



**HITEC**  
Power  
Protection

**CONTINUOUS POWER  
IN YOUR CONTROL**



# **DRUPS - WHAT IS IT ?**

## 何謂動態不斷電系統？

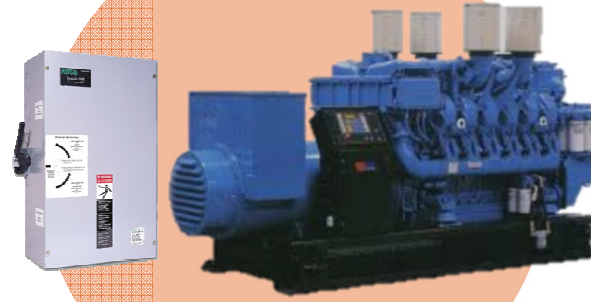


The complete and seamless mechanical integration of a  
UPS with a continuous power genset...  
完整結合不斷電系統以及緊急發電系統



UPS  
不斷電系統

+



Genset  
緊急發電系統

=



DRUPS  
動態不斷電系統



...but it's not static – it's dynamic!



battery (chemical)  
based energy storage  
儲能於化學電池

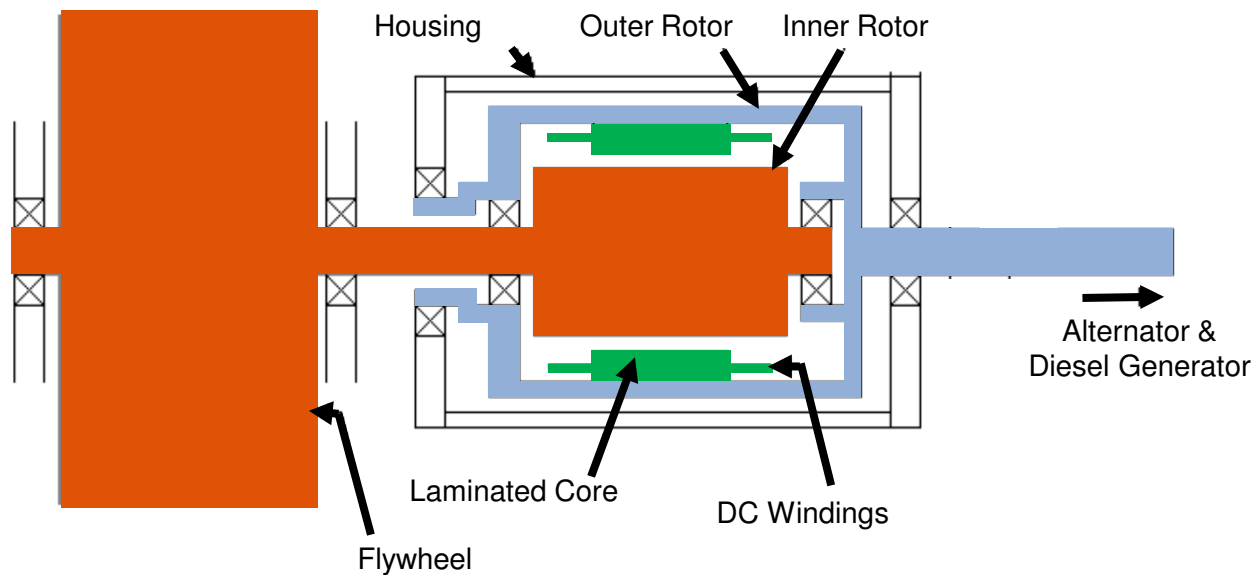


