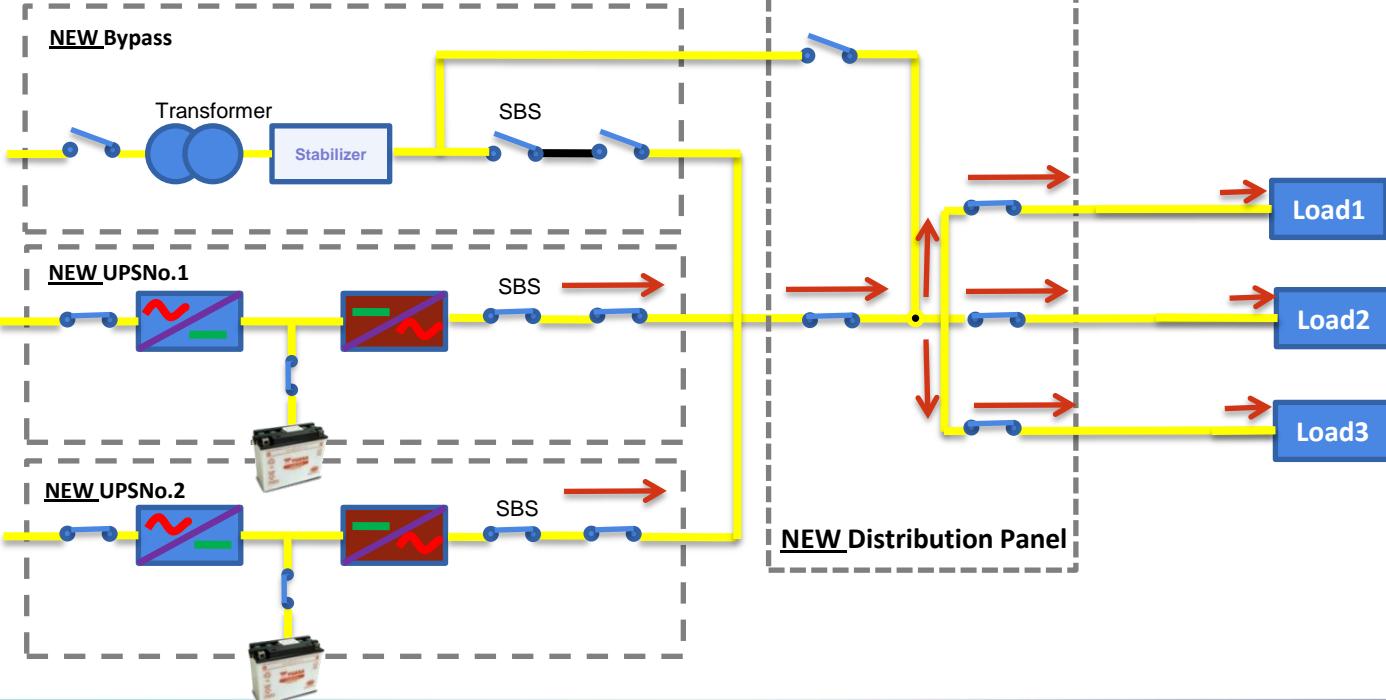
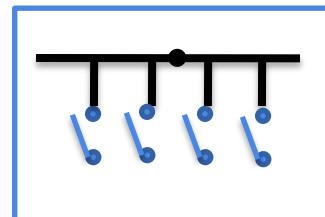
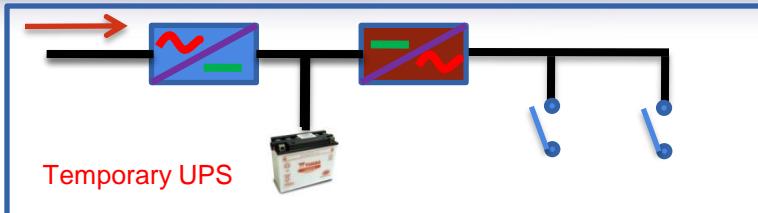
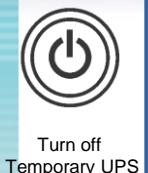
Switching load from Temporary UPS to New UPS

