WEBINAR 5
5. Eficiencia en el suministro eléctrico en industrias / Electric energy efficiency in industries

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Índice clave en industrias: el coste global de kWh eléctrico

Key ratio in industries: the global cost of the electrical kWh

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Costes del kWh eléctrico disponibles en el proyecto SCOoPE para benchmarking

Cost of electrical kWh available in the SCOoPE proyect for benchmarking

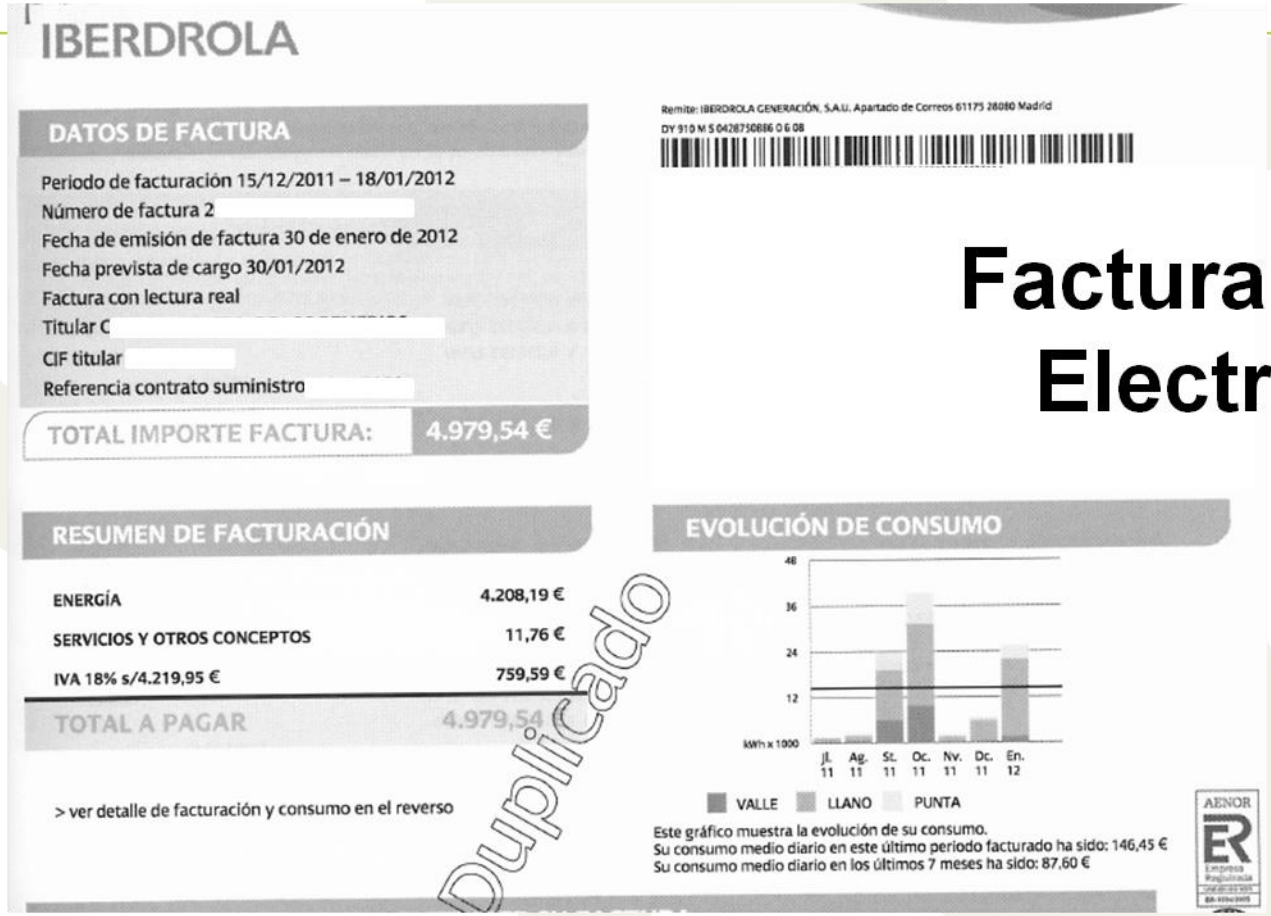
Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Media general en la industria alimentaria: en Europa, 0.08 - 0.15 euros / kWh

General average in agro-industries: in Europe, 0.08 - 0.15 euros / kWh

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Factura eléctrica
Electrical bill