flywheel (mechanical)  
based energy storage  
儲能於機械飛輪

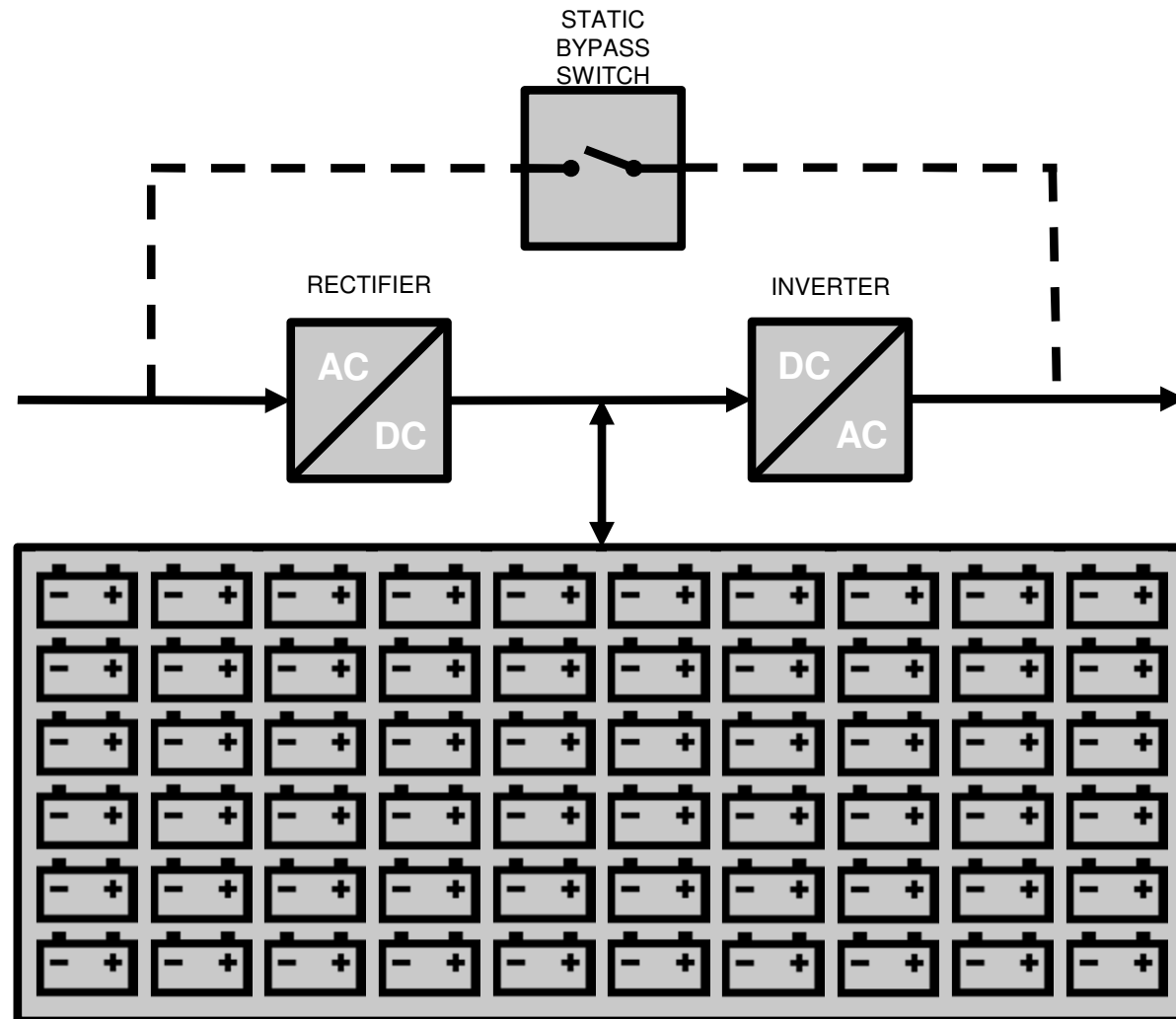


# Rotational storage and direct energy extraction...

$$KE = \frac{1}{2} \Sigma (mr^2) \omega^2$$



... versus chemical and bi-directional conversion



# HOW DOES IT FUNCTION ?

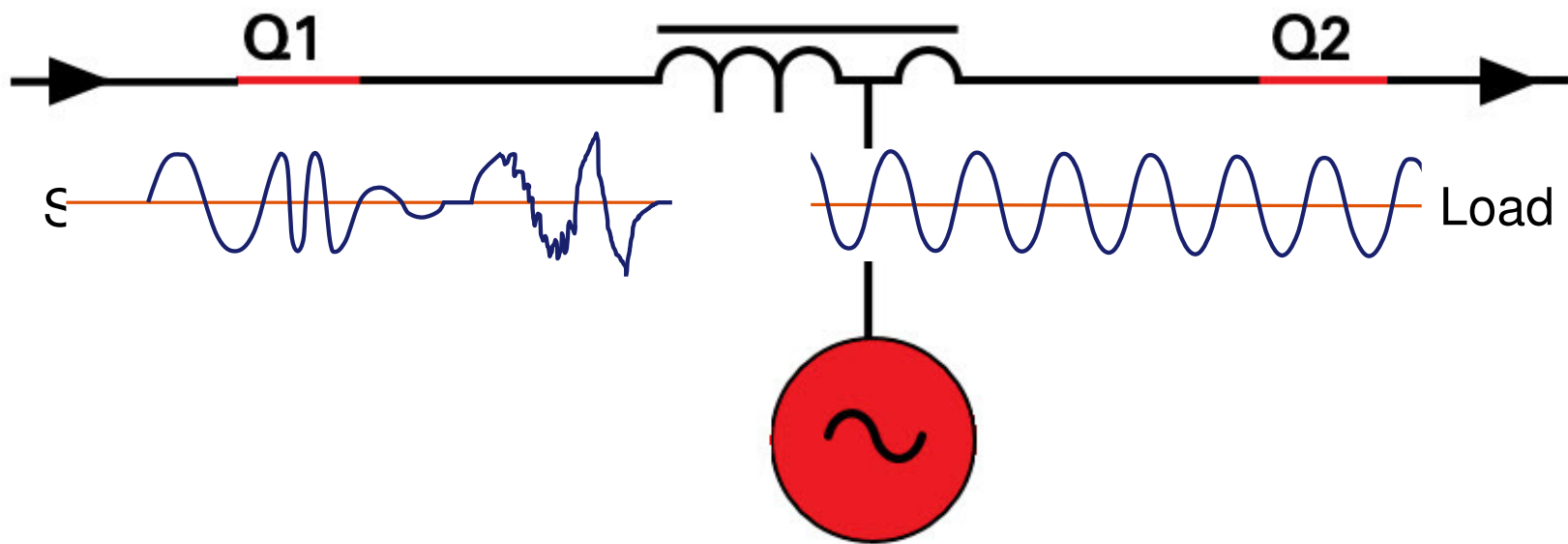
## 動態系統功能為何？



**AS A POWER CONDITIONER**  
**電源穩壓整流器**



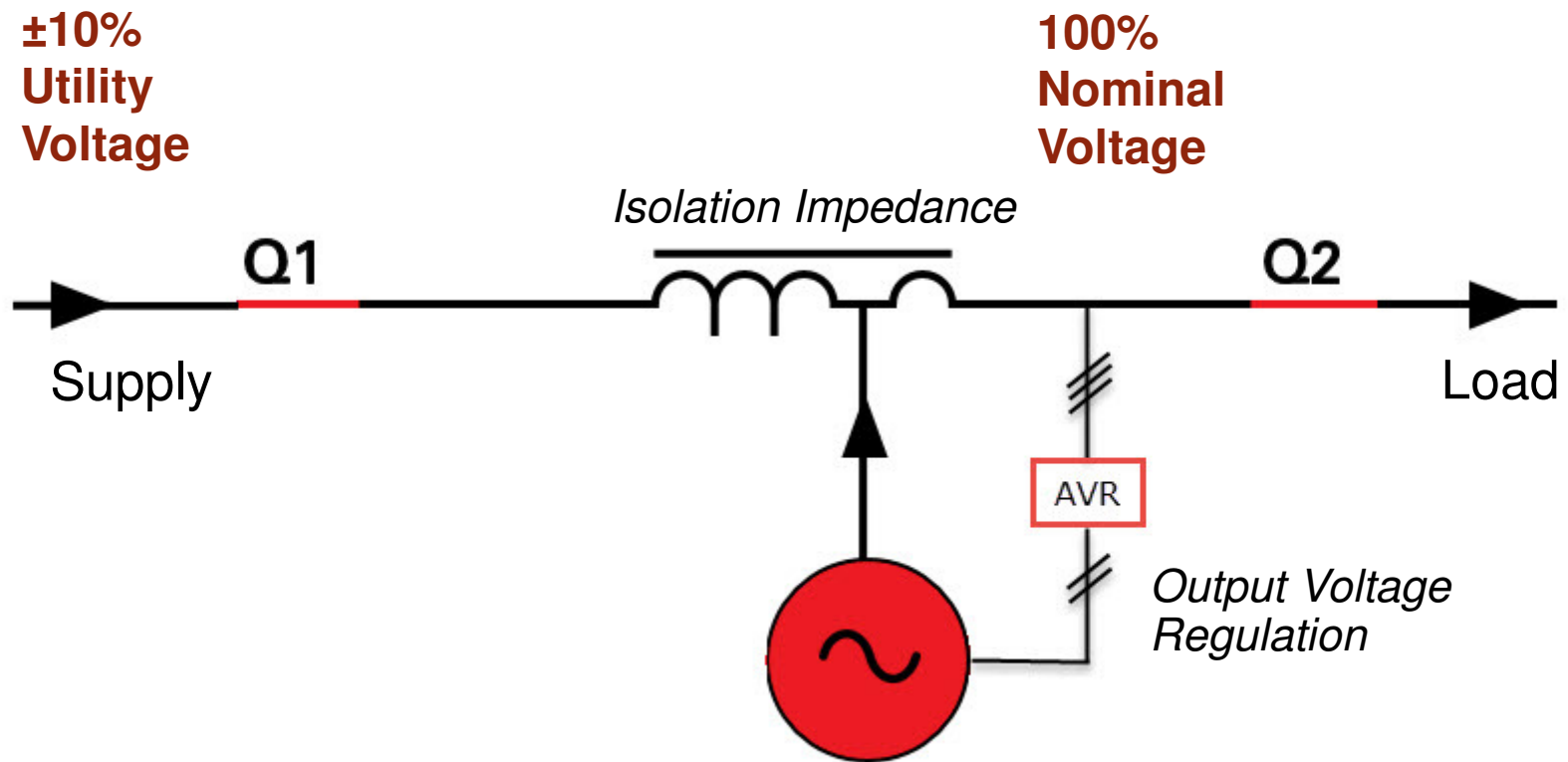




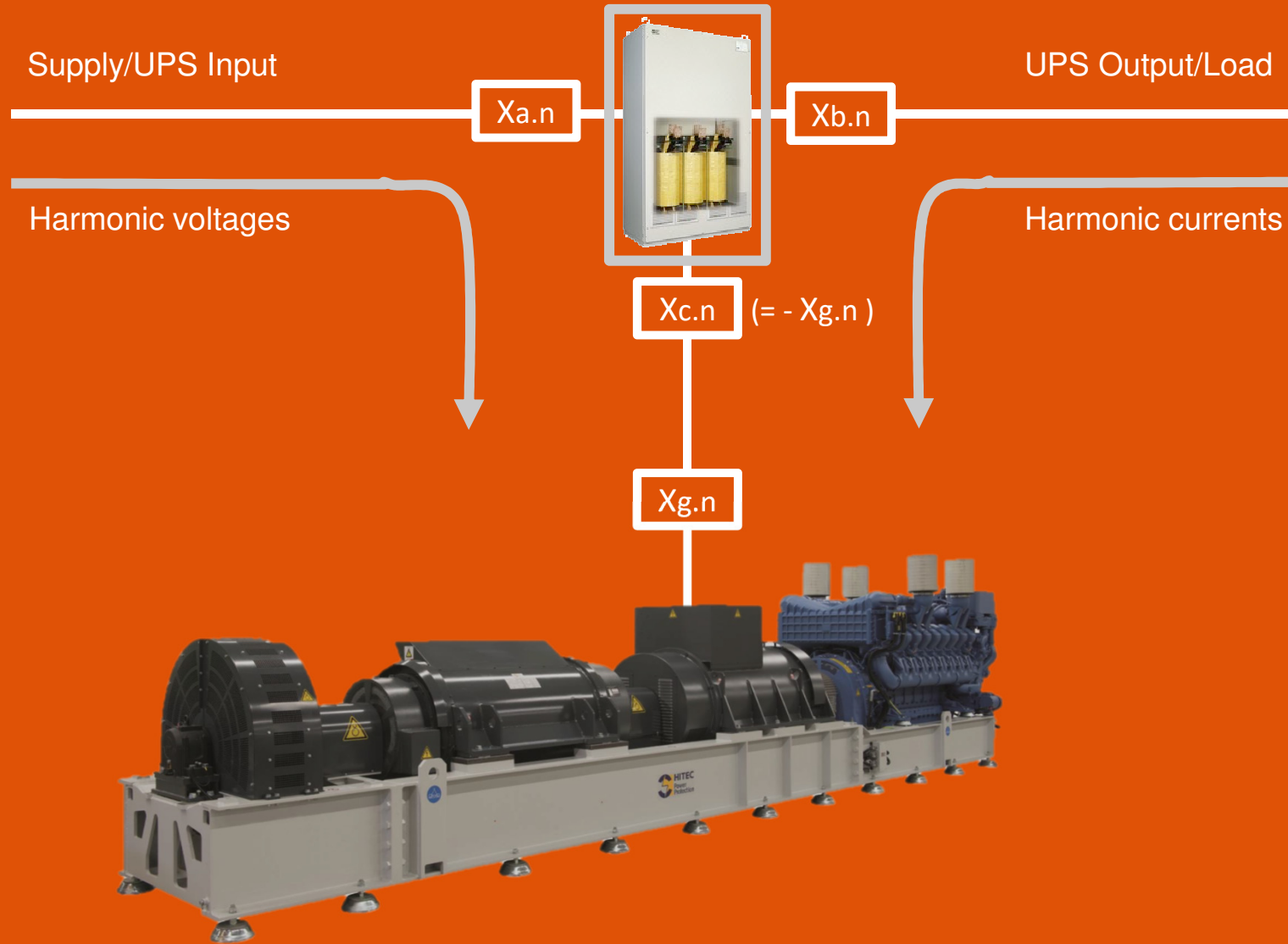
