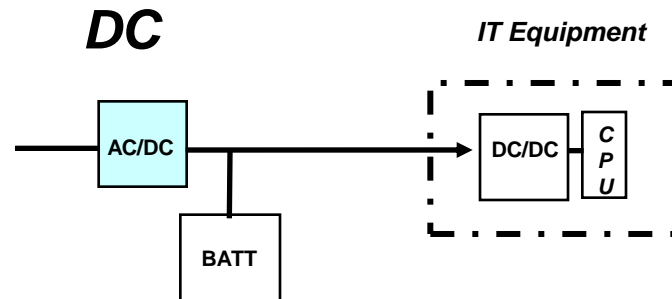


380V DC UPS vs. AC UPS

DC UPS-solution

Control Parameter:

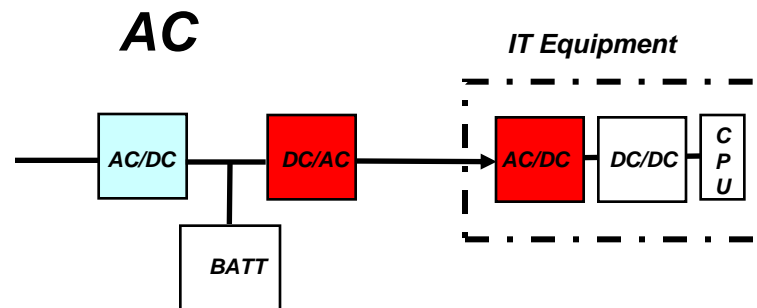
1. V



Traditional UPS-solution

Control Parameters:

1. V
2. Hz
3. Phase
4. Waveform

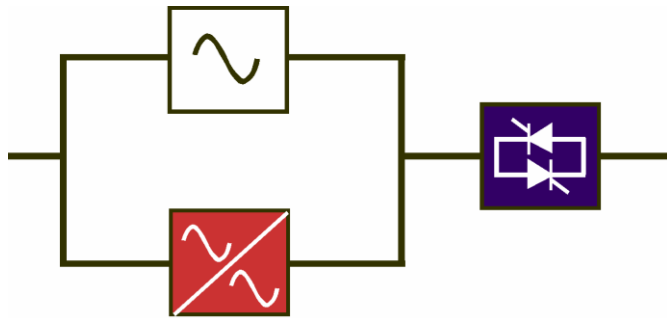


- The DC system is less complicated.
- Fewer conversions means better efficiency.