Temporary Distribution panel



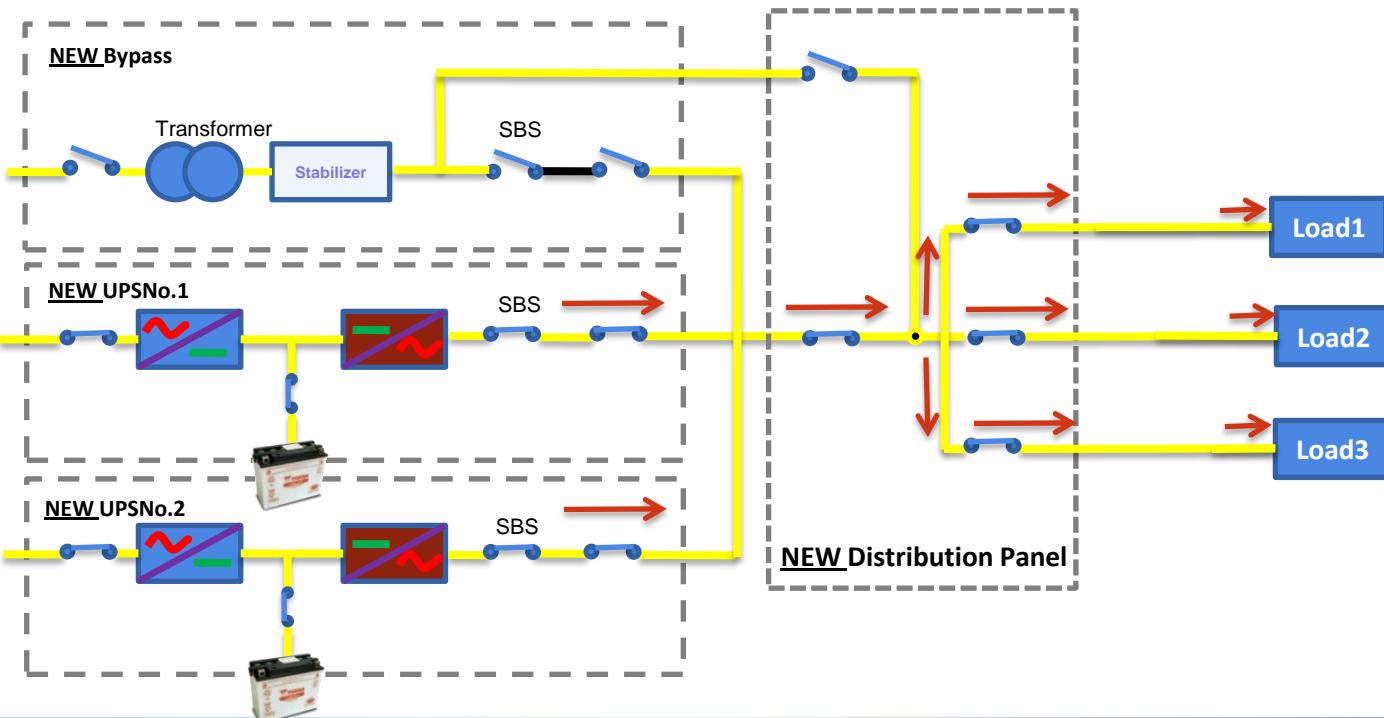
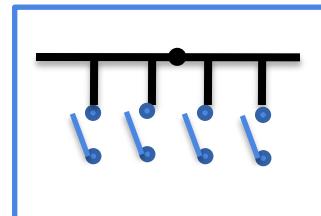
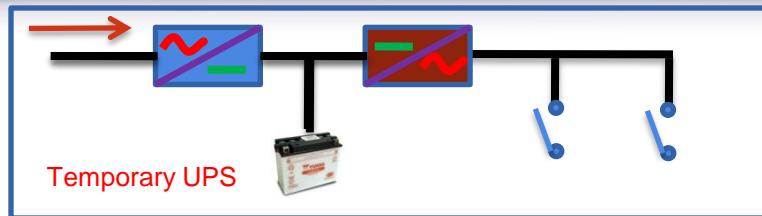
Switching load from Temporary UPS to New UPS