# Power Factor Correction 電力因數改善



# Sag/Surge Mitigation 穩壓



# Harmonic Filtering (諧波改善)

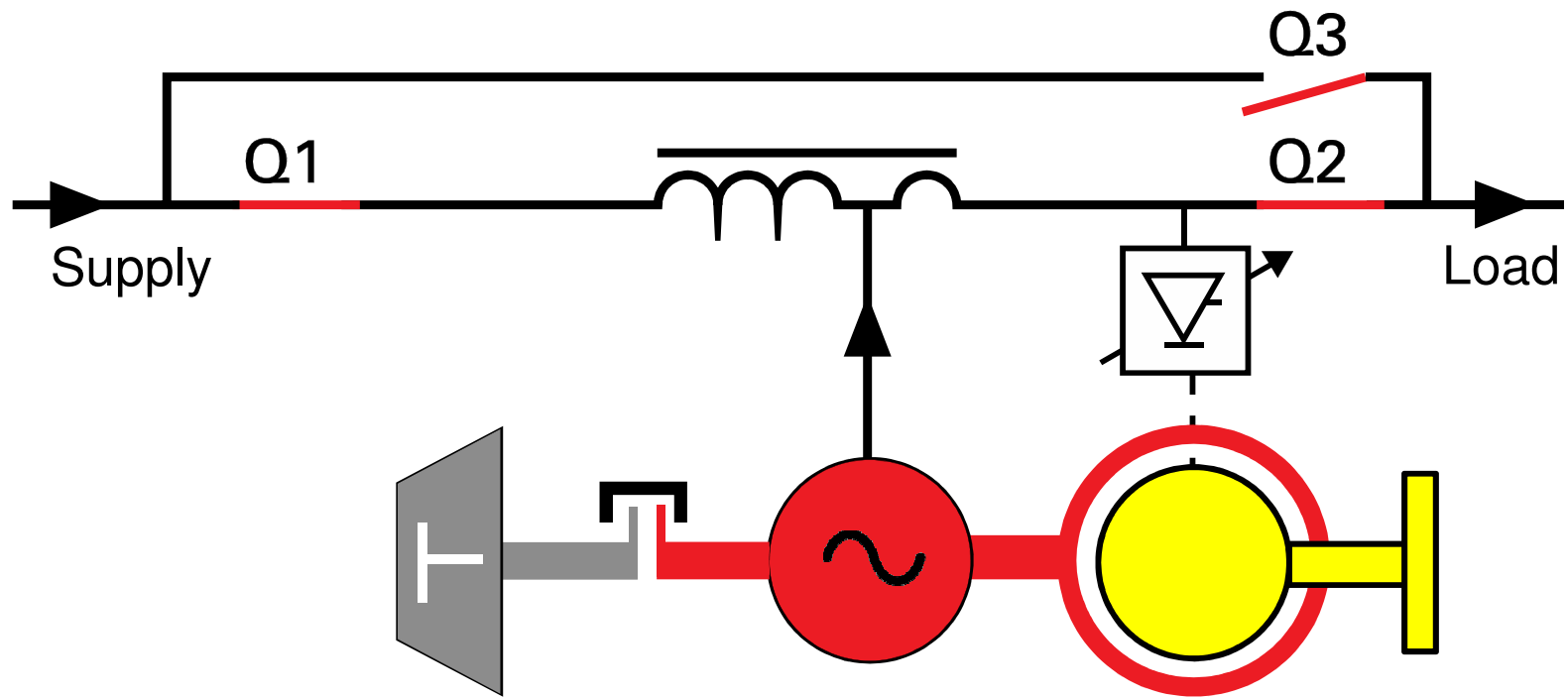


# Fault Clearing Capability 短路保護

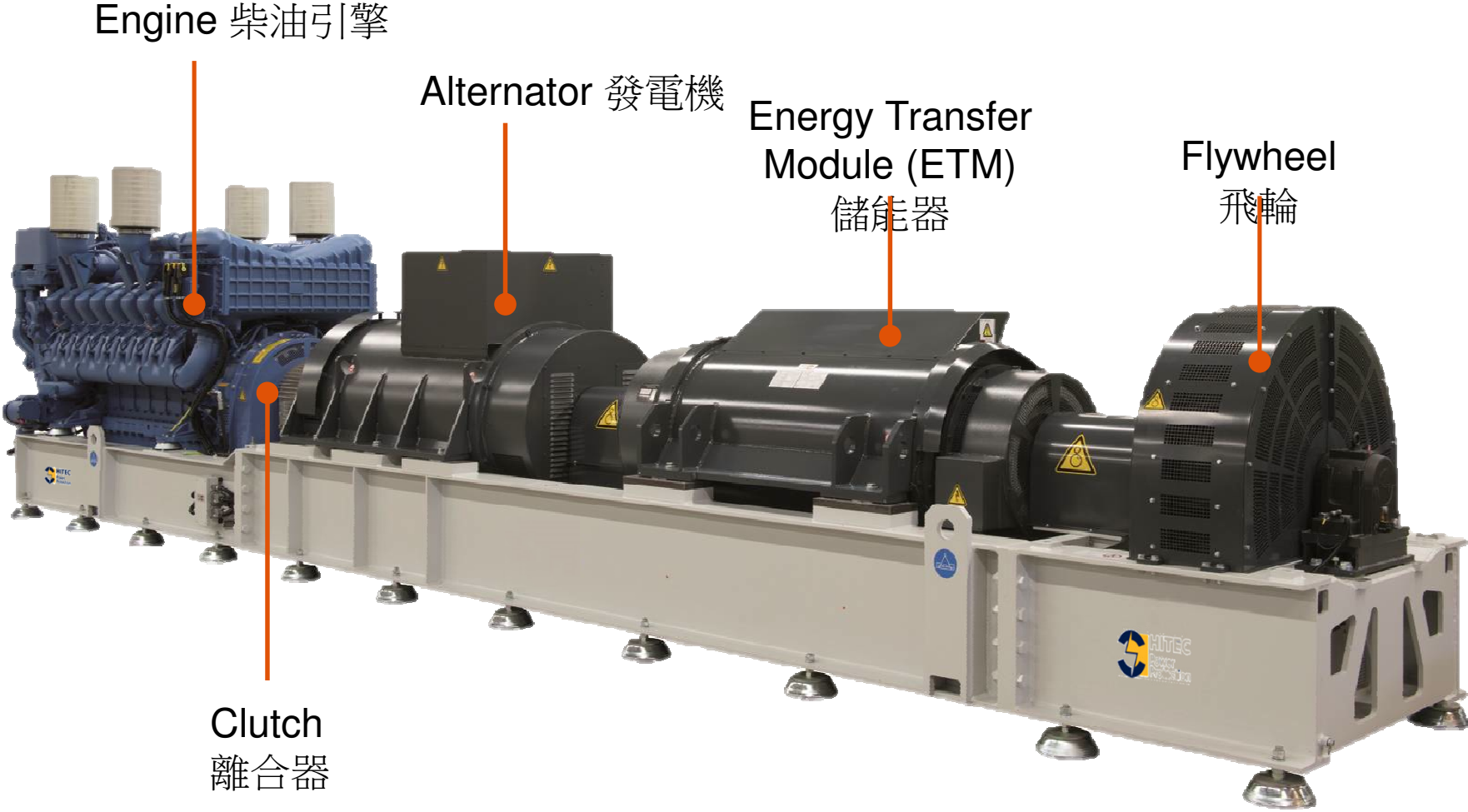


**AS AN OUTAGE ELIMINATOR**  
不斷電電源



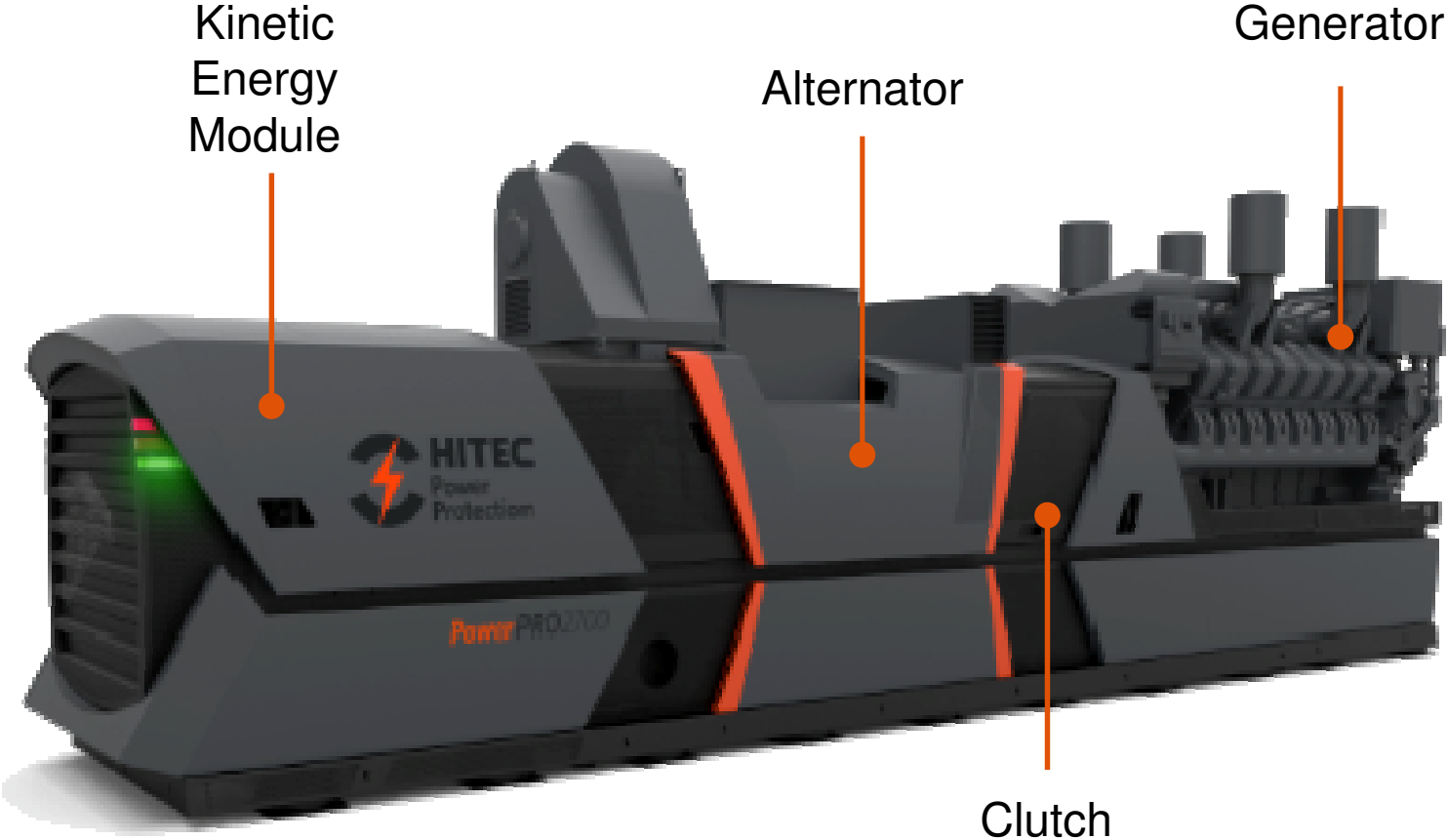


# Power Module Components

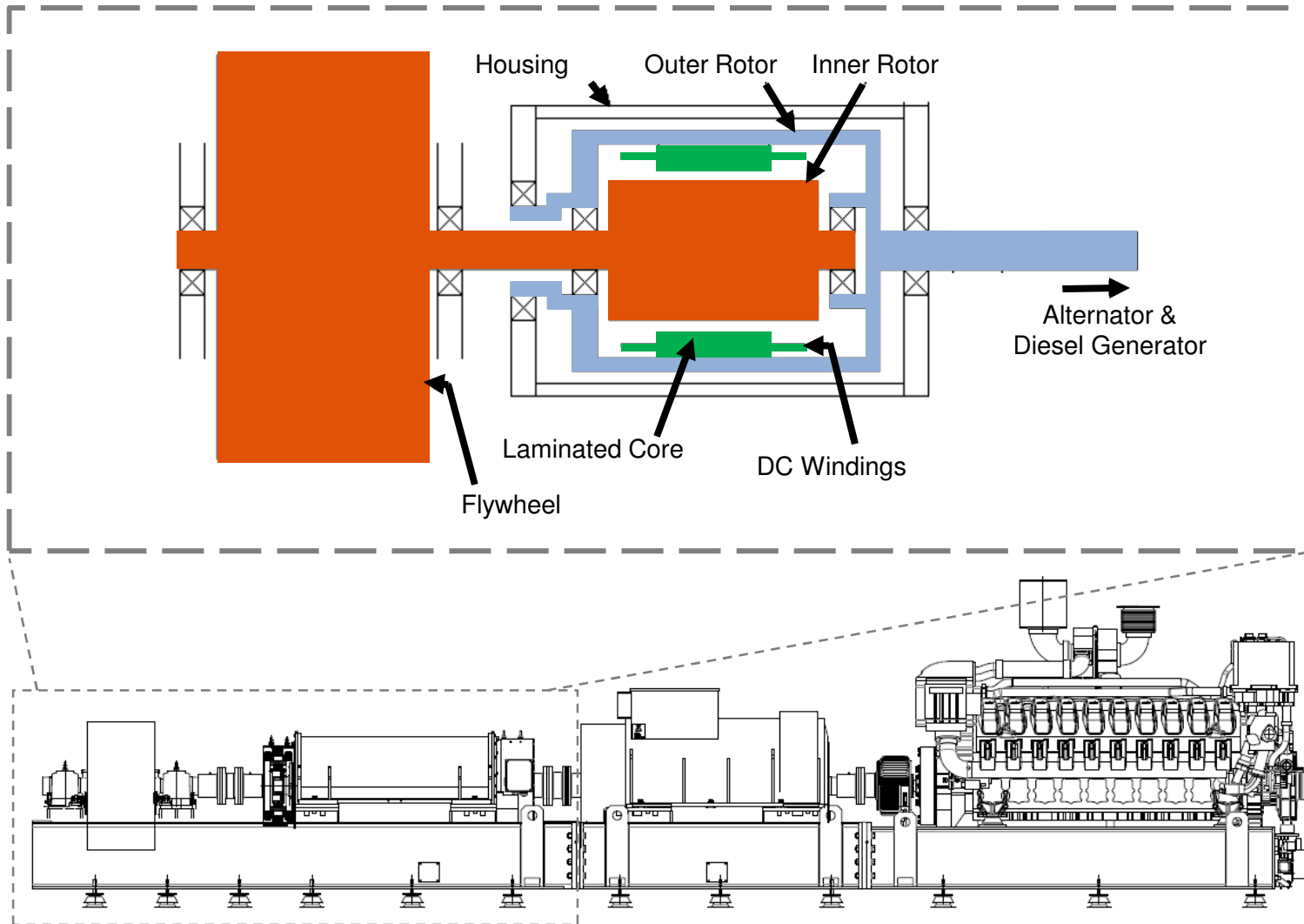




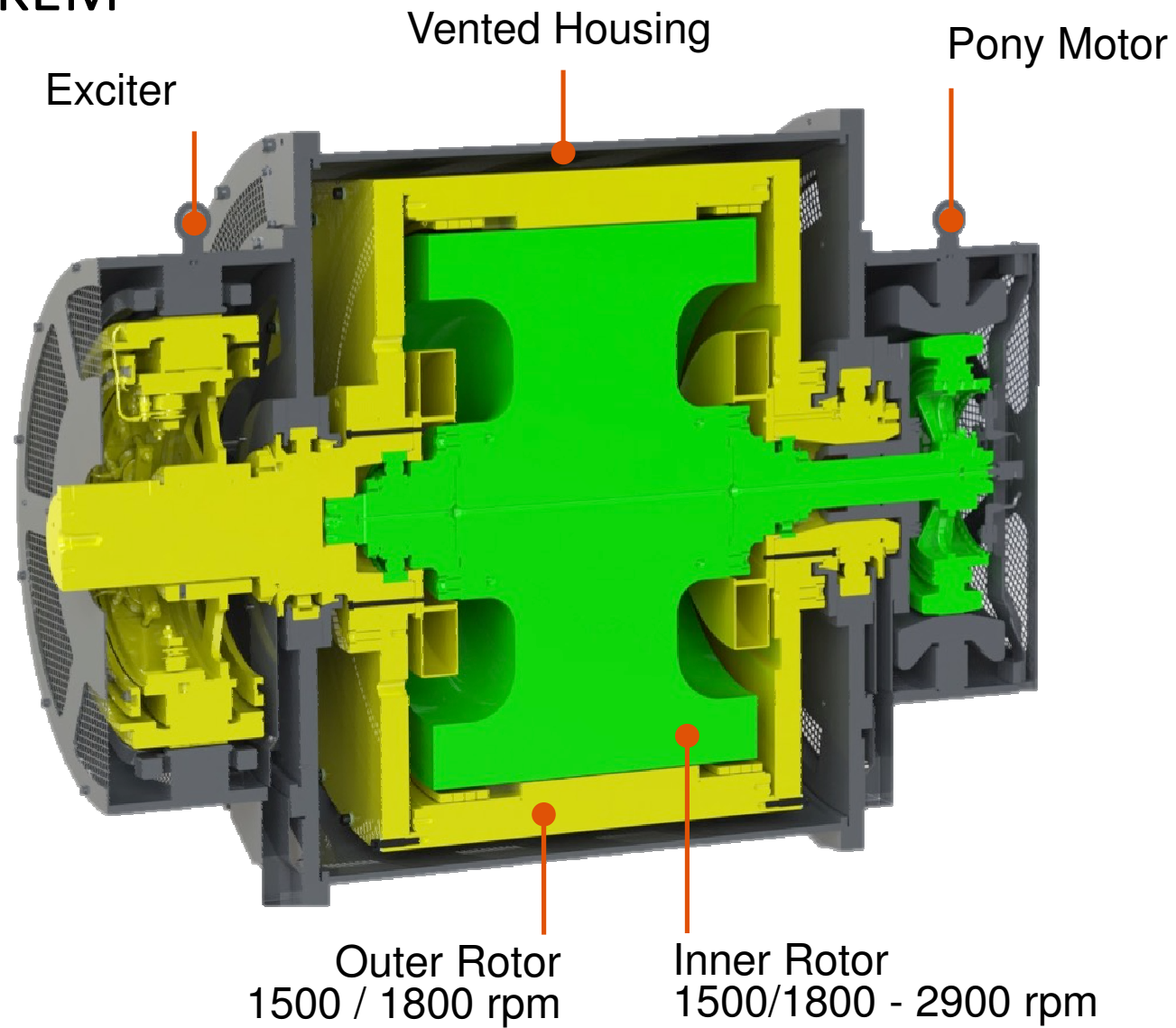
# Power Module Components



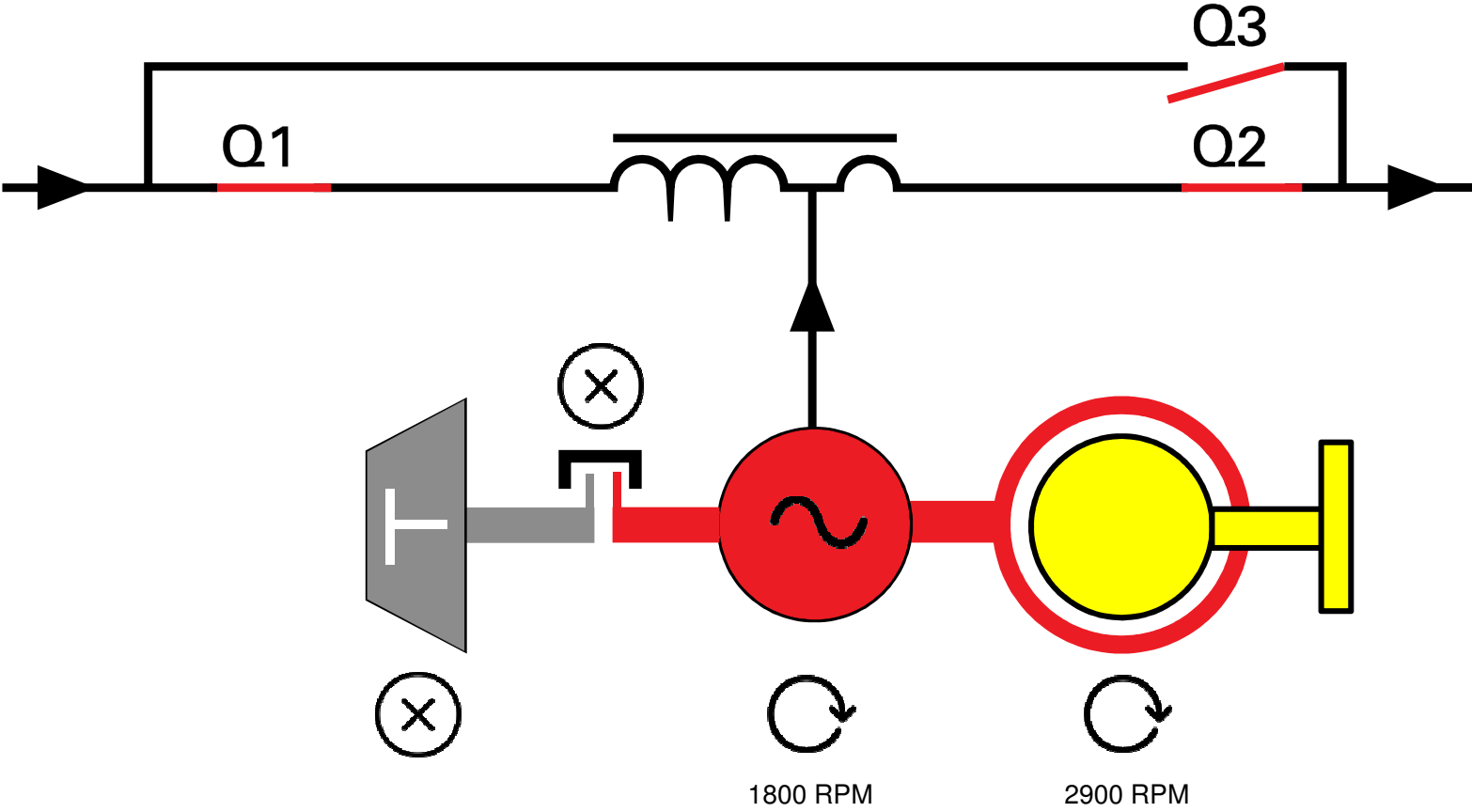
# The UPS "Prime Mover"