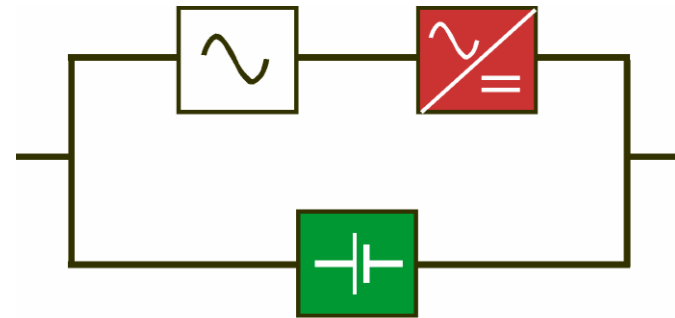
System reliability



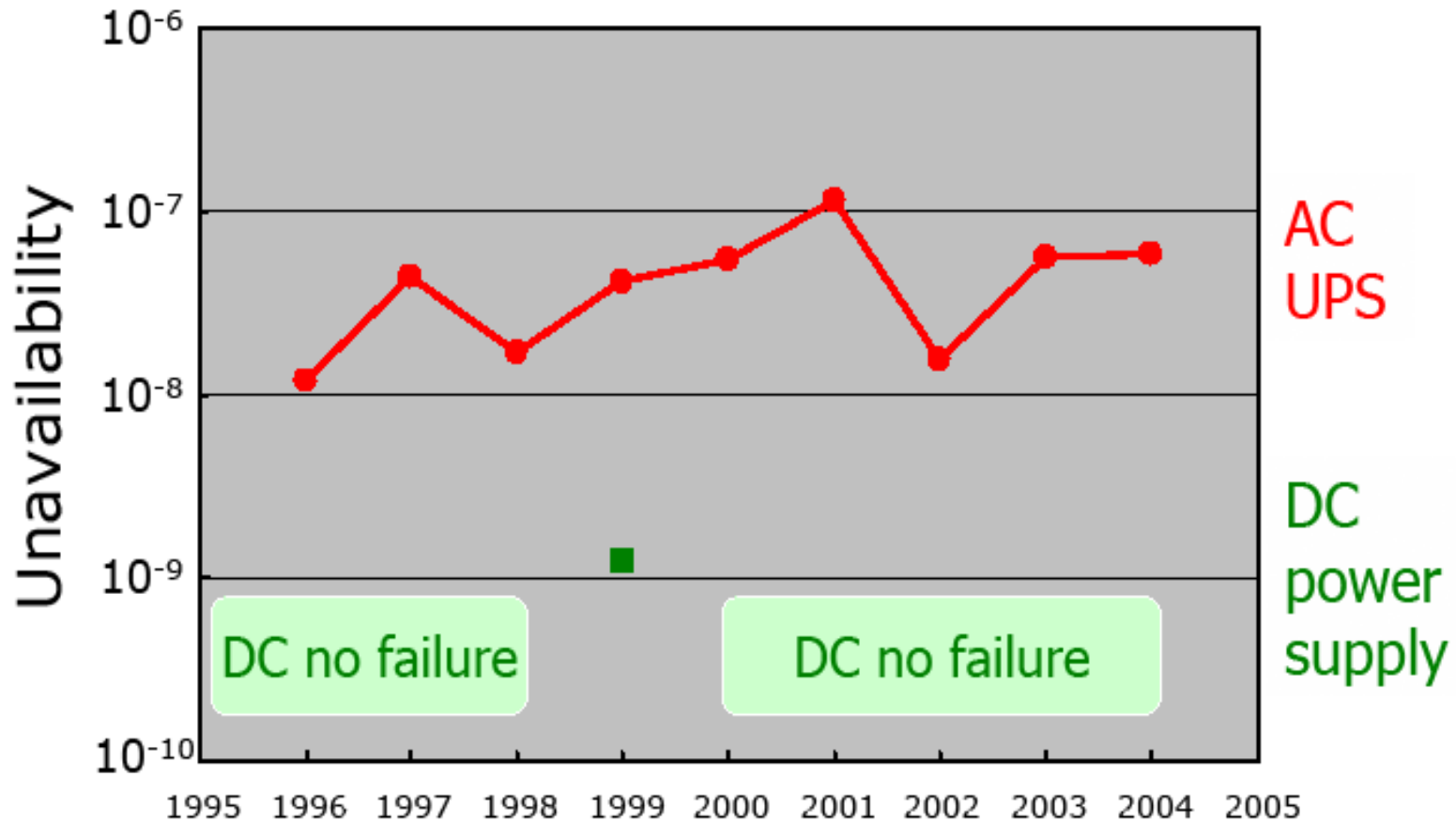
AC and DC UPS - Reliability comparison



$$U_{AC} = 7.4 \cdot 10^{-6} \text{ (3h)}$$
$$t_{\text{down}} = 3 \text{ min } 50 \text{ s}$$



$$U_{DC} = 9 \cdot 10^{-10} \text{ (8h)}$$
$$t_{\text{down}} = 0.03 \text{ s}$$



(Field data for 10,000 UPSs and 23,000 DC systems)



Power quality



Electronics must be protection against Environmental conditions



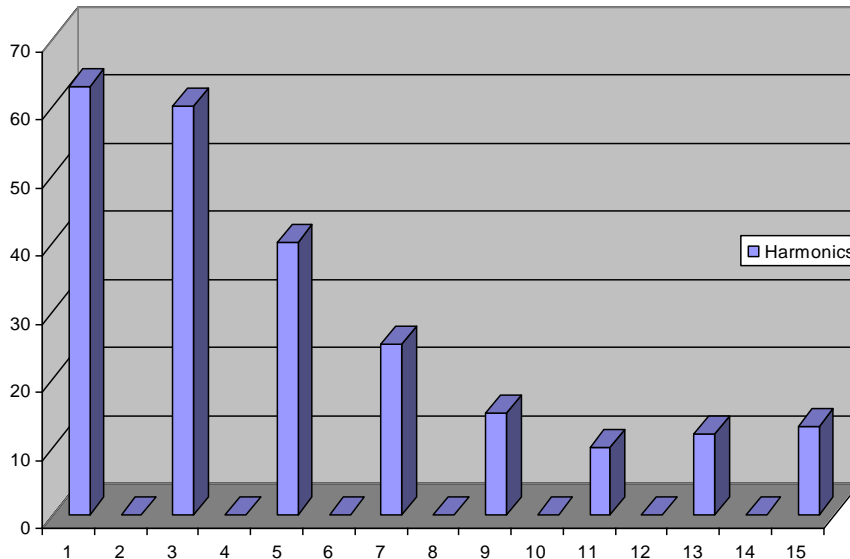
Overtones from "passive PFC" in ATX Workstation PSU

