

Making the **Future** of Your Business **Possible**

Maximise **Availability, Capacity** and
Efficiency of Your Critical Infrastructure





Making the **Future** of Your Business **Possible**

Maximise **Availability, Capacity** and
Efficiency of Your Critical Infrastructure

Evolución de los Sistemas de Alimentación Ininterrumpida (SAI) en pro de la eficiencia energética

Enrique Jauregualzo

Consultant Development Manager

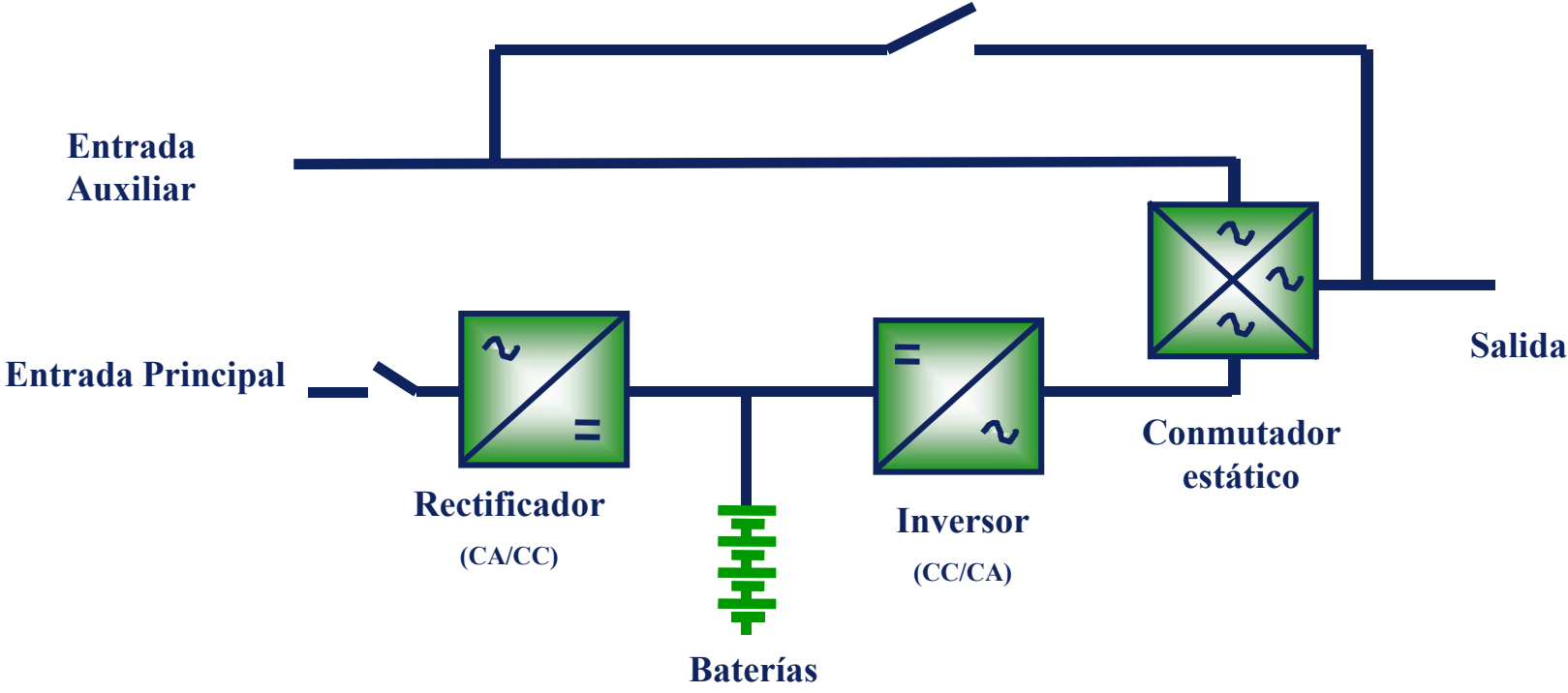
Emerson Network Power

Enrique.Jauregualzo@Emerson.com

+34-618808561



SAI doble conversión (VFI)