# The ETM/KEM

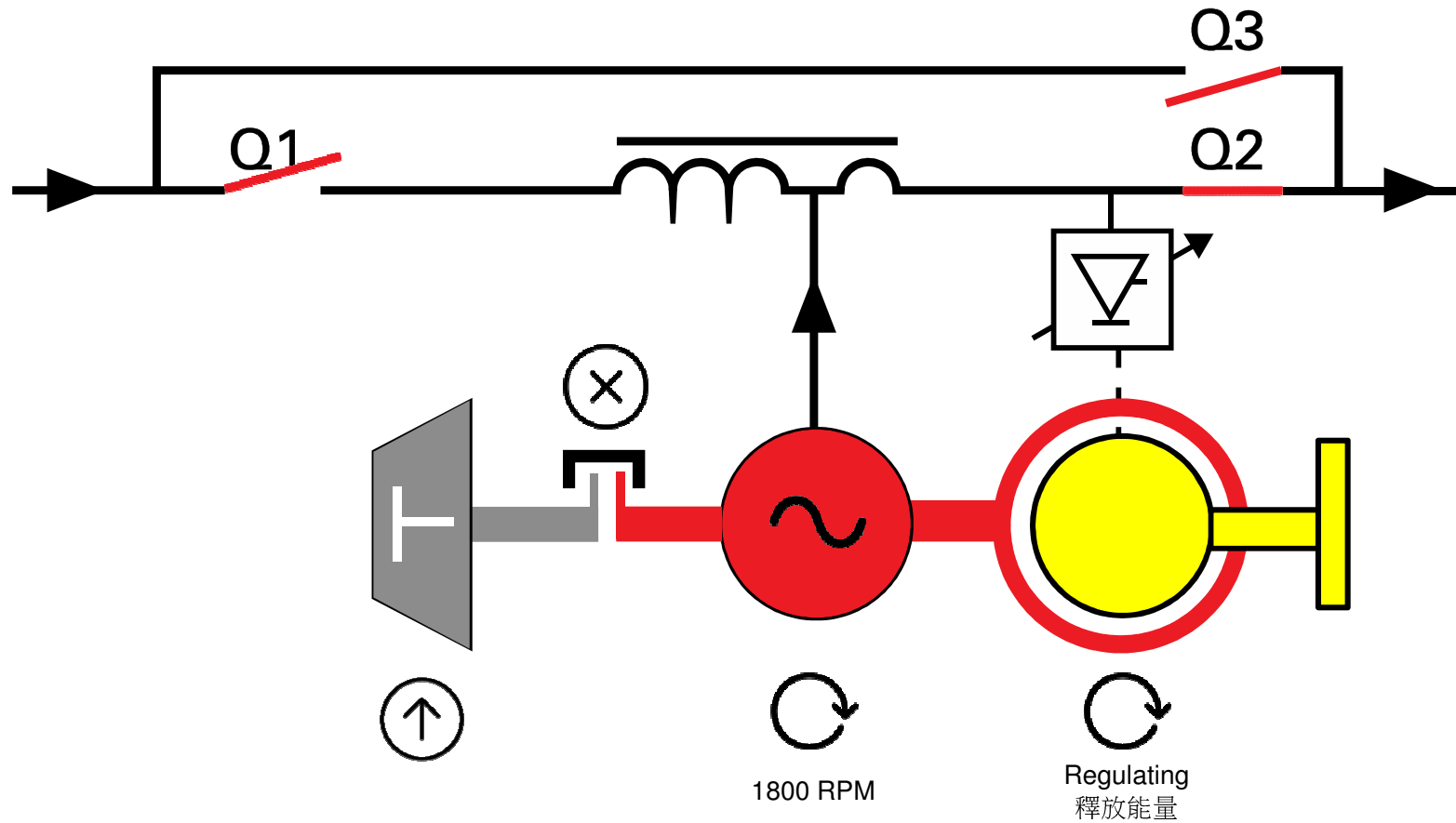


# Utility Mode 正常模式

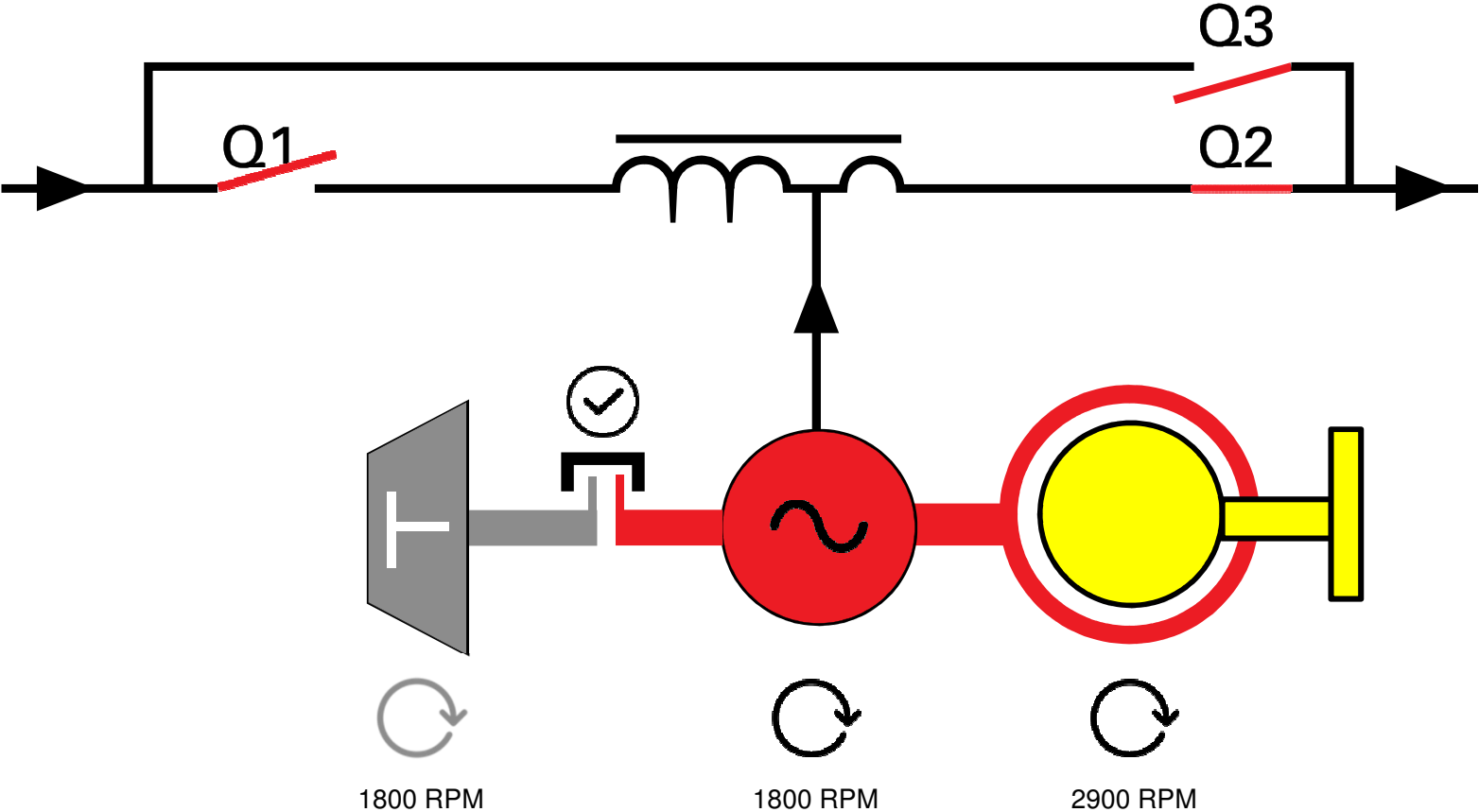


# Transfer Mode (Releasing the UPS Prime Mover)

能量轉移模式



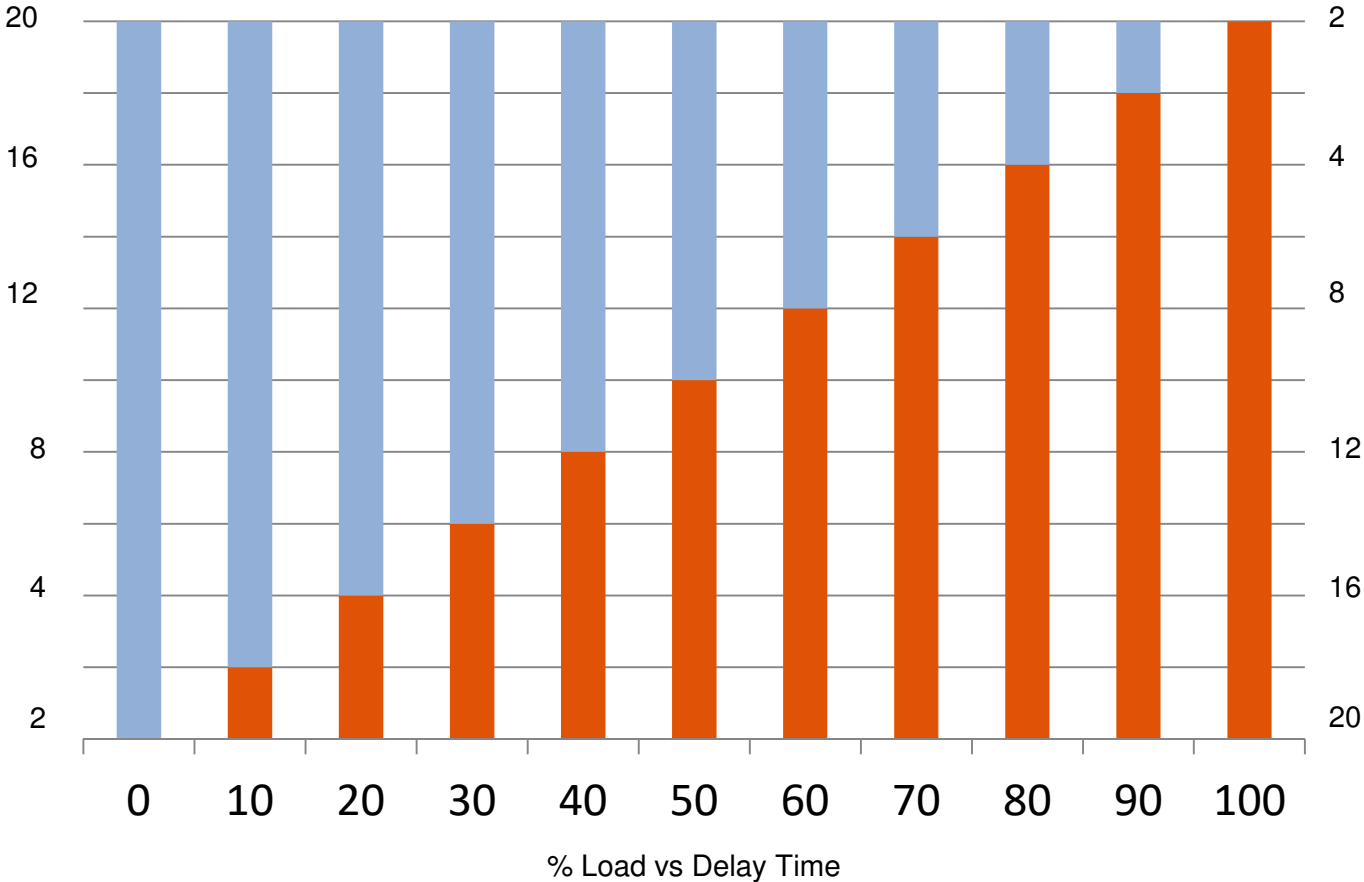
# Diesel (Genset) Mode 柴油模式



# HITEC-SPECIFIC FEATURES



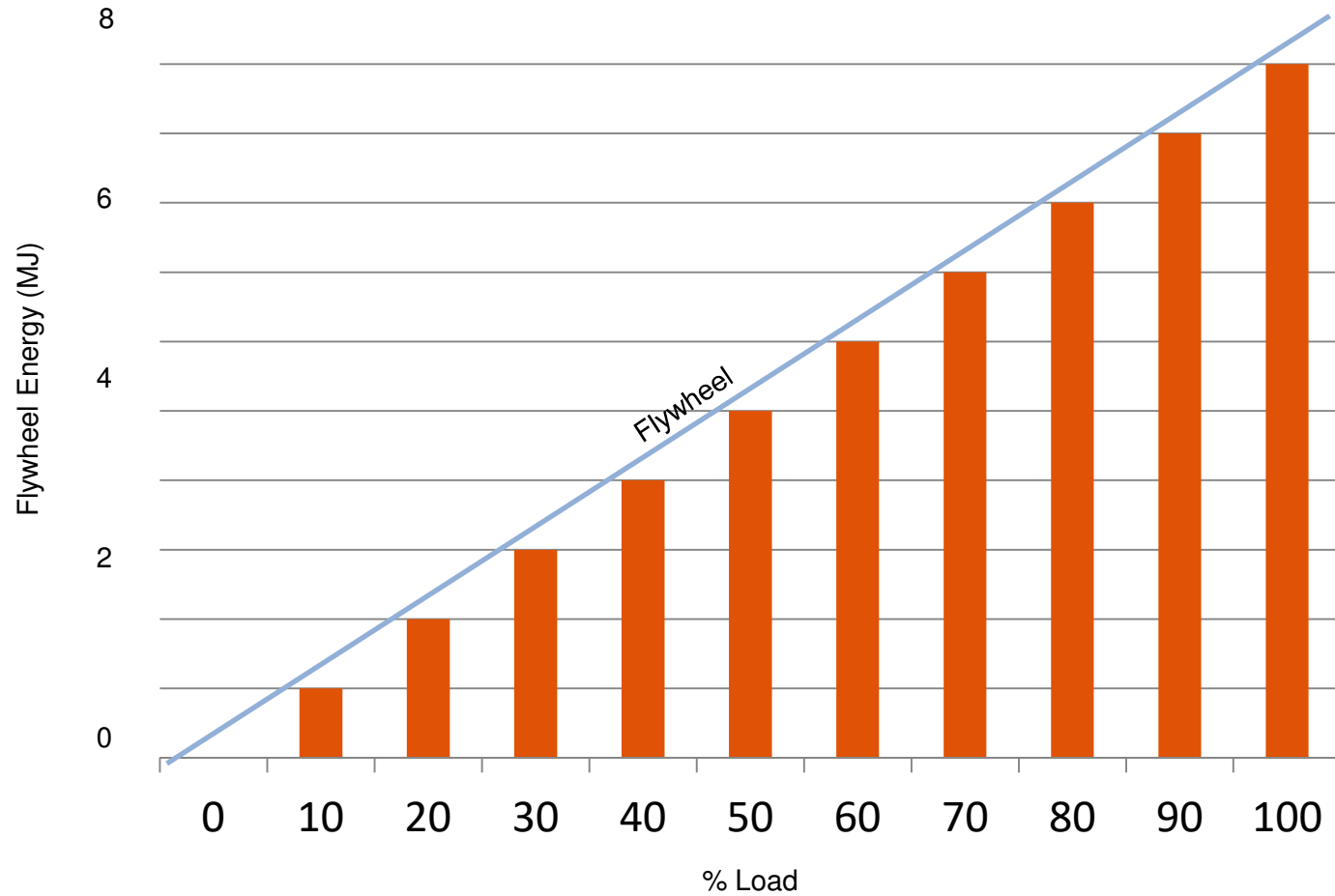
# Diesel Start Delay 柴油緩啟動

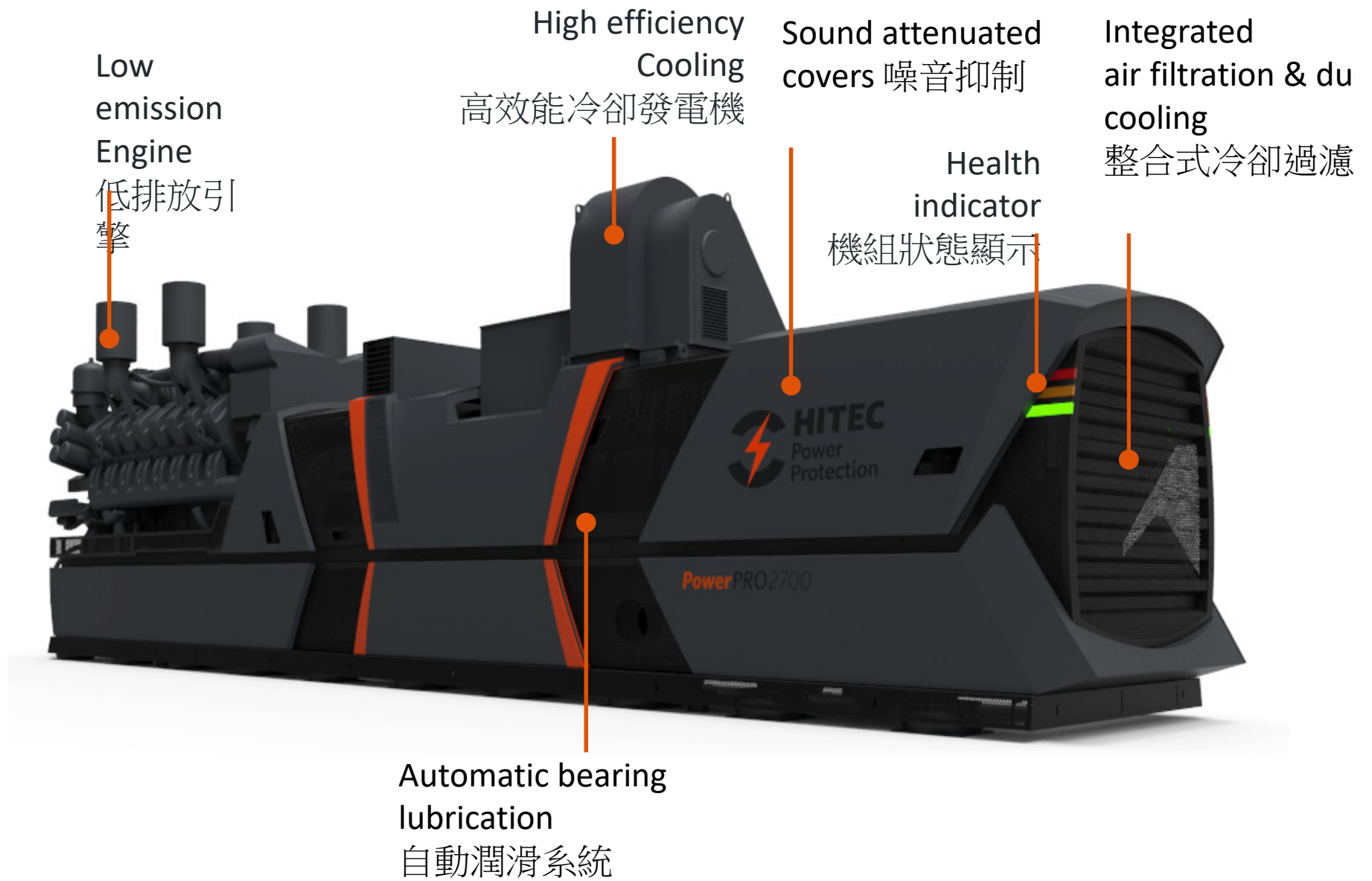




# Energy Storage Optimization (ESO) Mode

## 節能模式

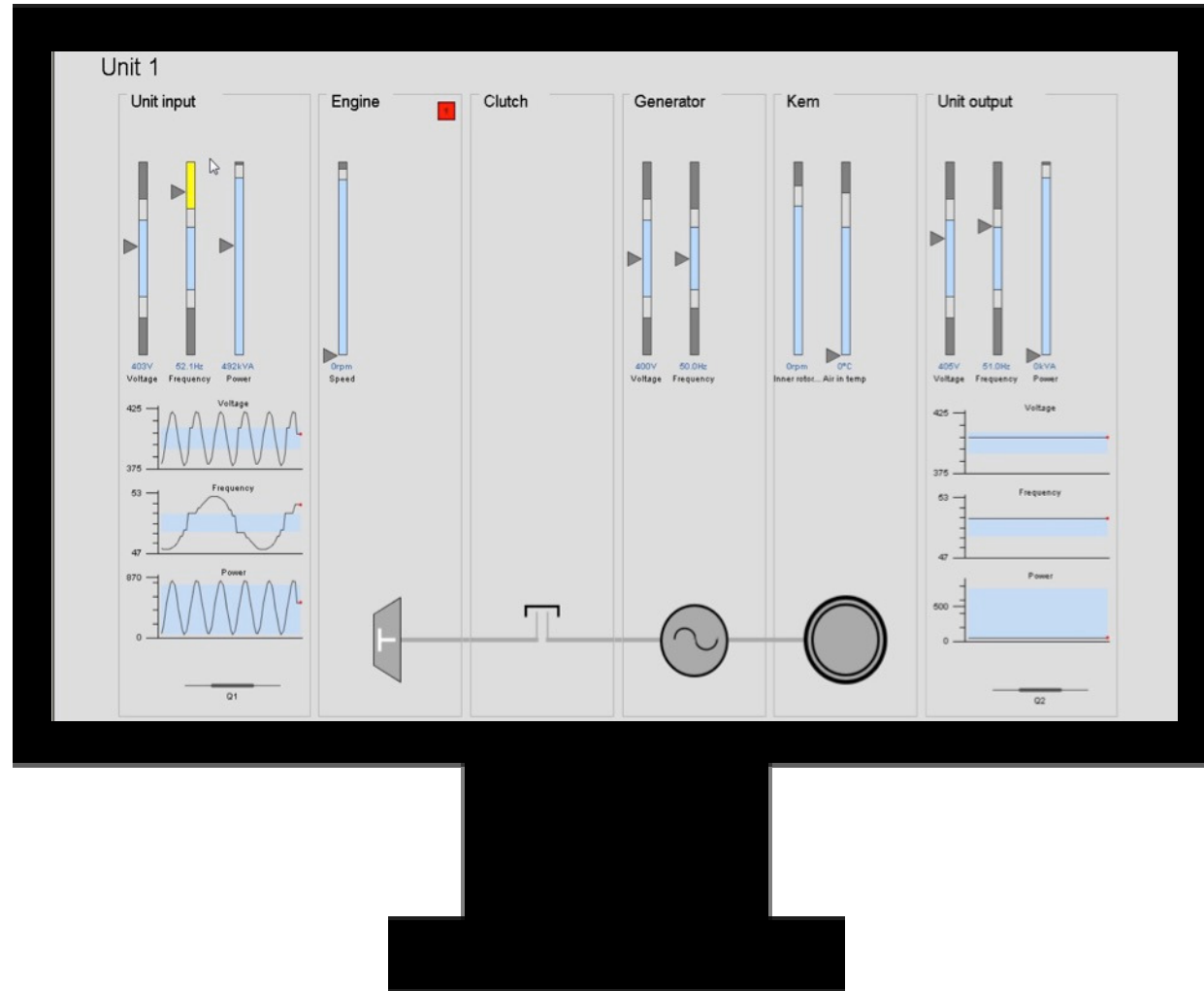




# Continuous Monitoring 即時監控系統



# Continuous Monitoring即時監控系統



# Predictive Analytics



# KEY DIESEL ROTARY BENEFITS

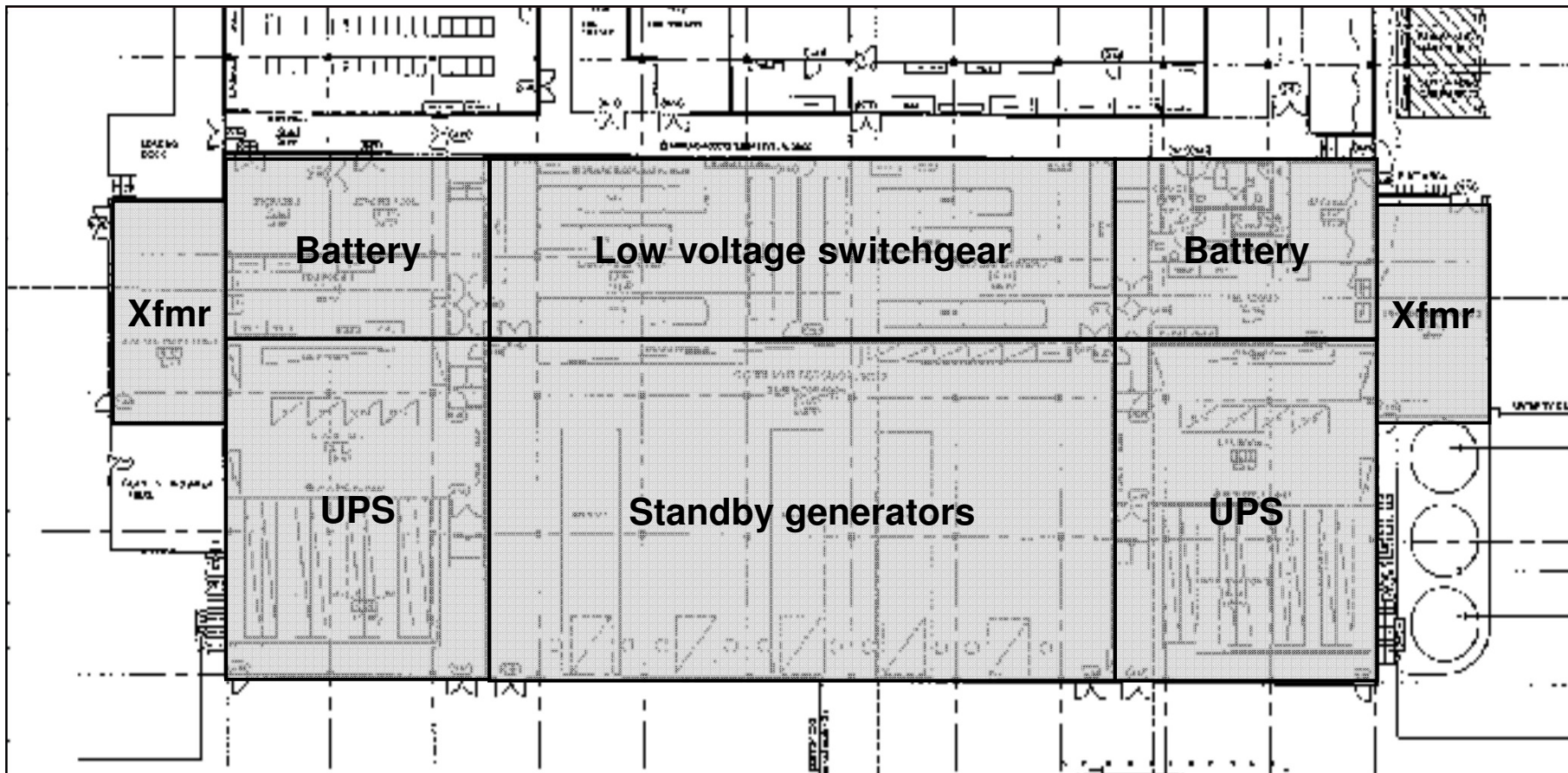