Considerable amount of overtones cause bad effects in the AC mains:

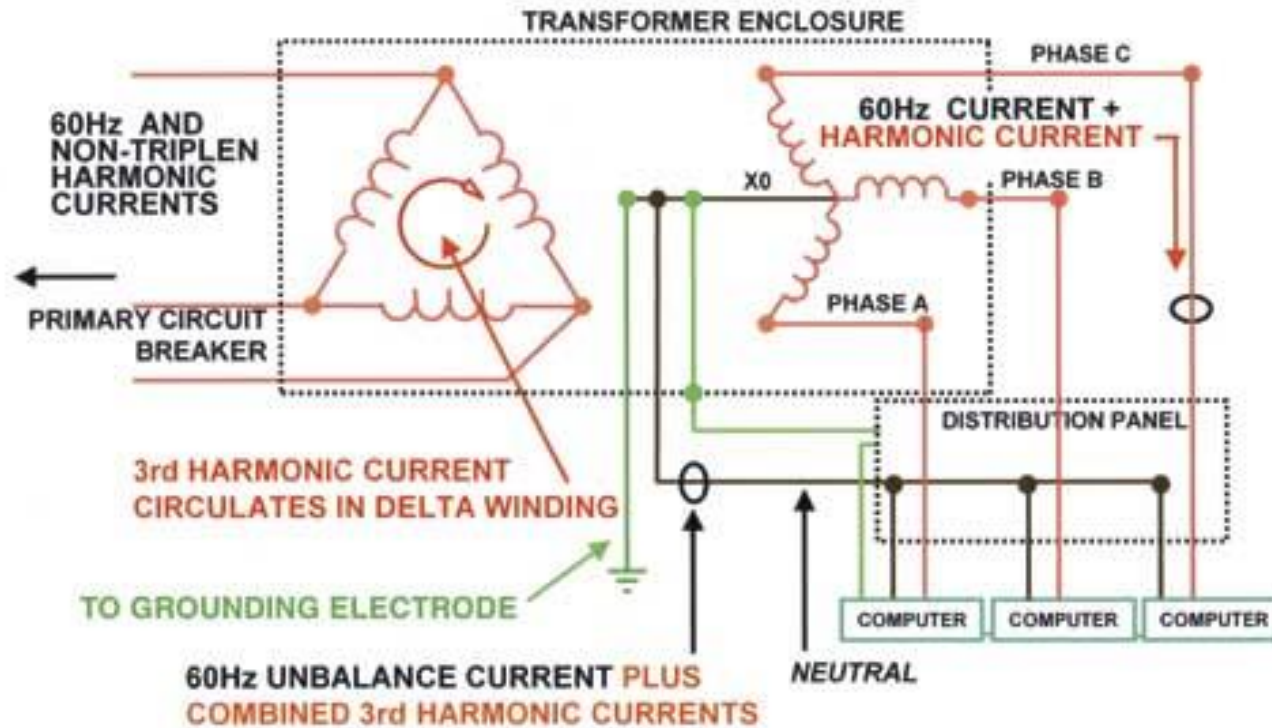
- Causing disturbances to other equipment
- Causing active power energy losses in the AC grid
- Causing currents in the zero return lead

... also "Active PFC" ATX workstation power units show a large amount of overtones