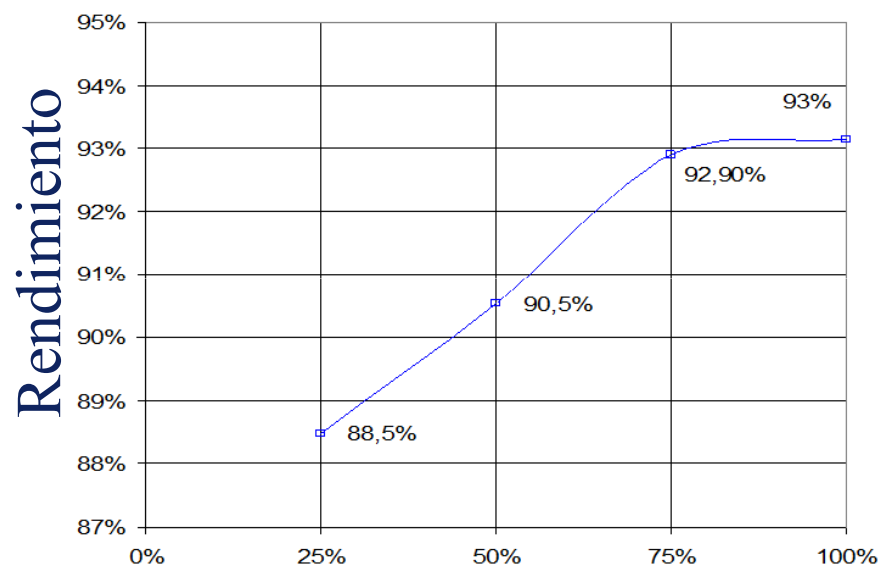


Making the **Future** of Your Business Possible
Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure



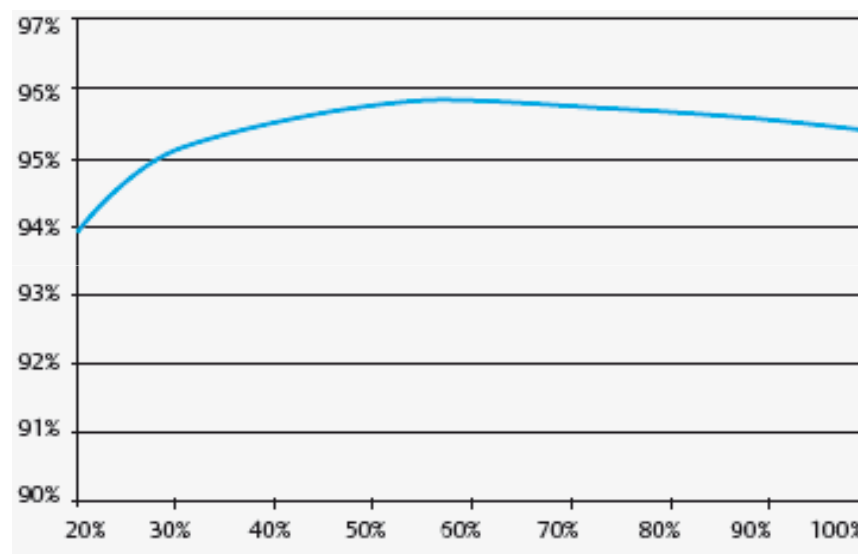
Curvas de rendimiento SAI

SAI 1



Nivel de carga

SAI 2



Nivel de carga

Making the **Future** of Your Business Possible

Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure



Cálculo de pérdidas

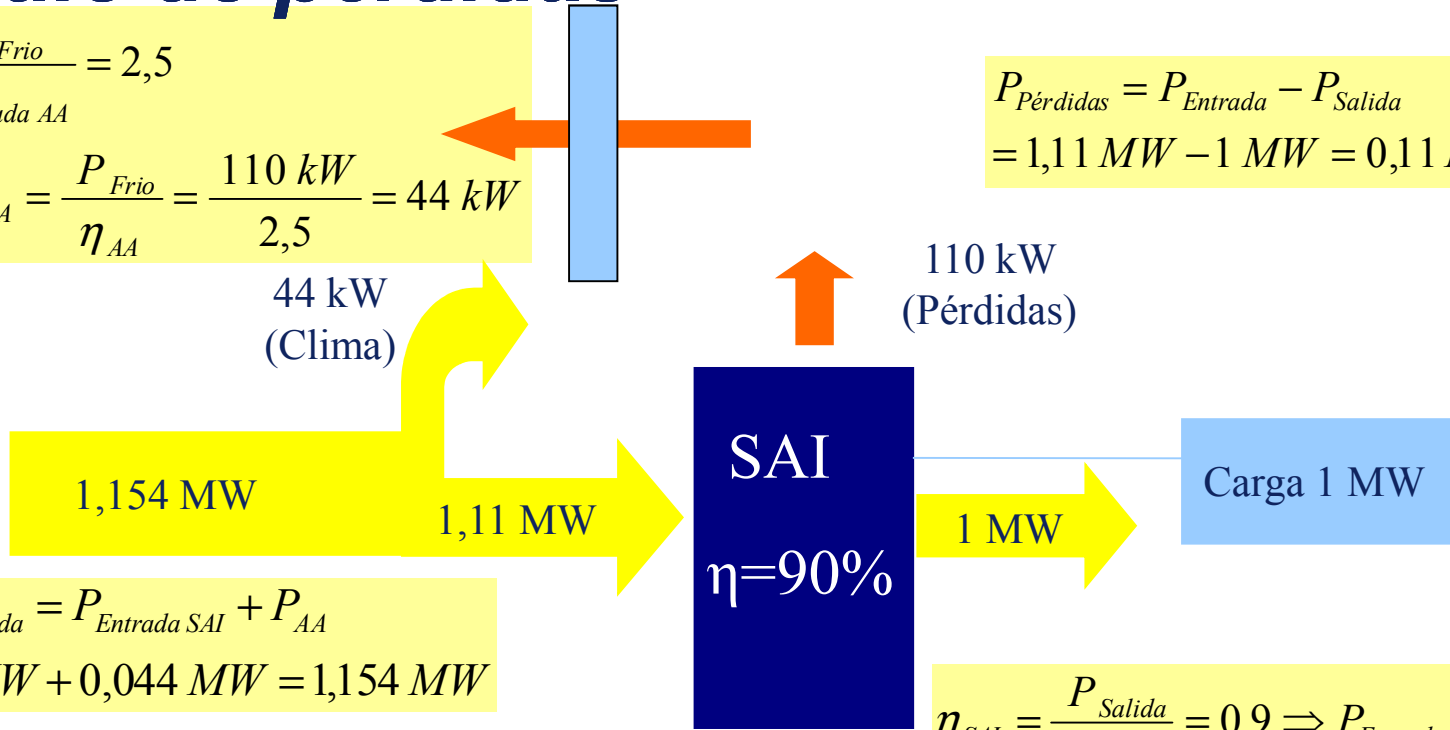
$$\eta_{AA} = \frac{P_{Frio}}{P_{entrada AA}} = 2,5$$

$$\Rightarrow P_{entrada AA} = \frac{P_{Frio}}{\eta_{AA}} = \frac{110 kW}{2,5} = 44 kW$$

44 kW
(Clima)

$$P_{Pérdidas} = P_{Entrada} - P_{Salida}$$

$$= 1,11 MW - 1 MW = 0,11 MW$$



$$P_{Total Entrada} = P_{Entrada SAI} + P_{AA}$$

$$= 1,11 MW + 0,044 MW = 1,154 MW$$

$$P_{Total Pérdidas} = P_{Total Entrada} - P_{Salida}$$

$$= 1,154 MW - 1 MW = 0,154 MW (154 kW)$$

$$\eta_{Total Sistema} = \frac{P_{Salida}}{P_{Entrada}} = \frac{1 MW}{1,154 MW} = 0,86$$

$$\eta_{SAI} = \frac{P_{Salida}}{P_{Entrada}} = 0,9 \Rightarrow P_{Entrada} = \frac{P_{Salida}}{\eta}$$

$$= \frac{1 MW}{0,9} = 1,11 MW$$

Making the **Future** of Your Business Possible

Maximise **Availability**, **Capacity** and **Efficiency** of Your Critical Infrastructure



Ej.: Carga de 1 MW

$$\Delta_{P\acute{e}rdidas} = P_{Carga} \left(\frac{1}{\eta_{SAI1}} - \frac{1}{\eta_{SAI2}} \right) \left(1 + \frac{1}{\eta_{AA}} \right)$$

Si el rendimiento del AA=2,5

$$\Delta_{P\acute{e}rdidas} = P_{Carga} \left(\frac{1}{\eta_{SAI1}} - \frac{1}{\eta_{SAI2}} \right) \left(1 + \frac{1}{2,5} \right) = P_{Carga} \left(\frac{1}{\eta_{SAI1}} - \frac{1}{\eta_{SAI2}} \right) 1,4$$

Comparando dos sistemas:

Sistema 1: $\eta=94\%$

Sistema 2 (Trinergy): $\eta=97,9\%$

y para una carga de 1 MW:

$$\Delta_{P\acute{e}rdidas} = 1 \text{ MW} \left(\frac{1}{0,94} - \frac{1}{0,979} \right) 1,4 = 59 \text{ kW}$$

Que al año significan p\acute{e}rdidas de:

$$\Delta_{P\acute{e}rdidas} = 59 \text{ kW} \times 24 \text{ h} \times 365 \text{ d\acute{ı}as} = 520 \text{ MWh anuales}$$

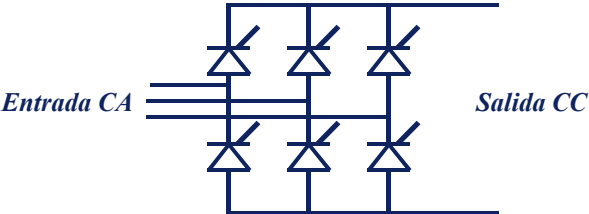
Making the **Future** of Your Business Possible

Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure



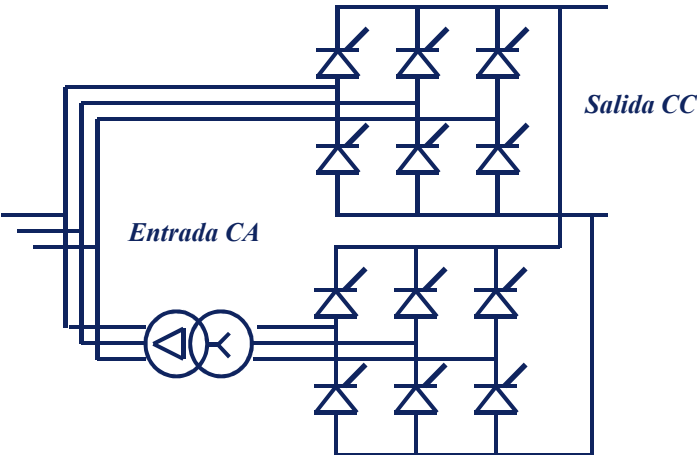
Rectificadores

Rectificador a tiristores de 6 pulsos



Mejora 1%
rendimiento

Rectificador a tiristores de 12 pulsos

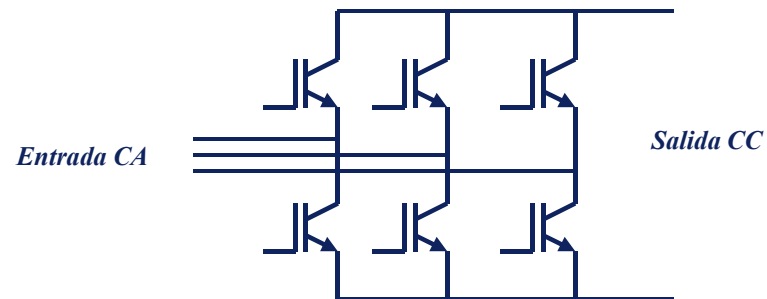


Making the **Future** of Your Business Possible
Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure

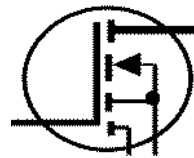


Rectificadores

Rectificador a IGBT



Novedad: Rectificador a CoolMos



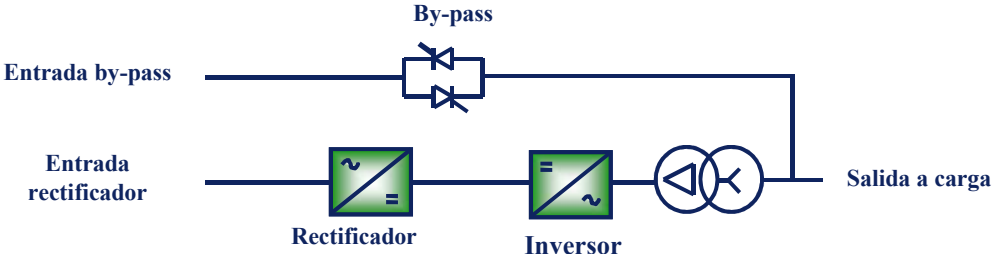
Making the **Future** of Your Business **Possible**

Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure

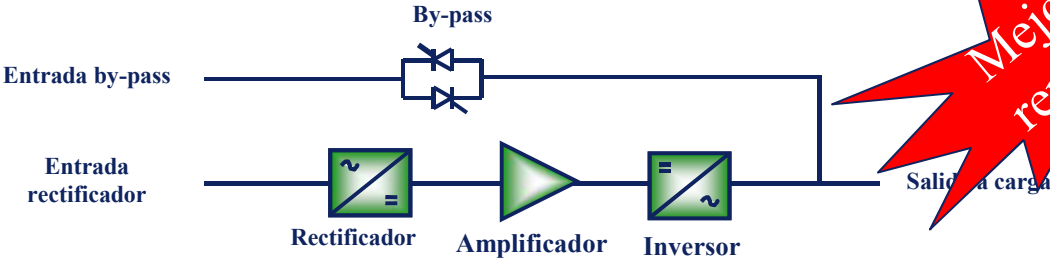


Tecnologías de SAI con y sin transformador interno

SAI CON TRANSFORMADOR INTERNO



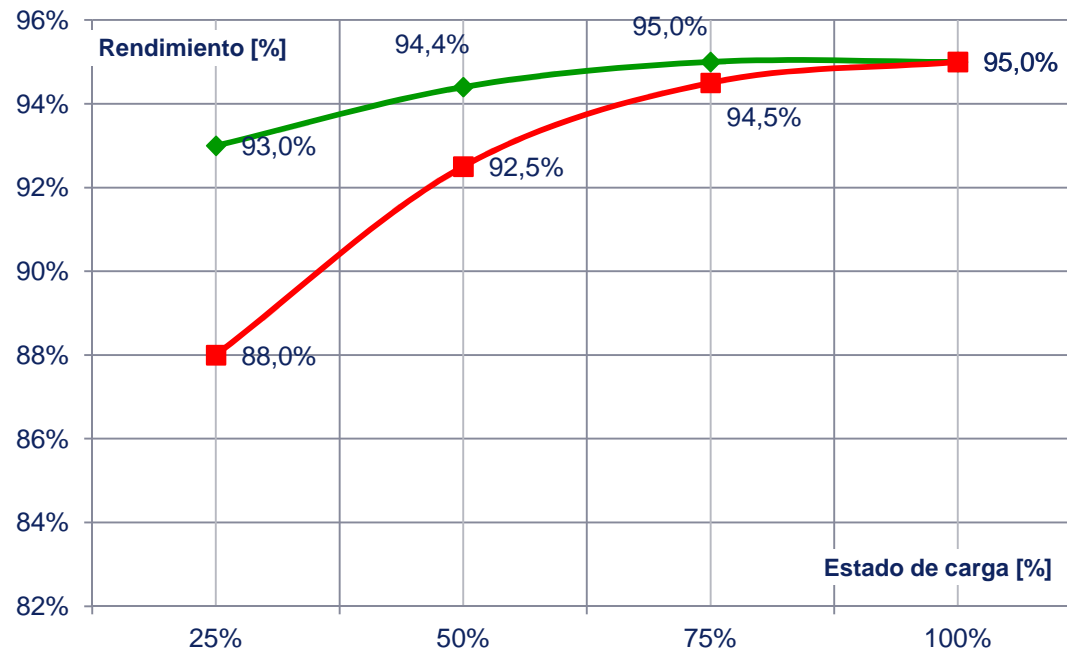
SAI SIN TRANSFORMADOR INTERNO



Mejora 3%
rendimiento

Reducción de consumos internos a bajos estados de carga

Ventiladores de velocidad variable
Sistemas de control más eficientes

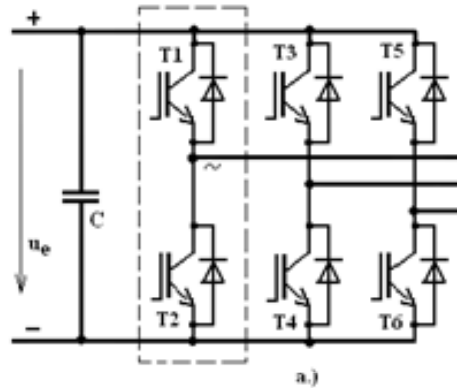


Making the **Future** of Your Business Possible

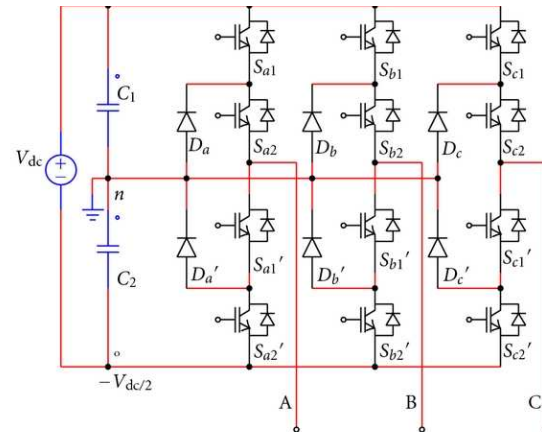
Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure



Inversores



Inversor de tres niveles



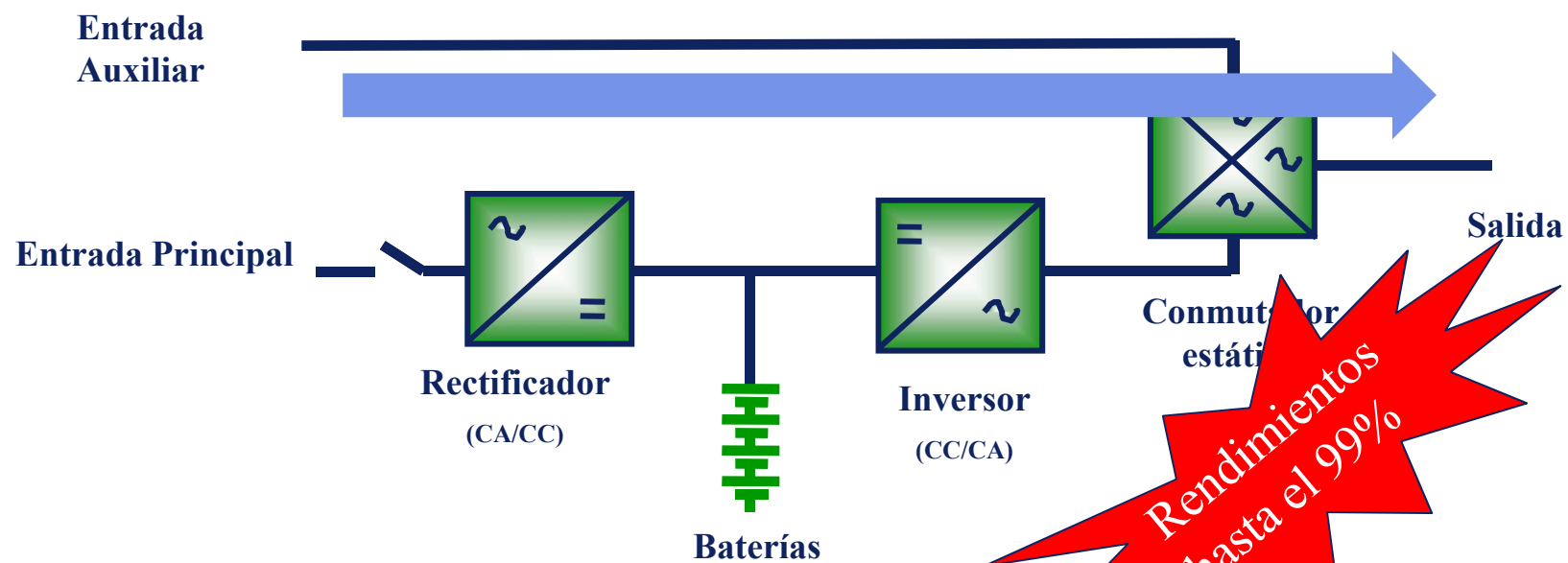
Mejora 2%
rendimiento

Making the **Future** of Your Business Possible

Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure



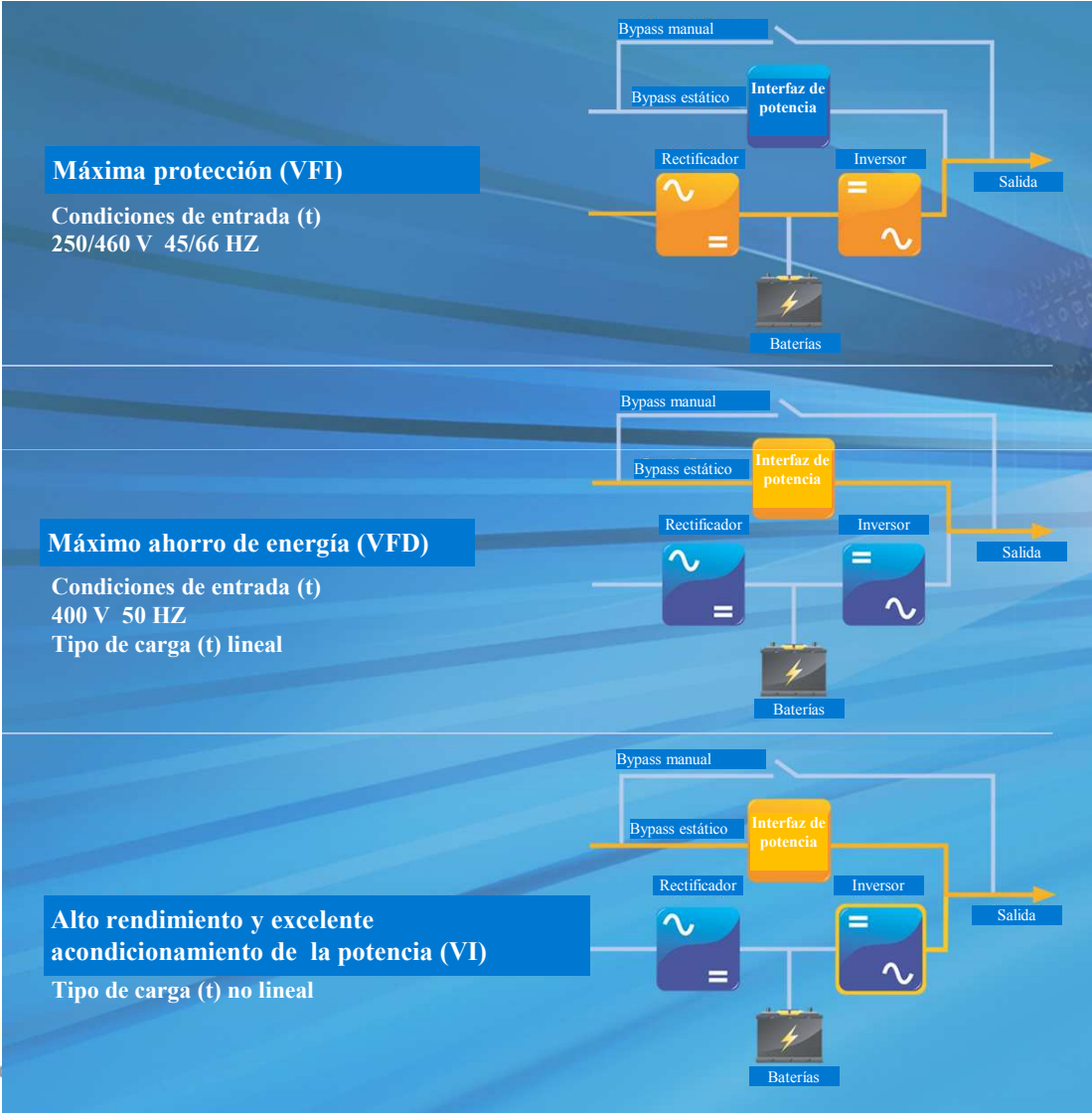
Modo "ECO"



Making the **Future** of Your Business Possible
Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure



SAI multimodos



Making the Future
Maximise Availability, Capacity



SAI Modular

- Gestión óptima de la energía durante el funcionamiento con cargas parciales
- Ahorros en costes de energía en cualquier instalación donde suelen producirse frecuentes variaciones en la carga



Making the **Future** of Your Business Possible

Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure

CARGA


EMERSON
Network Power

SAI Modular

SAI cargado al

100%

- Una lógica especial detecta el número de módulos que se necesitan para alimentar la carga manteniendo la redundancia
- Los módulos que no se necesitan funcionan en un modo standby especial que garantiza la fiabilidad del sistema

Making the **Future** of Your Business Possible

Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure

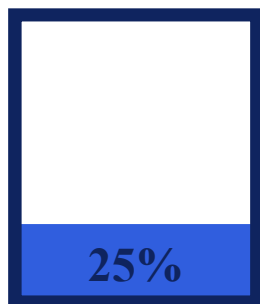


CARGA

EMERSON
Network Power

SAI Modular

SAI cargado en



- Un algoritmo especial comprueba que cada módulo funcione en el modo de espera durante el mismo período de tiempo
- También se garantiza el mismo envejecimiento de los componentes del módulo gracias a la autodetección del tiempo de funcionamiento de cada módulo