使用動態不斷電系統的好處



## 30+ Year Life 超過30年的使用週期

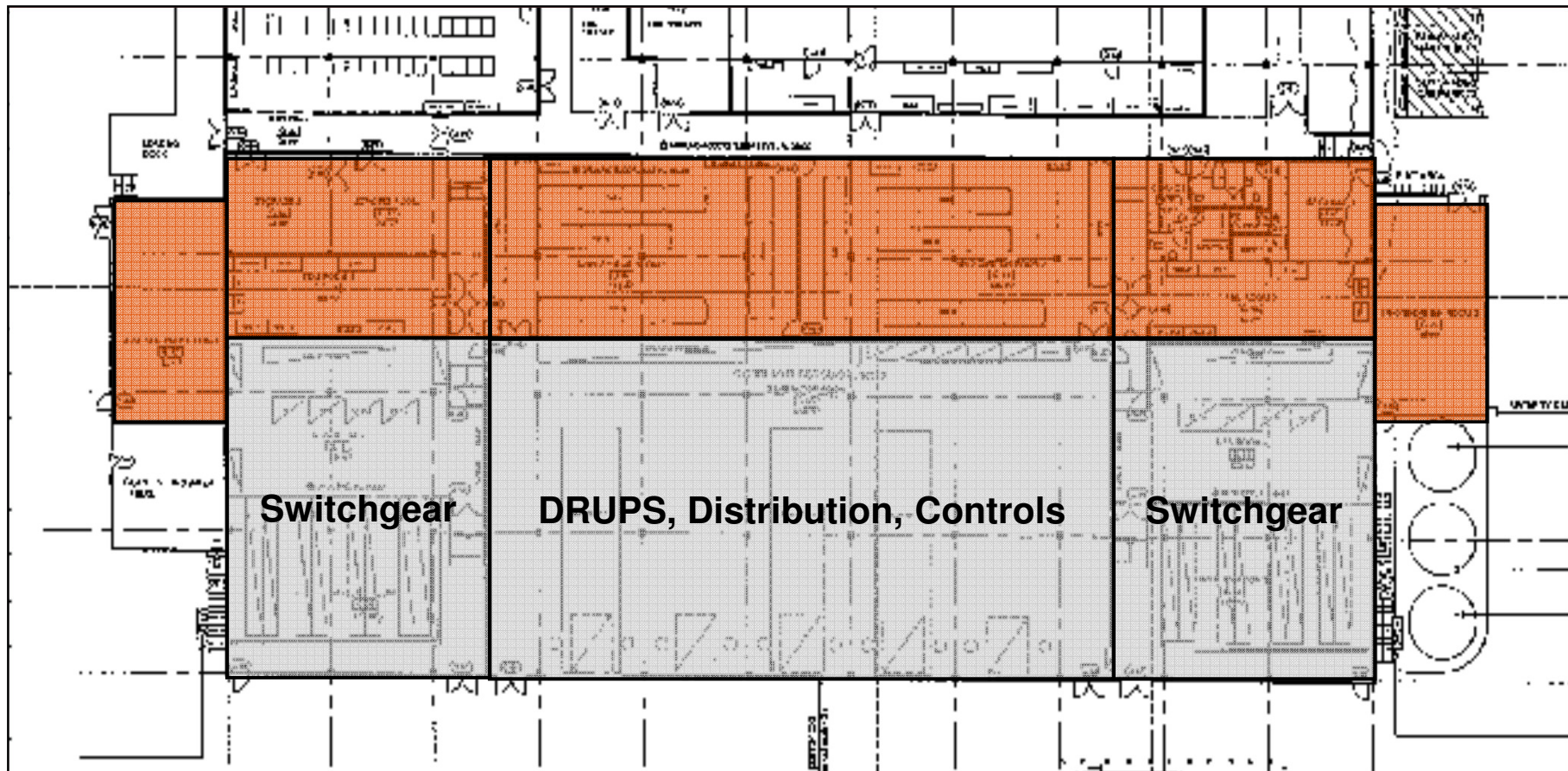


# Space-Saving

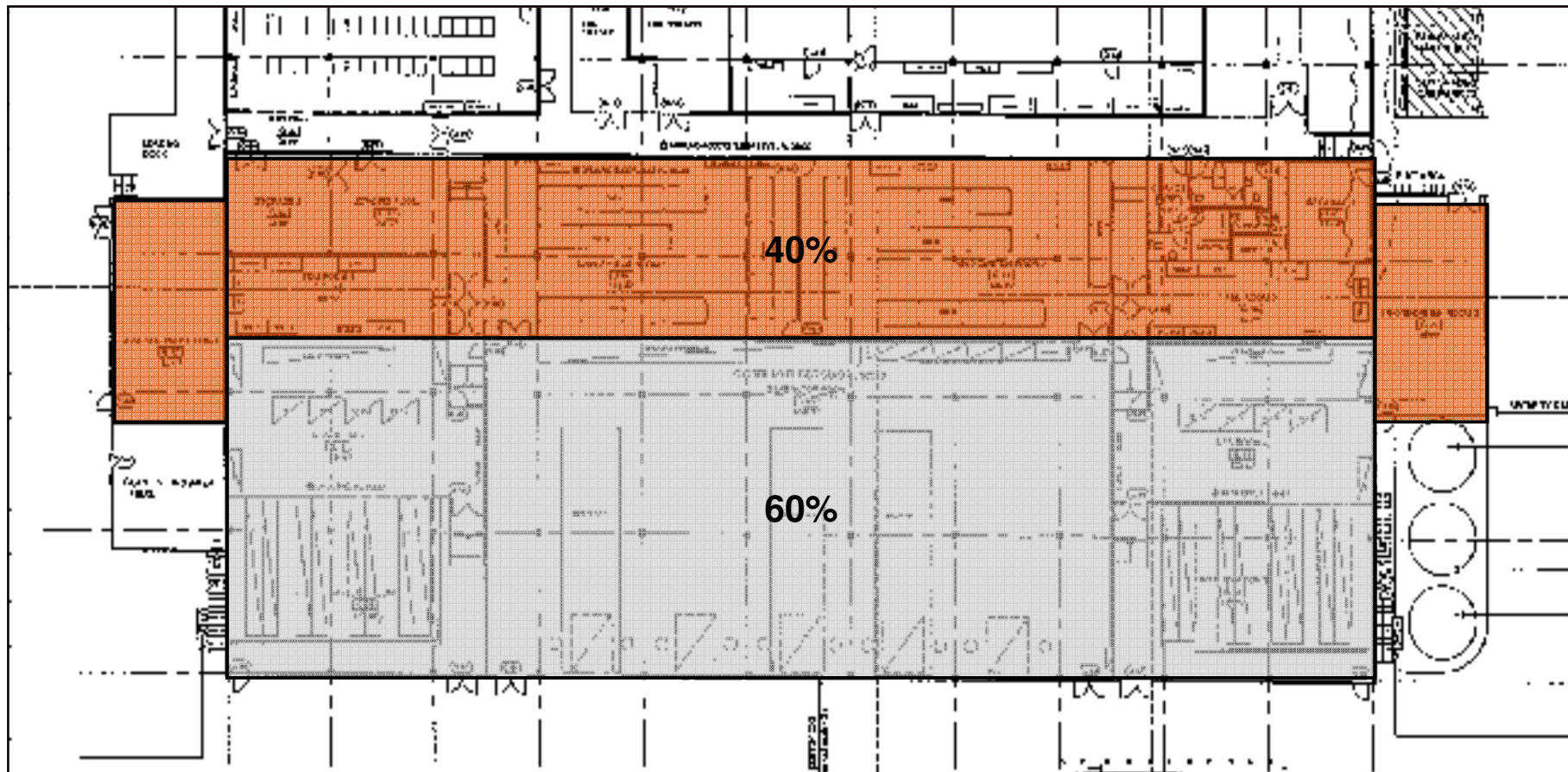




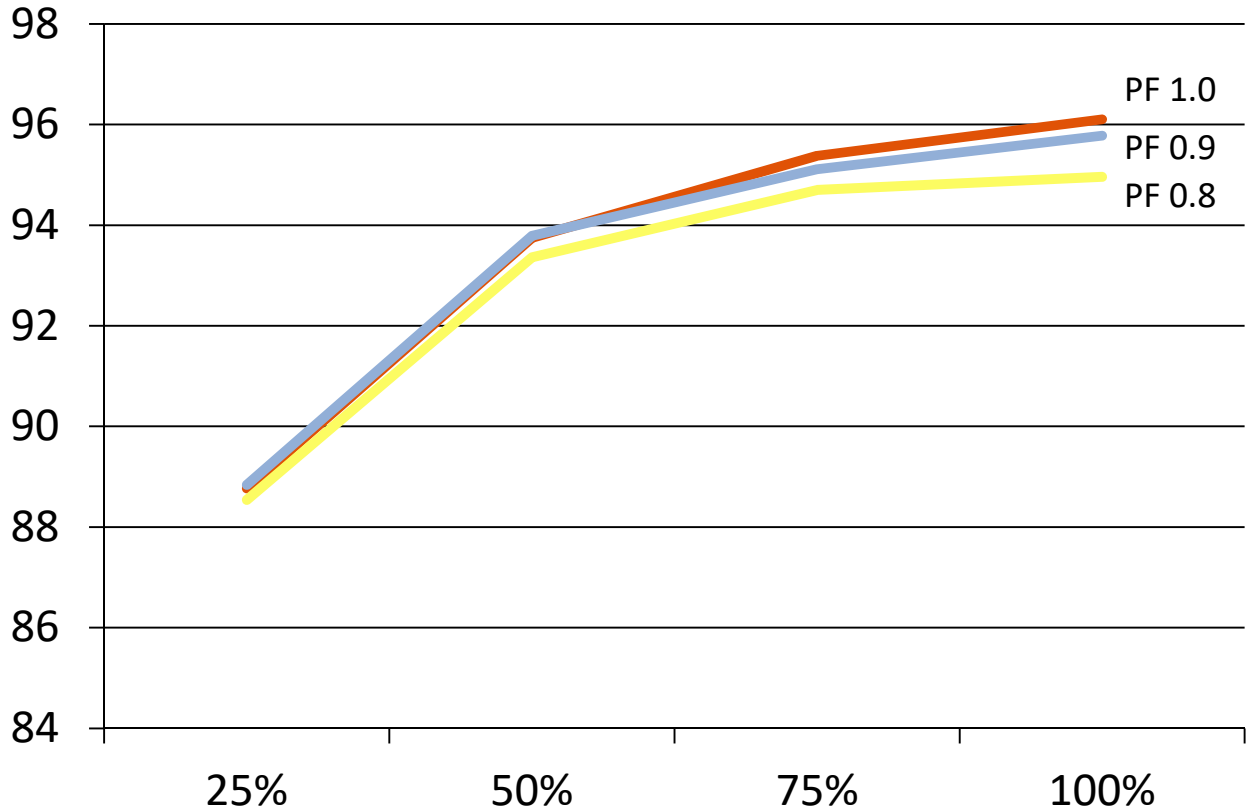
# Space-Saving 節省空間



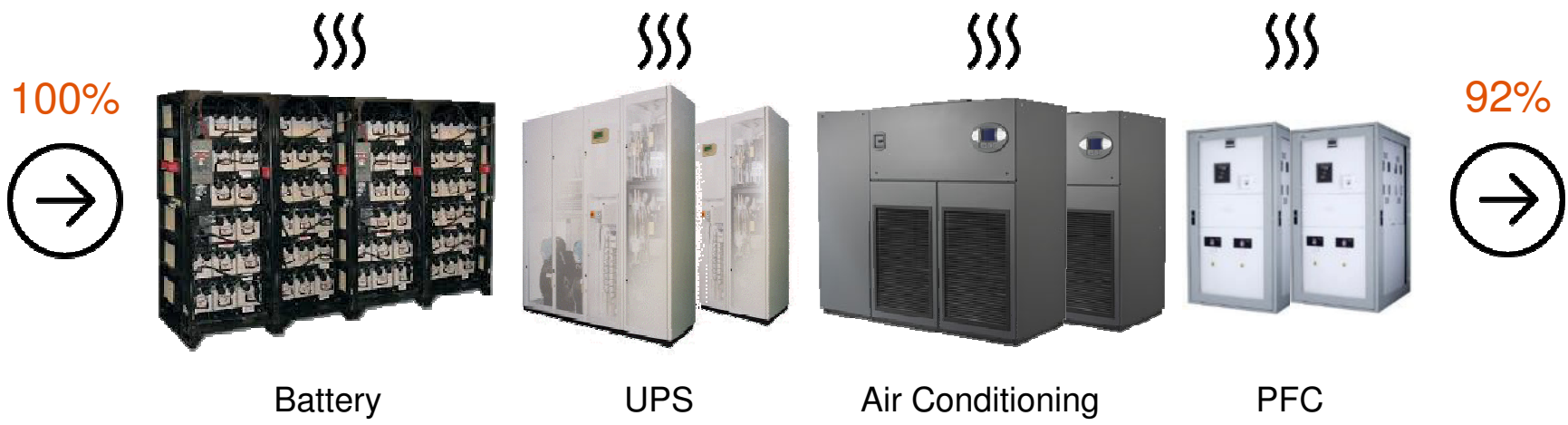
# Space-Saving 節省空間



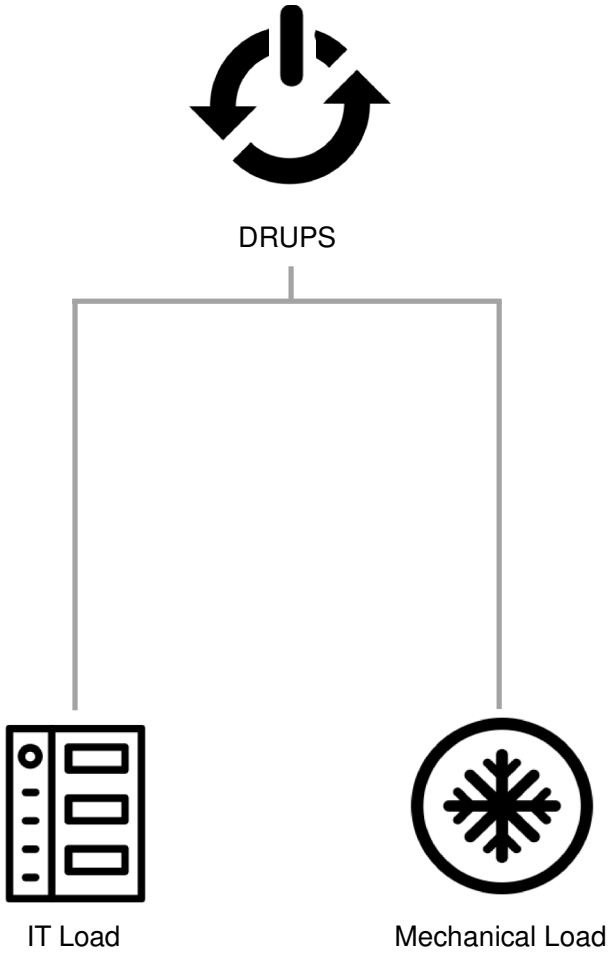
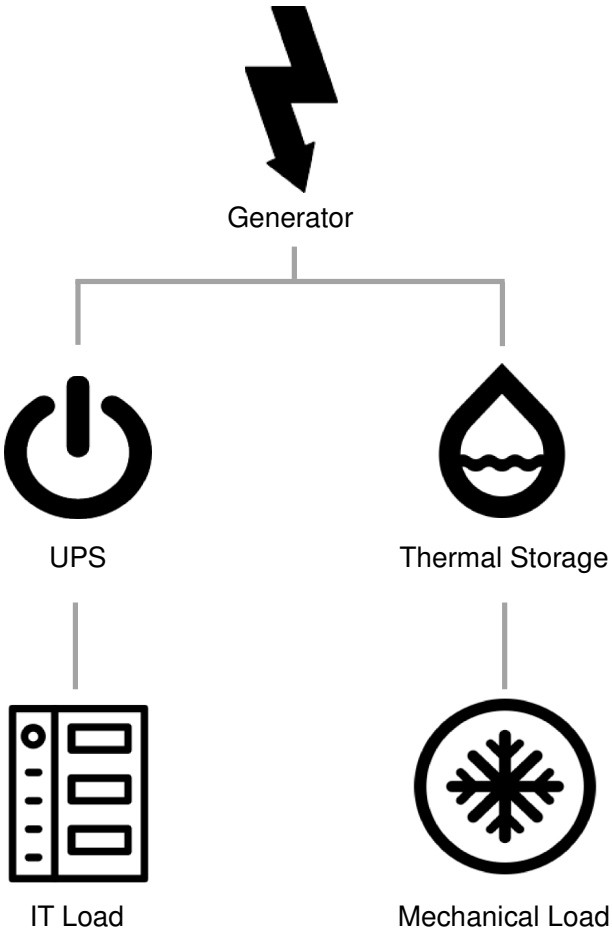
# Highly Efficient 高效能 (省電費)



# Highly Efficient 高效能



# Game Changing



# TOTAL COST OF OWNERSHIP

## 建置成本以及運轉成本



# CAPEX 建置成本

## **Space, primary 空間**

Deduct for battery storage, additional switchgear, and room to house the mechanical equipment

可以省去過多的機電設備安裝