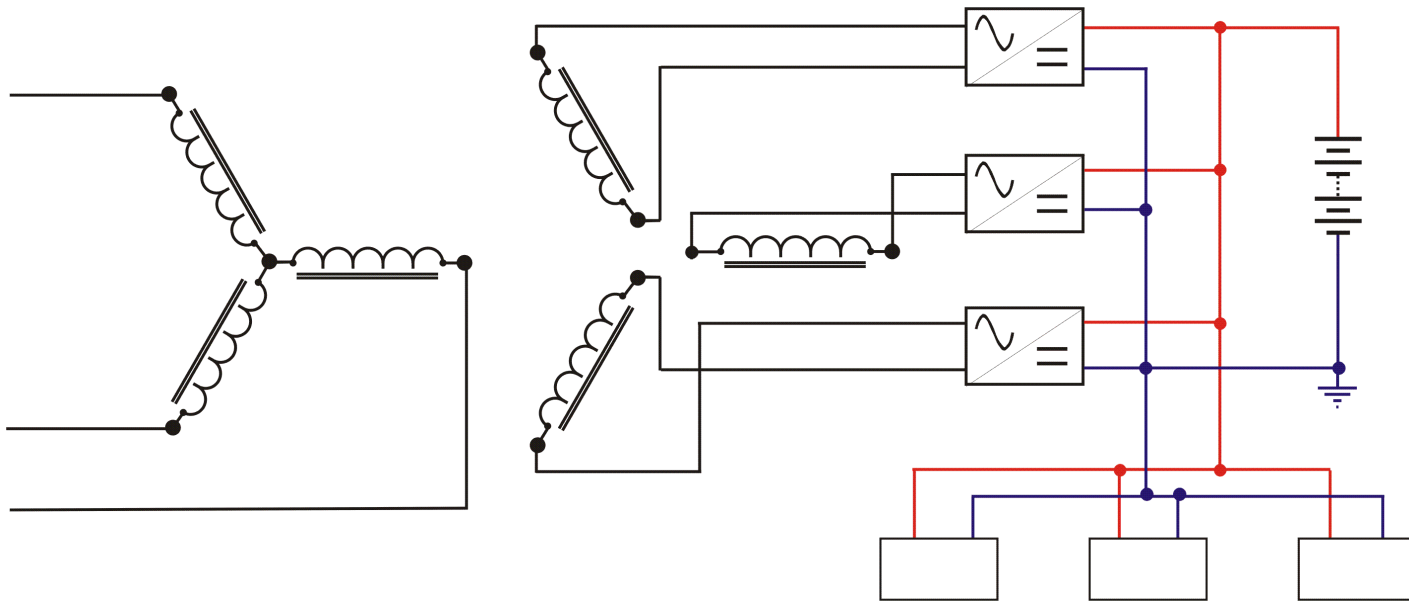
Harmonics content in input AC current of "passive PFC"-type ATX Workstation power supply



