Oscar Avella – Business Unit Manager

Motors/Generators/Mechanical Power Transmission – ABB Colombia

BALDOR/ABB

Soluciones eficientes en motores eléctricos para aplicaciones industriales

ABB

BALDOR®

A MEMBER OF THE ABB GROUP

DODGE®

ABB

La fórmula de valor

$$Vp = \frac{Qp \times Sp}{C \times T}$$

"To be the best as determined by our customers"

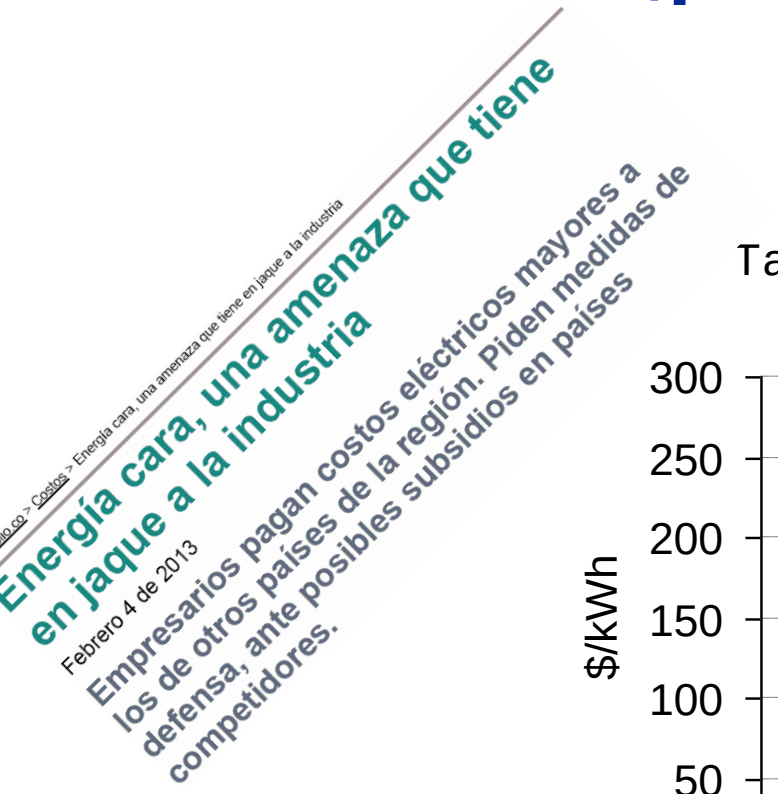
1 EL PROBLEMA

2 EL FABRICANTE

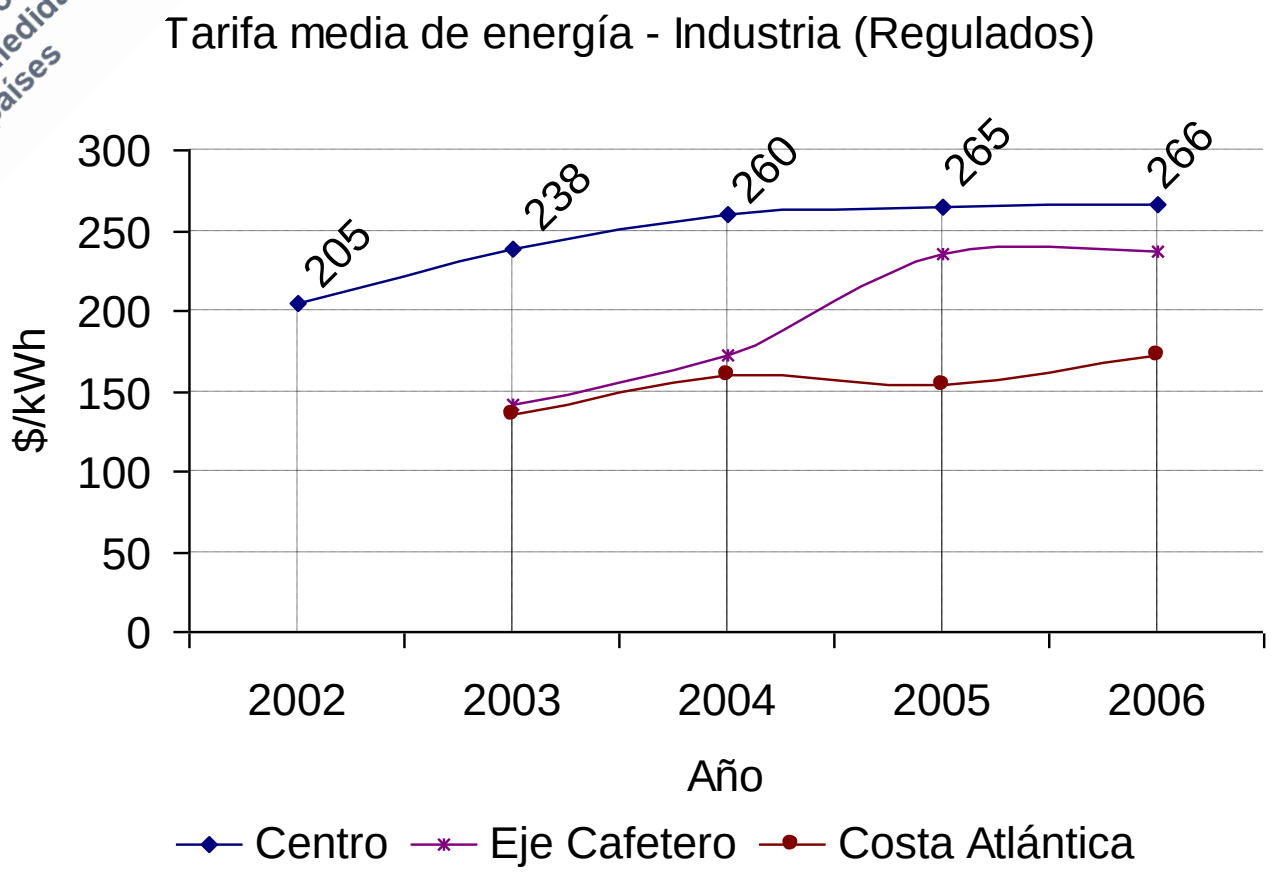
3 EL USUARIO

4 LA SOLUCION
GESTIÓN ENERGÉTICA
(FABRICANTE+USUARIO)

Alta eficiencia?,porque la preocupación..

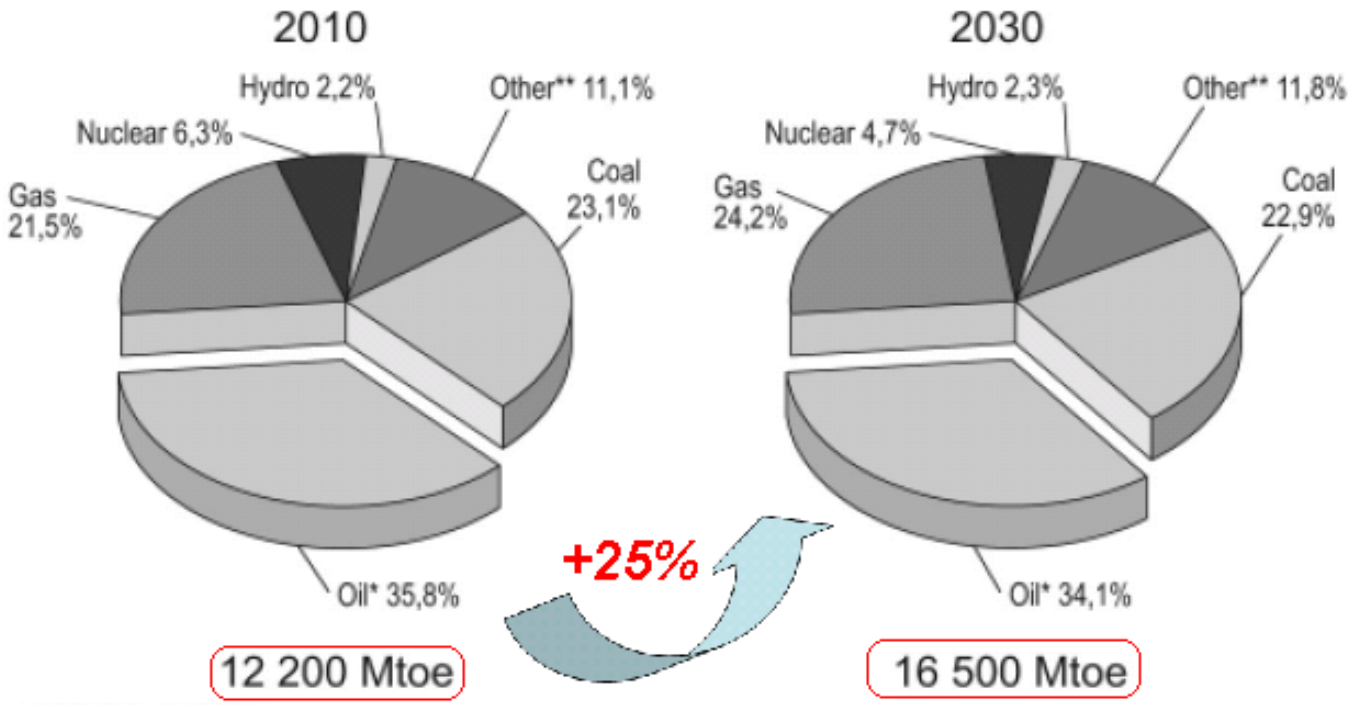


$/kWh



Alta eficiencia?,porque la preocupación..