## **Space, secondary**

Real estate cost, lease cost, land cost, opportunity cost, building structure, construction of floors, walls, ceiling.

減少因空間所帶來的問題，並增加空間所帶來的效益。

## **Support systems**

Deduct for hydrogen and battery monitoring, louvers and dampers, fire suppression

減少不必要的相關監測以及支援系統

## **Mechanical systems**

deduct for HVAC, CW system, roof top condensers, ventilation, controls, and associated structural and roofing costs.

減少不必要的高壓設備以及冷卻系統

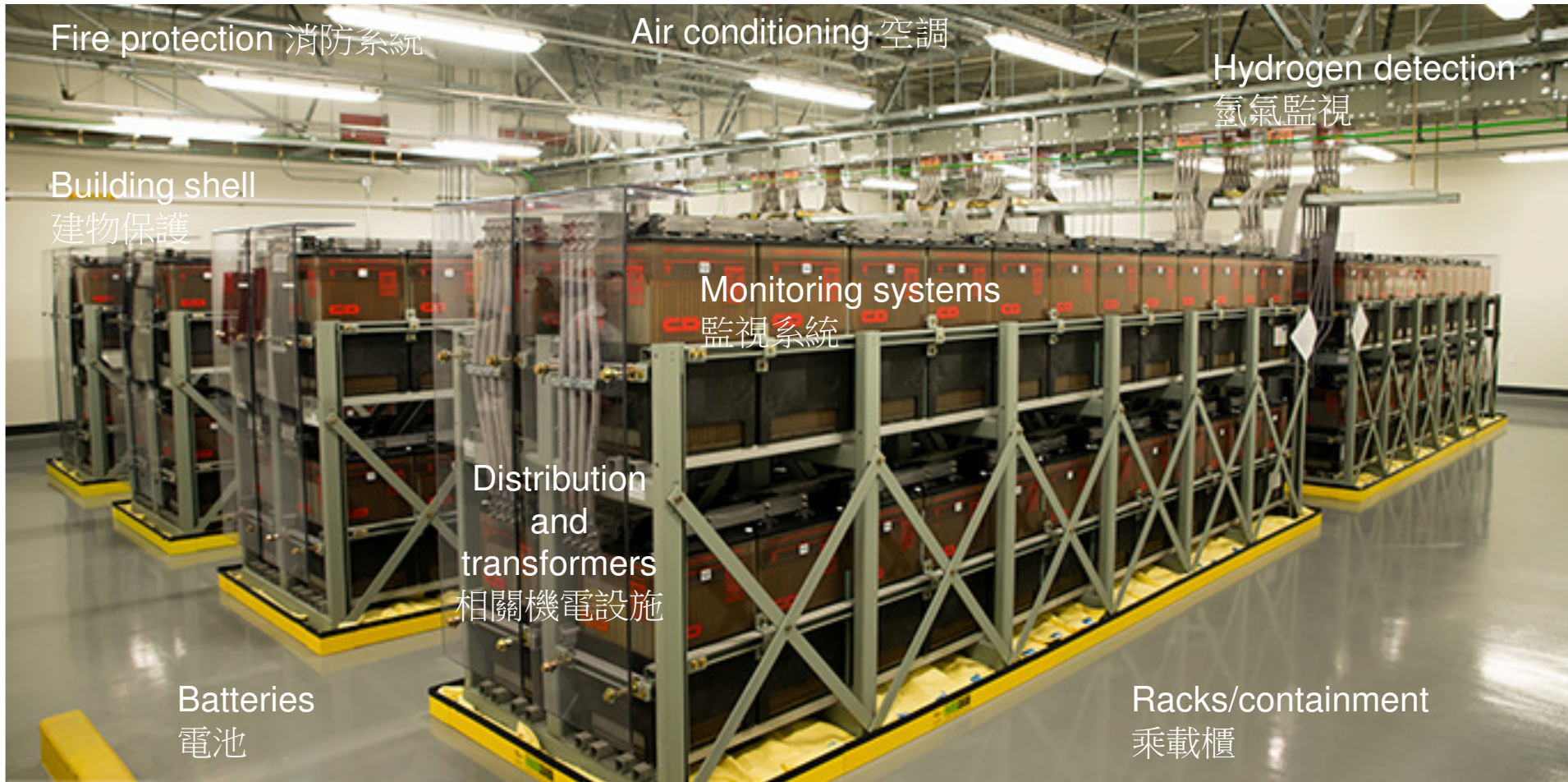
## **Electrical systems**

Cost to upsize the generator and switchgear, depending on load.

減少機電系統整合問題



# CAPEX





# OPEX 運轉成本

## **Efficiency 效能**

Minimum 2% (often more) gain in system efficiency; larger gains in <50%  
比一般系統多2%以上的效能

## **Power for cooling 冷卻效能**

Operating cost for the mechanical system  
不需要多餘空調冷去

## **Preventative maintenance 預防保養**

Deduct for maintaining monitoring systems and mechanical systems  
相對較少保養 (UPS+Genset)

## **Overhauls and major maintenance 機組大保養**

Deduct for battery replacements vs bearing overhauls  
相對較少保養 電池每三年要更換，動態每十年更換軸承。

## **Equipment longevity 產品生命週期更長**

UPS lifespan of 12-15 years vs. 25 – 30+ for DRUPS. UPS system requires complete replacement during lifecycle of DRUPS. Mechanical system lifecycle is 15 to 20 years, one replacement during DRUPS lifecycle.