IBERDROLA

Remite: IBERDROLA GENERACIÓN, S.A.U. Apartado de Correos 61175 28080 Madrid

DATOS DE FACTURA

Periodo de facturación 15/12/2011 – 18/01/2012
Número de factura 2
Fecha de emisión de factura 30 de enero de 2012
Fecha prevista de cargo 30/01/2012
Factura con lectura real
Titular C
CIF titular
Referencia contrato suministro

TOTAL IMPORTE FACTURA: 4.979,54 €

RESUMEN DE FACTURACIÓN

ENERGÍA	4.208,19 €
SERVICIOS Y OTROS CONCEPTOS	11,76 €
IVA 18% s/4.219,95 €	759,59 €
TOTAL A PAGAR	4.979,54

> ver detalle de facturación y consumo en el reverso

Duplicado

EVOLUCIÓN DE CONSUMO

kWh x 1000 — 48, 36, 24, 12

Jl. 11 · Ag. 11 · St. 11 · Oc. 11 · Nv. 11 · Dc. 11 · En. 12

VALLE · LLANO · PUNTA

Este gráfico muestra la evolución de su consumo.
Su consumo medio diario en este último periodo facturado ha sido: 146,45 €
Su consumo medio diario en los últimos 7 meses ha sido: 87,60 €

AENOR ER Empresa Registrada

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Referencia contrato suministro:
Empresa distribuidora: **UNION FENOSA DISTRIBUCION, S.A.**
Número de contrato de acceso:
Identificación punto de suministro (CUPS):
Forma de pago: **DOMICILIACION BANCARIA**
Entidad: **CAJA RURAL PROVINCIAL CIUDAD REAL**
Sucursal ***
**** Ocultos para su seguridad

Tipo discriminación horaria: **3P**
Potencia contratada: **PP: 20,7 kW PLL: 20,7 kW PV: 20,7 kW**
Peaje de acceso a la red (ATR): **3.0A**
Precios de peajes de acceso: **B.O.E. del 26/04/2012**
Duración de contrato hasta: **17/06/2013**

CONOZCA AL DETALLE SU FACTURACIÓN Y CONSUMOS

ENERGÍA			
Potencia facturada (12/04/2013–16/05/2013)	PP 17,6 kW x 1,574477 €/kW		27,71 €
	PLL 17,6 kW x 0,944687 €/kW		16,63 €
	PV 17,6 kW x 0,629791 €/kW		11,08 €
Total importe potencia hasta 16/05/2013		55,42 €	
Energía facturada (12/04/2013–16/05/2013)	P 301 kWh x 0,205509 €/kWh		61,86 €
	LL 789 kWh x 0,160991 €/kWh		127,02 €
	V 492 kWh x 0,104219 €/kWh		51,28 €
Total 1.582 kWh hasta 16/05/2013		240,16 €	
Energía reactiva (12/04/2013–16/05/2013)	P1 57,67 kVArh x 0,041554 €/kVArh		2,40 €
	P2 162,63 kVArh x 0,041554 €/kVArh		6,76 €
Total energía reactiva hasta 16/05/2013		9,16 €	
Impuesto sobre electricidad	4,864% s/304,74 € x 1,05113		15,58 €
TOTAL ENERGÍA			320,32 €
SERVICIOS Y OTROS CONCEPTOS			
Alquiler equipos de medida			10,98 €
TOTAL SERVICIOS Y OTROS CONCEPTOS			10,98 €
IMPORTE TOTAL			**331,30 €**
IVA	21% s/331,3 €		**69,57 €**
TOTAL IMPORTE FACTURA			400,87 €

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Referencia contrato suministro:
Empresa distribuidora: **UNION FENOSA DISTRIBUCION, S.A.**
Número de contrato de acceso:
Identificación punto de suministro (CUPS):
Forma de pago: **DOMICILIACION BANCARIA**
Entidad: **CAJA RURAL PROVINCIAL CIUDAD REAL**
Sucursal ***
**** Ocultos para su seguridad

Tipo discriminación horaria: **3P**
Potencia contratada: **PP: 20,7 kW PLL: 20,7 kW PV: 20,7 kW**
Peaje de acceso a la red (ATR): **3.0A**
Precios de peajes de acceso: **B.O.E. del 26/04/2012**
Duración de contrato hasta: **17/06/2013**