Negative effects of harmonics



DC UPS - No harmonics

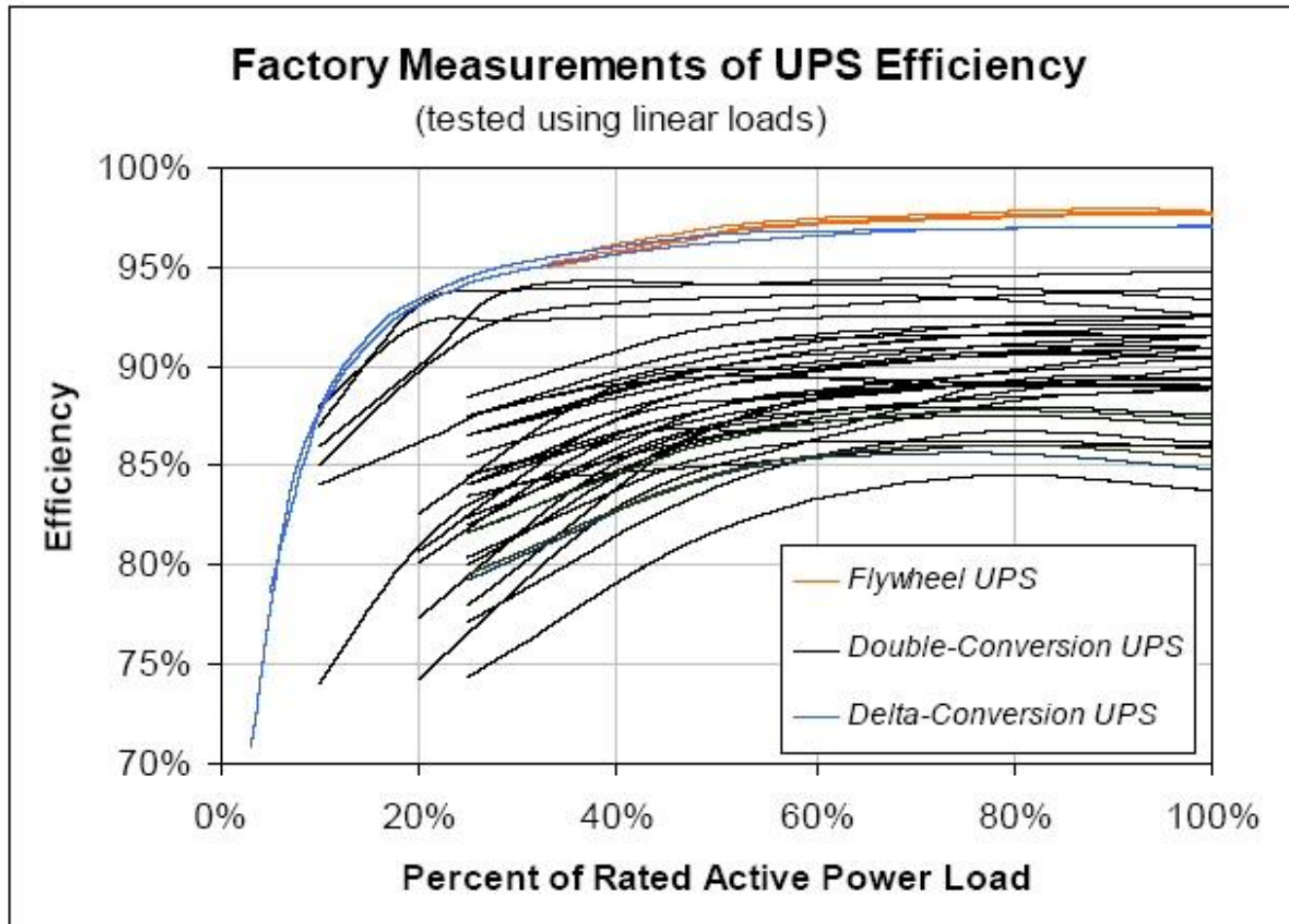


Pure sine wave input current produces no harmonics in transformer and power system