# Operating cost in \$/kVA/year 運轉成本

## ROTARY



Energy losses



Cooling



Maintenance



Overhauls

\$75

Total

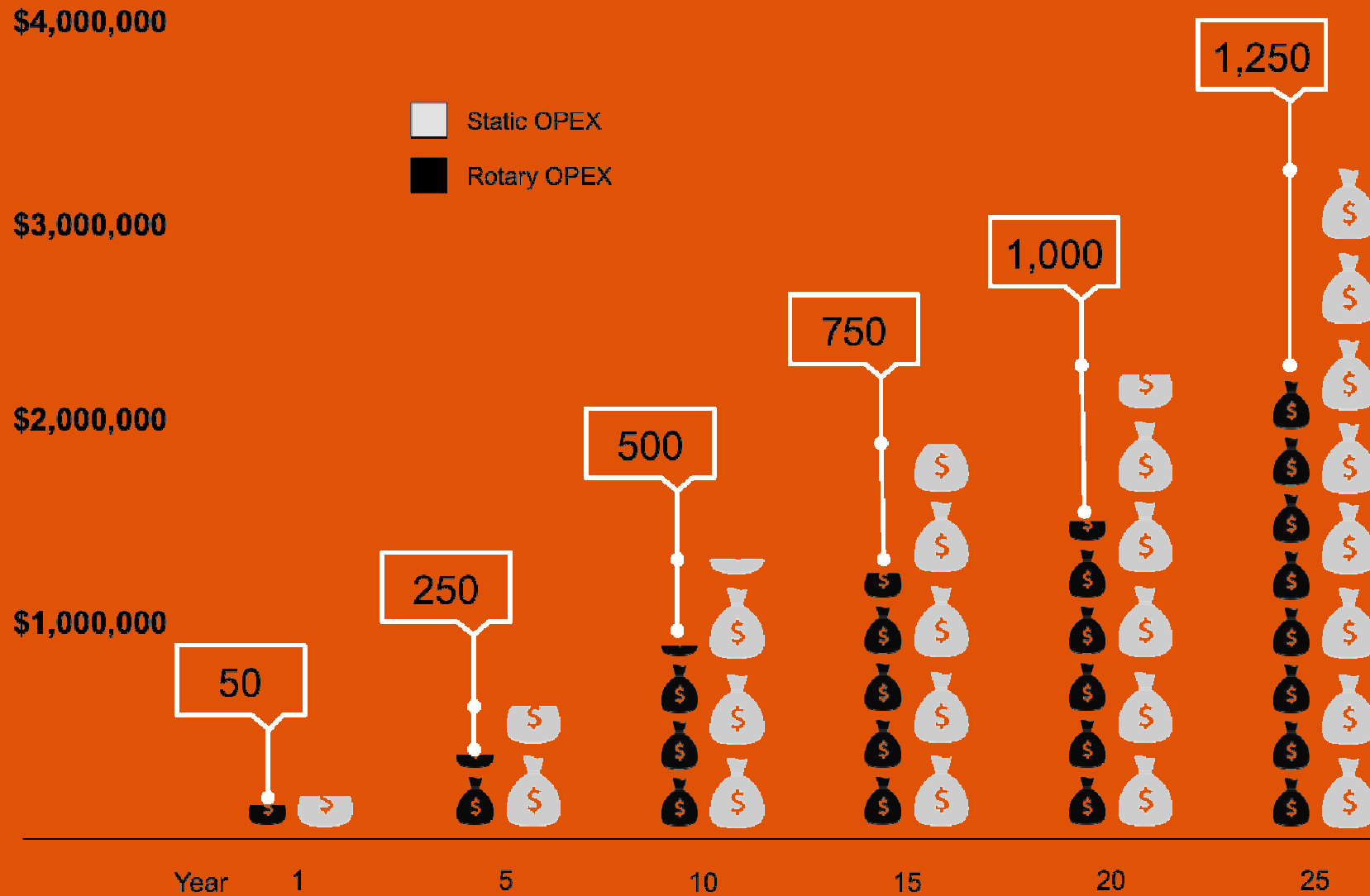
## STATIC



\$125



# Operating cost savings per MW load

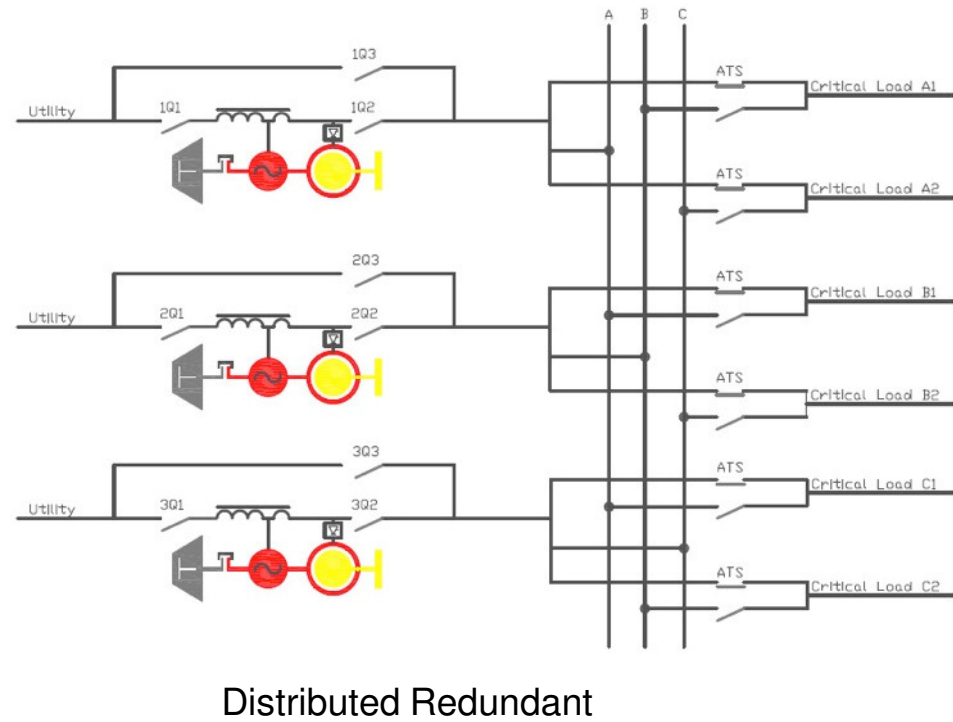
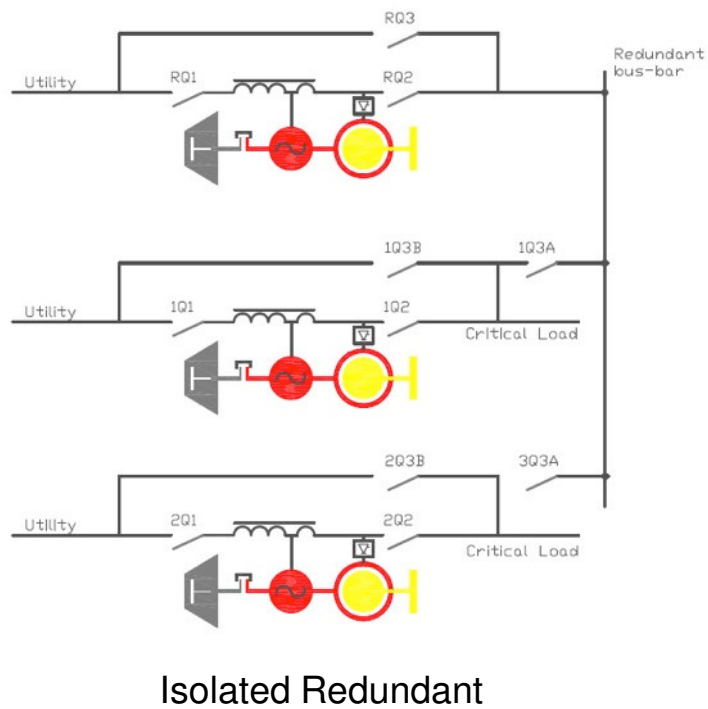
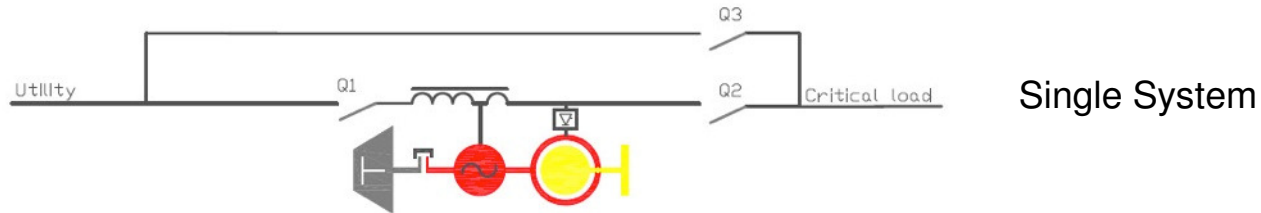


# CONFIGURATIONS

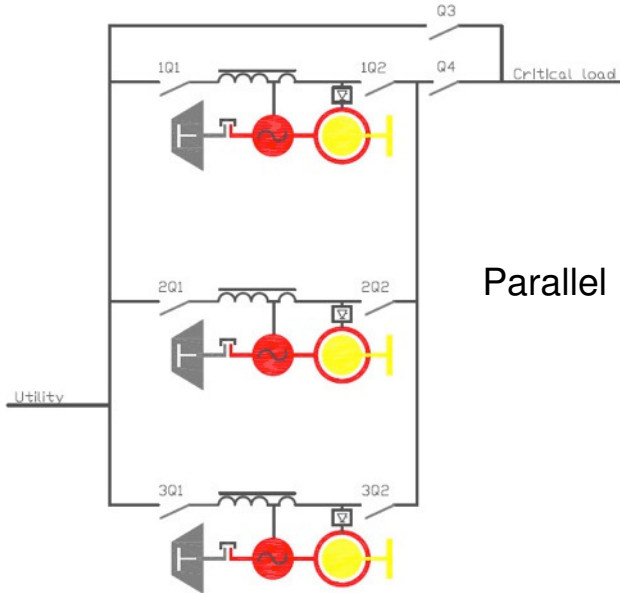
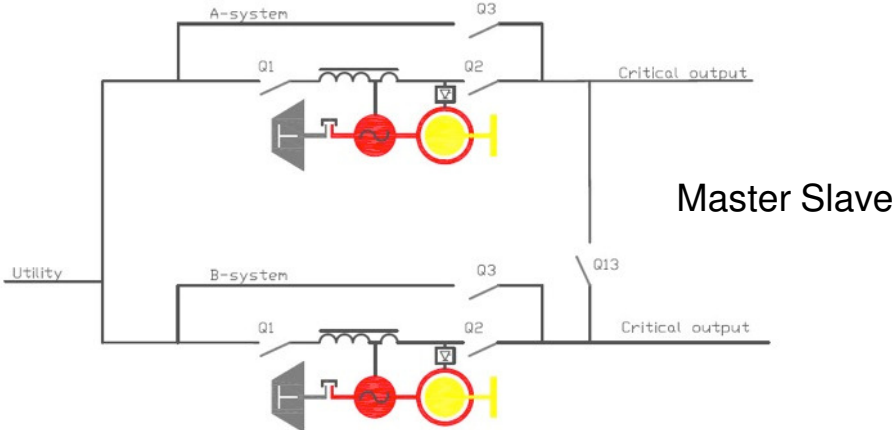
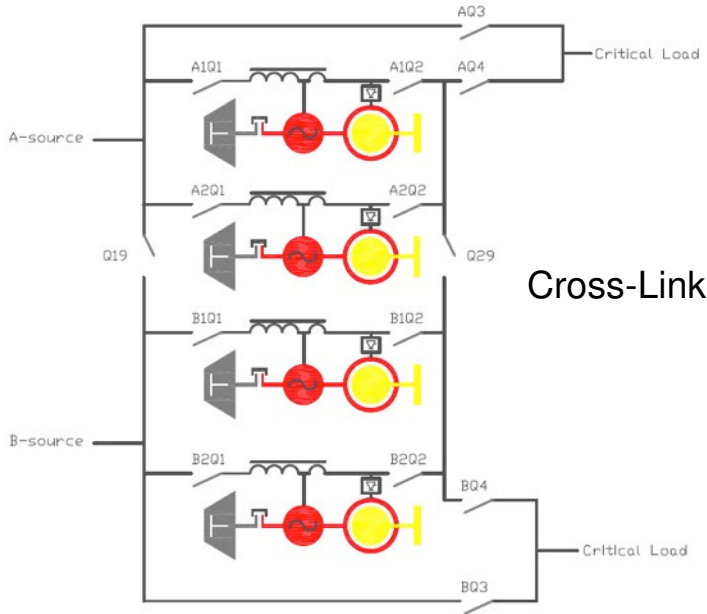
## 建置及運轉架構



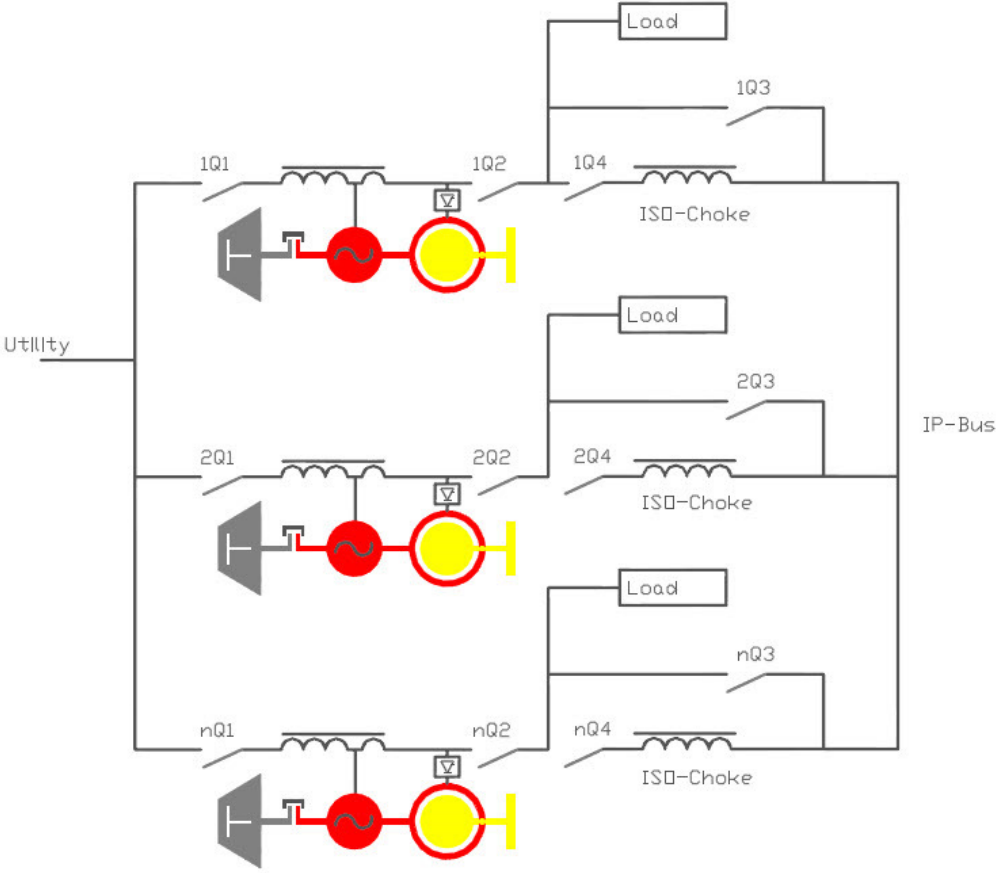
# Single Systems 單機系統



# Parallel Systems 並聯系統



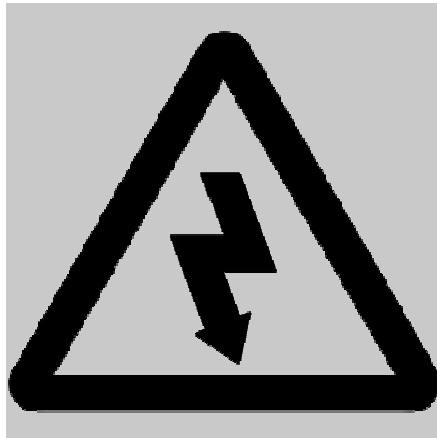
# Everything In Between 其他



Isolated Parallel



# Voltage range 電壓



**Low Voltage**

**400 – 600V**

**3 ph. 3 wire  
3 ph. 4 wire**



**Medium Voltage**

**5 – 35kV**

**3 ph. 3 wire  
3 ph. 4 wire**





# Turnkey Solutions





**CONTINUOUS POWER  
IN YOUR CONTROL**

**Thank you for your time.**