CONOZCA AL DETALLE SU FACTURACIÓN Y CONSUMOS

ENERGÍA			
Potencia facturada (12/04/2013–16/05/2013)	PP 17,6 kW x 1,574477 €/kW		27,71 €
	PLL 17,6 kW x 0,944687 €/kW		16,63 €
	PV 17,6 kW x 0,629791 €/kW		11,08 €
Total importe potencia hasta 16/05/2013		55,42 €	
Energía facturada (12/04/2013–16/05/2013)	P 301 kWh x 0,205509 €/kWh		61,86 €
	LL 789 kWh x 0,160991 €/kWh		127,02 €
	V 492 kWh x 0,104219 €/kWh		51,28 €
Total 1.582 kWh hasta 16/05/2013		240,16 €	
Energía reactiva (12/04/2013–16/05/2013)	P1 57,67 kVArh x 0,041554 €/kVArh		2,40 €
	P2 162,63 kVArh x 0,041554 €/kVArh		6,76 €
Total energía reactiva hasta 16/05/2013		9,16 €	
Impuesto sobre electricidad	4,864% s/304,74 € x 1,05113		15,58 €
TOTAL ENERGÍA			320,32 €
SERVICIOS Y OTROS CONCEPTOS			
Alquiler equipos de medida			10,98 €
TOTAL SERVICIOS Y OTROS CONCEPTOS			10,98 €
IMPORTE TOTAL			331,30 €
IVA	21% s/331,3 €		69,57 €
TOTAL IMPORTE FACTURA			400,87 €

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Factor de carga:

En el mes considerado, se obtiene el consumo de electricidad, in kWh/mes. La energía que se puede consumir a potencia máxima se calcula multiplicando la potencia máxima por el número de horas del mes. Finalmente, el consumo de electricidad (kWh/mes) dividido por la energía que se puede consumir a potencia máxima (kWh/mes) es el factor de carga.

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Load factor:

For the month considered, obtain the electrical energy consumption, in kWh/month. The energy that could have been used at peak demand, in kWh/month, is the peak demand (kW) multiplied by the number of hours of the month. Finally, the electrical energy consumption (kWh/month) divided by the energy that could have been used at peak demand (kWh/month) is the load factor.

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Referencia contrato suministro:
Empresa distribuidora: **UNION FENOSA DISTRIBUCION, S.A.**
Número de contrato de acceso:
Identificación punto de suministro (CUPS):
Forma de pago: **DOMICILIACION BANCARIA**
Entidad: **CAJA RURAL PROVINCIAL CIUDAD REAL**
Sucursal ***
**** Ocultos para su seguridad

Tipo discriminación horaria: **3P**
Potencia contratada: **PP: 20,7 kW PLL: 20,7 kW PV: 20,7 kW**
Peaje de acceso a la red (ATR): **3.0A**
Precios de peajes de acceso: **B.O.E. del 26/04/2012**
Duración de contrato hasta: **17/06/2013**

CONOZCA AL DETALLE SU FACTURACIÓN Y CONSUMOS

ENERGÍA			
Potencia facturada (12/04/2013–16/05/2013)	PP 17,6 kW x 1,574477 €/kW		27,71 €
	PLL 17,6 kW x 0,944687 €/kW		16,63 €
	PV 17,6 kW x 0,629791 €/kW		11,08 €
Total importe potencia hasta 16/05/2013		55,42 €	
Energía facturada (12/04/2013–16/05/2013)	P 301 kWh x 0,205509 €/kWh		61,86 €
	LL 789 kWh x 0,160991 €/kWh		127,02 €
	V 492 kWh x 0,104219 €/kWh		51,28 €
Total 1.582 kWh hasta 16/05/2013		240,16 €	
Energía reactiva (12/04/2013–16/05/2013)	P1 57,67 kVArh x 0,041554 €/kVArh		2,40 €
	P2 162,63 kVArh x 0,041554 €/kVArh		6,76 €
Total energía reactiva hasta 16/05/2013		9,16 €	
Impuesto sobre electricidad	4,864% s/304,74 € x 1,05113		15,58 €
TOTAL ENERGÍA			320,32 €
SERVICIOS Y OTROS CONCEPTOS			
Alquiler equipos de medida			10,98 €
TOTAL SERVICIOS Y OTROS CONCEPTOS			10,98 €
IMPORTE TOTAL			**331,30 €**
IVA	21% s/331,3 €		**69,57 €**
TOTAL IMPORTE FACTURA			400,87 €

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

EJEMPLO / EXAMPLE
Consumo de electricidad: 1582 kWh
Potencia máxima: 20,7 kW
Período: 34 días = 816 horas
Factor de carga: 1582 / (20,7 * 816) = 0,094 = 9,4%

Electrical energy consumption: 1582 kWh
Peak demand: 20,7 kW
Time period: 34 days = 816 hours
Load factor: 1582 / (20,7 * 816) = 0,094 = 9,4%

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

SCOoPE Saving Cooperative Energy

Factor de potencia:

Se necesita el consumo de electricidad (EC, in kWh), y el consumo de energía reactiva (REC, in kVArh) de la información de las facturas. El ratio REC/EC es el valor de la tangente trigonométrica, valor característico del sistema eléctrico (dado que REC/EC es la tangente del ángulo, es posible calcular el ángulo). El coseno de este ángulo es el factor de potencia.