Temporary Distribution panel

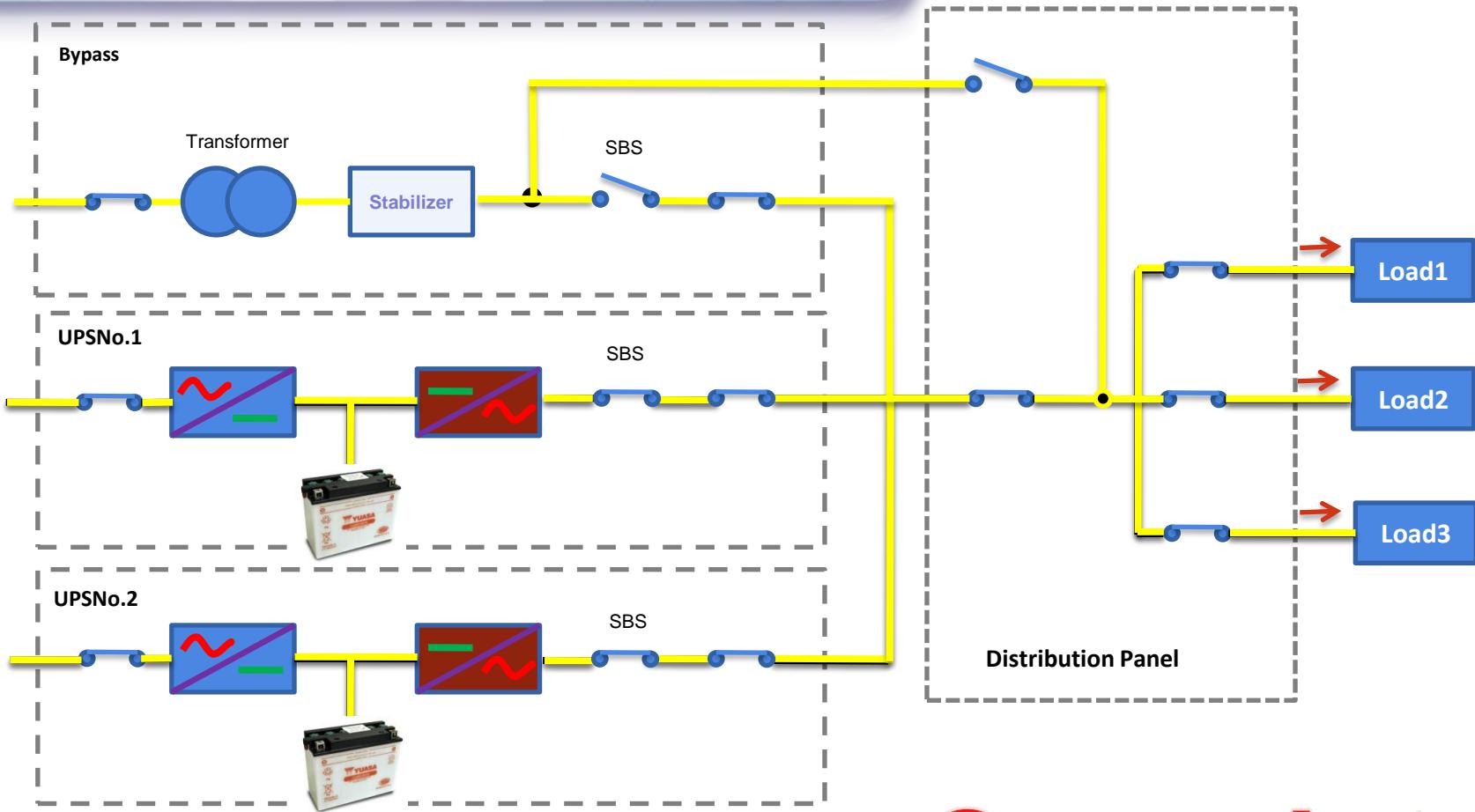


Switching load from Temporary UPS to New UPS

Temporary Distribution panel



Switching load from Temporary UPS to New UPS



Complete



Success!

**Thank you
for your kind
attention**