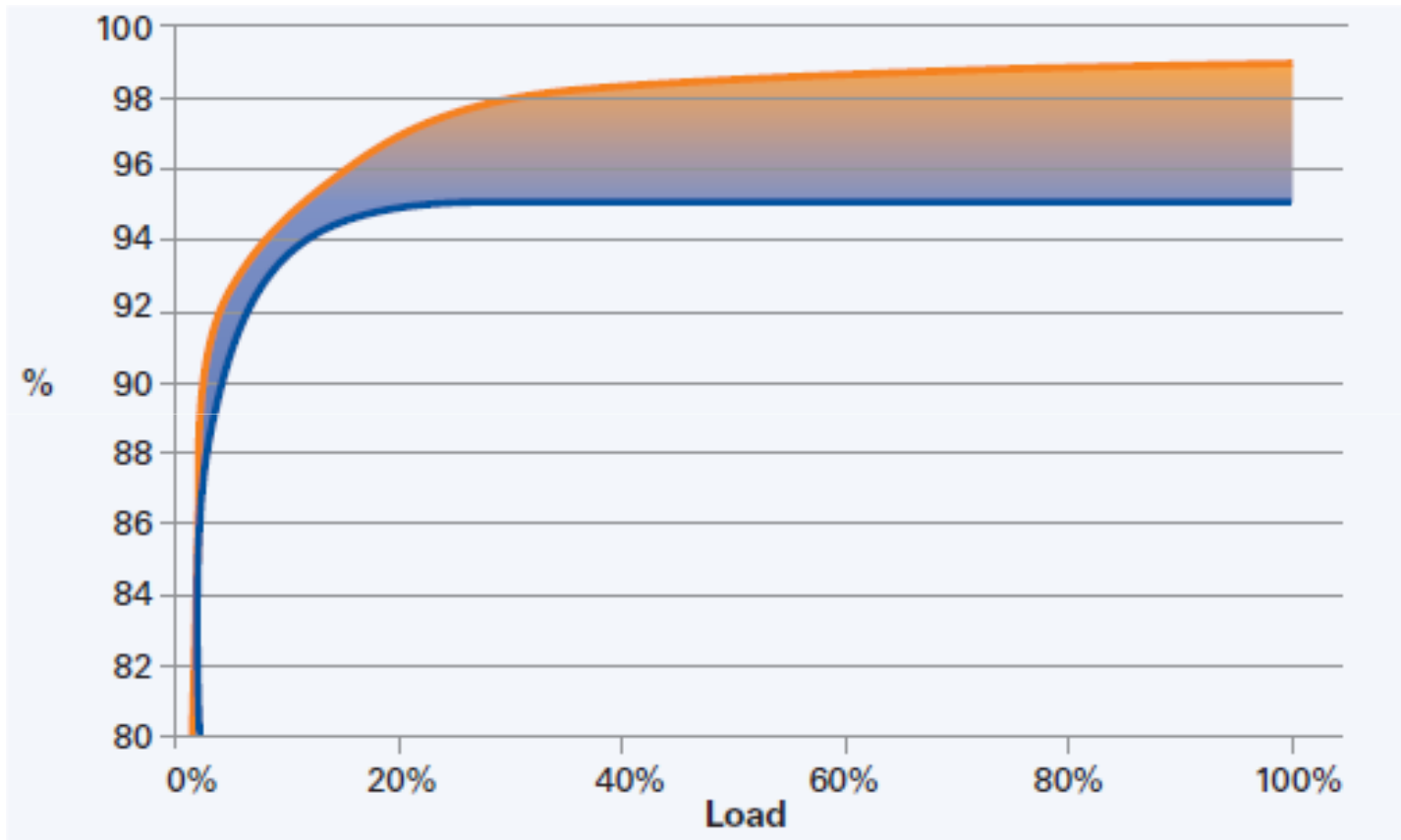
Making the **Future** of Your Business Possible

Maximise Availability, Capacity and Efficiency of Your Critical Infrastructure

CARGA

EMERSON
Network Power

Trinergy: Curva de rendimiento



Making the **Future** of Your Business **Possible**

Maximise **Availability**, **Capacity** and **Efficiency** of Your Critical Infrastructure



Gracias por su atención

- Enrique Jaureguialzo
- Consultant Development Manager
- Enrique.Jaureguialzo@Emerson.com
- +34-618808561

Making the **Future** of Your Business **Possible**

Maximise **Availability**, **Capacity** and **Efficiency** of Your Critical Infrastructure