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

SCOoPE Saving Cooperative Energy

Power factor:

Calculate the electrical consumption (EC, in kWh), and the reactive energy consumption (REC, in kVArh) using the information of the bills. Then the ratio REC/EC is the value of a trigonometric function, characteristic of the electrical system (REC/EC is the tangent of the angle characteristic of the system; so this angle can be also calculated). The cosine of this angle is the power factor.

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Referencia contrato suministro:
Empresa distribuidora: **UNION FENOSA DISTRIBUCION, S.A.**
Número de contrato de acceso:
Identificación punto de suministro (CUPS):
Forma de pago: **DOMICILIACION BANCARIA**
Entidad: **CAJA RURAL PROVINCIAL CIUDAD REAL**
Sucursal ***
**** Ocultos para su seguridad

Tipo discriminación horaria: **3P**
Potencia contratada: **PP: 20,7 kW PLL: 20,7 kW PV: 20,7 kW**
Peaje de acceso a la red (ATR): **3.0A**
Precios de peajes de acceso: **B.O.E. del 26/04/2012**
Duración de contrato hasta: **17/06/2013**

CONOZCA AL DETALLE SU FACTURACIÓN Y CONSUMOS

ENERGÍA			
Potencia facturada (12/04/2013–16/05/2013)	PP 17,6 kW x 1,574477 €/kW		27,71 €
	PLL 17,6 kW x 0,944687 €/kW		16,63 €
	PV 17,6 kW x 0,629791 €/kW		11,08 €
Total importe potencia hasta 16/05/2013		55,42 €	
Energía facturada (12/04/2013–16/05/2013)	P 301 kWh x 0,205509 €/kWh		61,86 €
	LL 789 kWh x 0,160991 €/kWh		127,02 €
	V 492 kWh x 0,104219 €/kWh		51,28 €
Total 1.582 kWh hasta 16/05/2013		240,16 €	
Energía reactiva (12/04/2013–16/05/2013)	P1 57,67 kVArh x 0,041554 €/kVArh		2,40 €
	P2 162,63 kVArh x 0,041554 €/kVArh		6,76 €
Total energía reactiva hasta 16/05/2013		9,16 €	
Impuesto sobre electricidad	4,864% s/304,74 € x 1,05113		15,58 €
TOTAL ENERGÍA			320,32 €
SERVICIOS Y OTROS CONCEPTOS			
Alquiler equipos de medida			10,98 €
TOTAL SERVICIOS Y OTROS CONCEPTOS			10,98 €
IMPORTE TOTAL			**331,30 €**
IVA	21% s/331,3 €		**69,57 €**
TOTAL IMPORTE FACTURA			400,87 €

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

EJEMPLO / EXAMPLE

Consumo de electricidad: 1582 kWh

Consumo de energía reactiva: 220,3 kVArh

Ratio (tangente trigonométrica de ϕ): 220,3 / 1582 = 0,14

Ángulo ϕ: 7,93º Factor de potencia (coseno de ϕ): 0,99

Electrical consumption: 1582 kWh

Reactive energy consumption : 220,3 kVArh

Ratio (trigonometric tangent of ϕ): 220,3 / 1582 = 0,14

Angle ϕ: 7,93º Power factor (cosine of ϕ): 0,99

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Baterías de condensadores

Capacitor batteries

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Procesos horizontales: iluminación, aire comprimido, aire acondicionado

Horizontal processes: lighting, compressed air, air conditioning

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Equipos de enfriamiento, refrigeración y congelación: cámaras frigoríficas