Energy efficiency

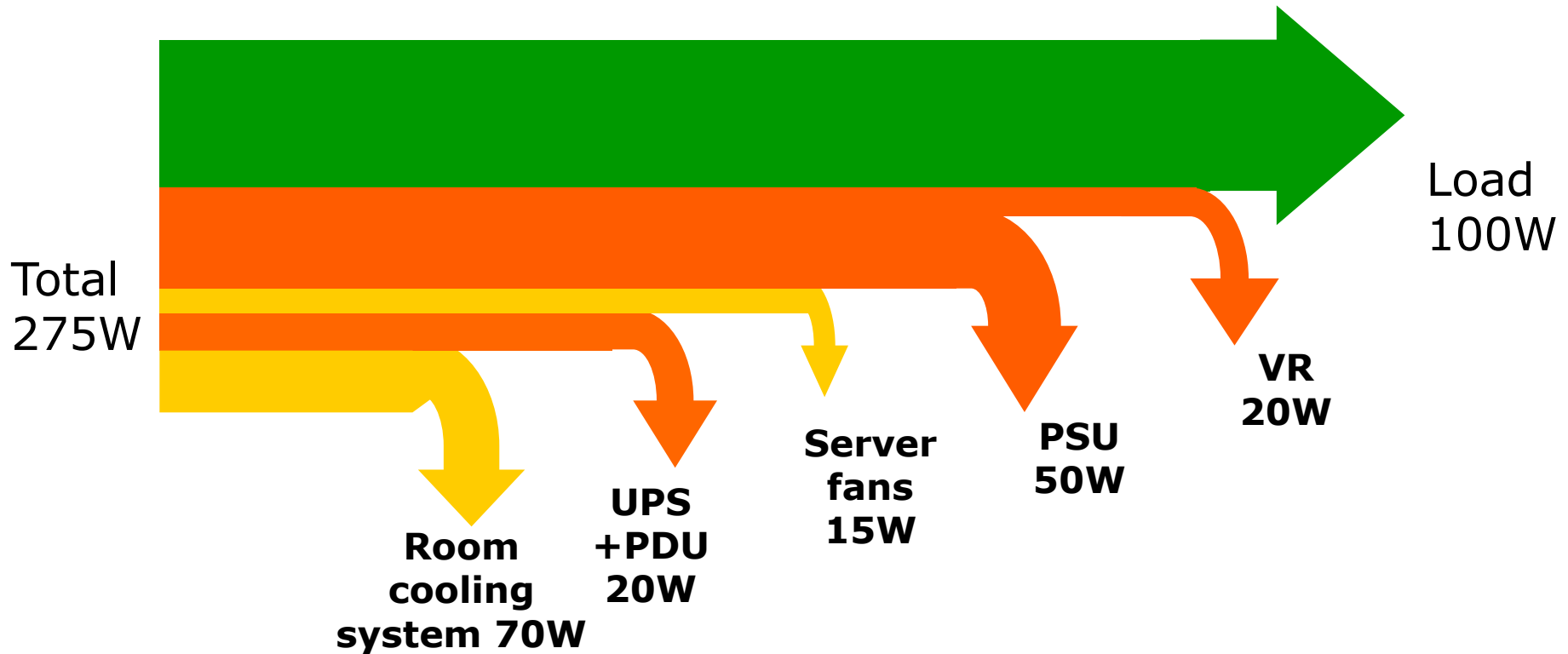


AC UPS Efficiency



Source: Lawrence Berkeley National Laboratory
January 2007

Power Consumption: 100W System Load



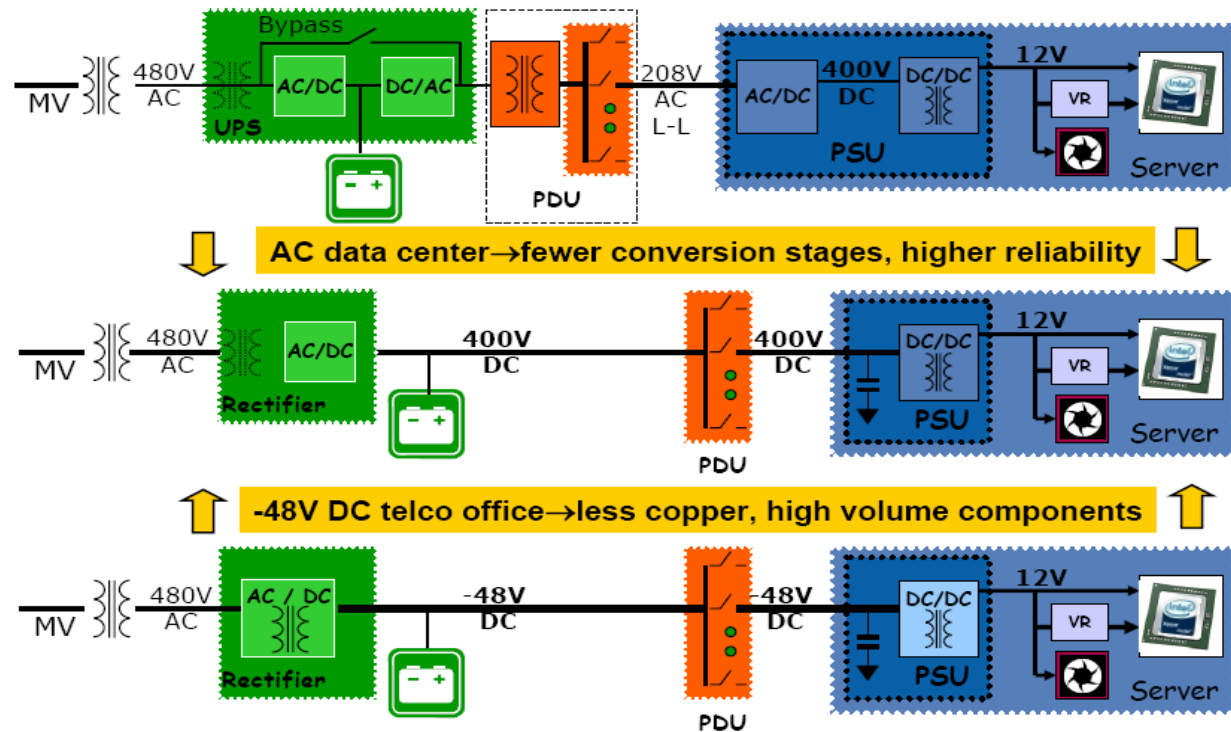
ICT convergence also for Uninterruptible Power

ICT convergence is a reality.

The border between data equipment and telecom equipment is long gone.

Now also the different power systems converge into one common solution.

Moving towards 400Vdc



Picture shown with courtesy of Intel Corporation, USA