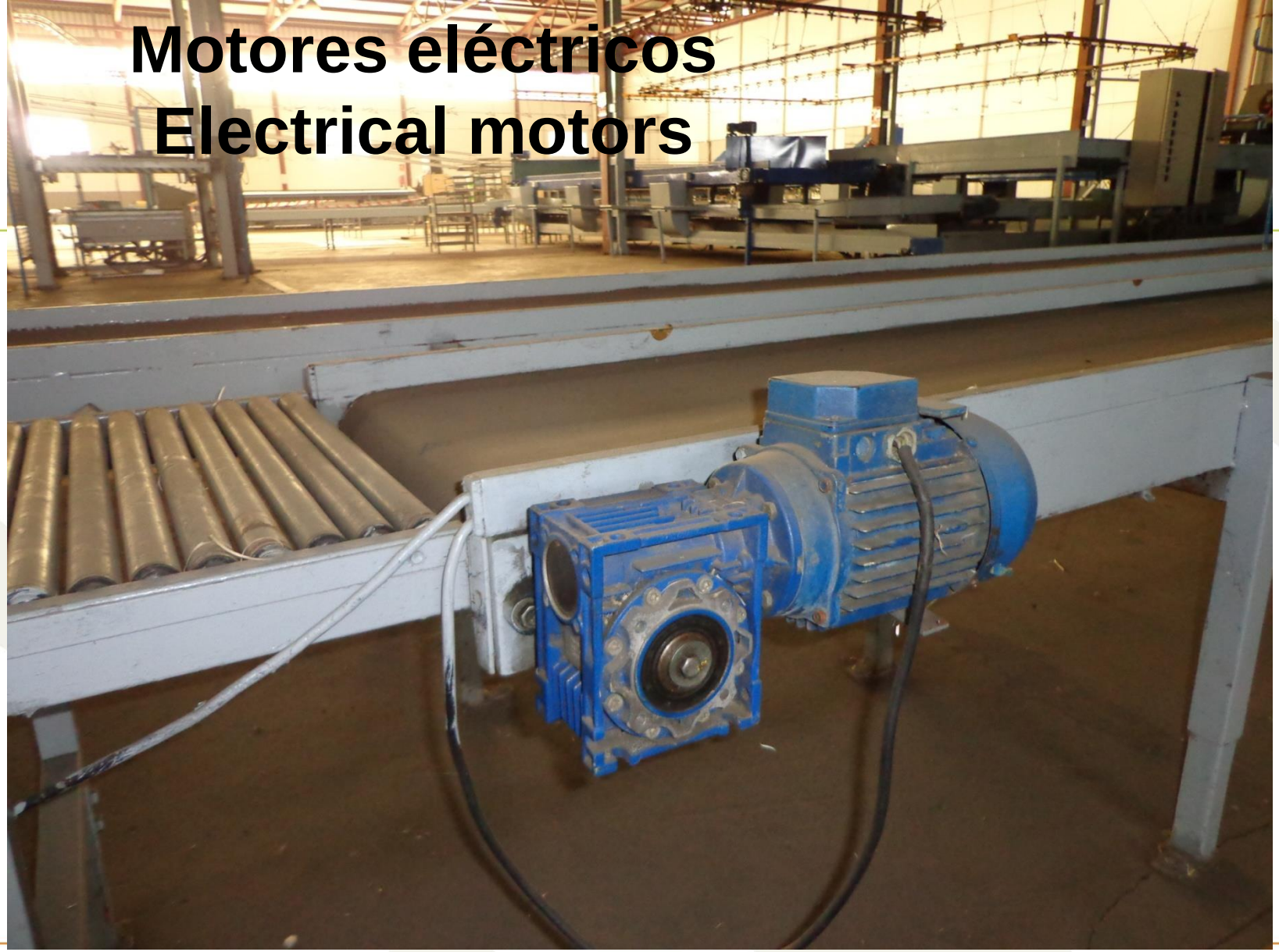
Cooling and freezing equipment: refrigerating chambers

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Motores eléctricos
Electrical motors



Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Equipos específicos de agroindustrias
Specific equipment of agro-industries

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

SCOoPE Saving Cooperative Energy

Cinco claves:

1) Edificios eficientes
2) Equipamiento eficiente
3) Automatización
4) Energías alternativas
5) Cambios productivos

Five keys:

1) Efficient buildings
2) Efficient equipment
3) Automation
4) Alternative energies
5) Production changes

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Equipamiento eficiente
Efficient equipment

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Automatización y control
Automation and control

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Energy Efficiency Management Systems

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Oportunidades en automatización

Opportunities in automation

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Energías alternativas
Alternative energies

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Cambios productivos
Production changes

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

SCOoPE Saving Cooperative Energy

CLAVES
***Auditorías**
*** Nuevas tecnologías**

PROYECTO SCOoPE

KEYS
***Audits**
*** New technologies**

SCOoPE PROYECT

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985

¡Gracias por vuestra atención!
Thank you for your attention!

Persona de contacto / contact person:
José L. García

joseluis.garciaf@upm.es

Co-funded by the Horizon 2020 programme of the European Union. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695985