kWh

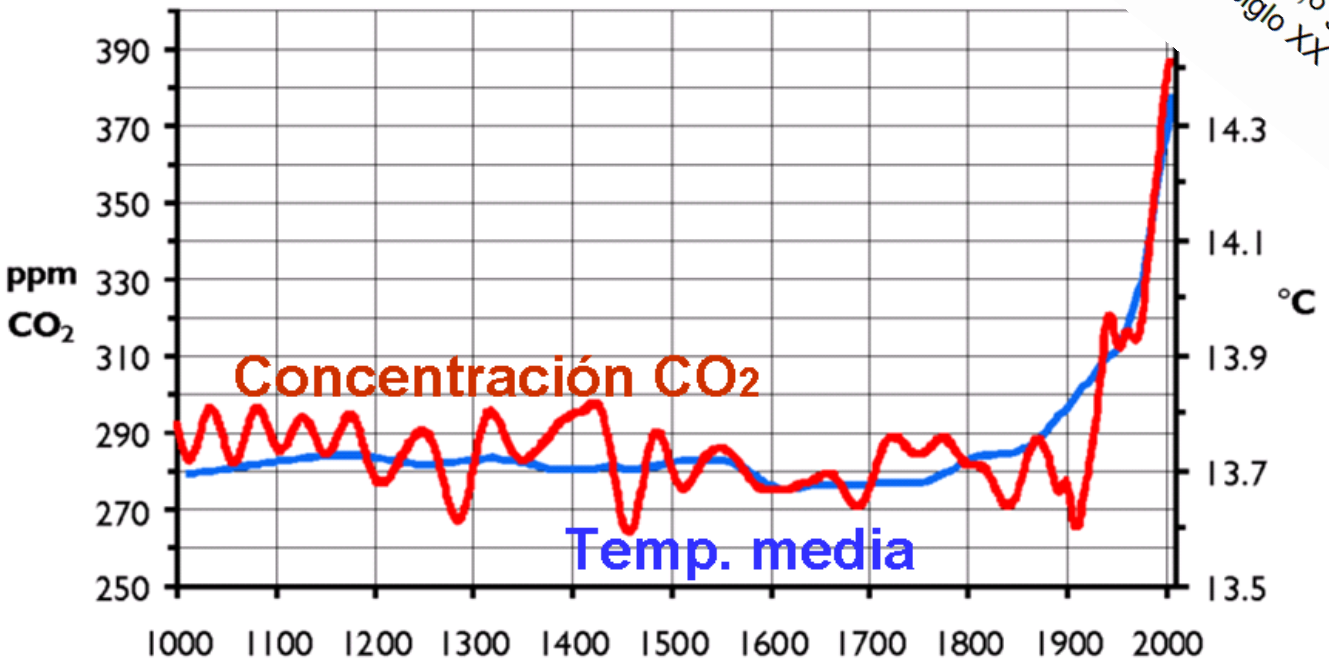


** Other includes combustible renewables & waste, geothermal, solar, wind, tide etc.

1 TOE = 11,63 MWh (TOE = ton oilequivalents)

Alta eficiencia?
porque la preocupación..

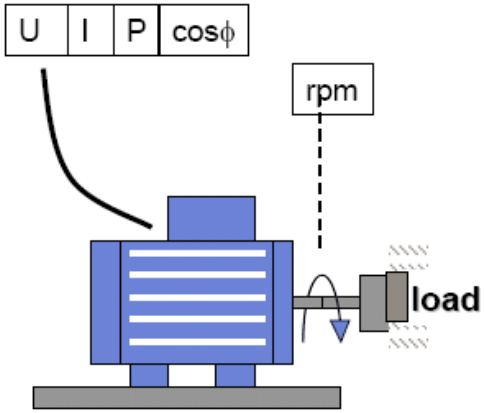
°C – CO_2



Cambio en los métodos de medida IEC/EN 60034-2-1: 2007-09

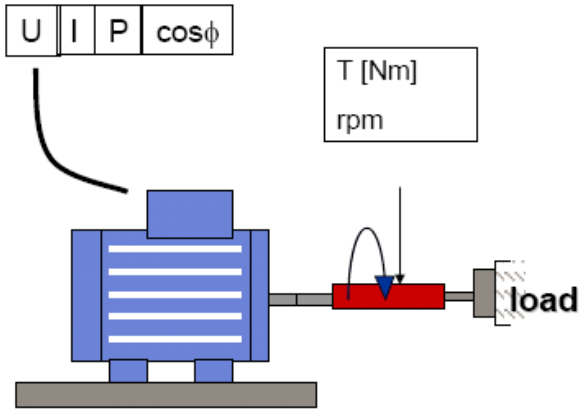
Proporciona nuevas reglas en relación con la metodología utilizada para la medición de eficiencia por parte de los fabricantes

Old standard (IEC60034-2 1996)



New standard (IEC60034-2-1 2007)

- Shaft torque is measured

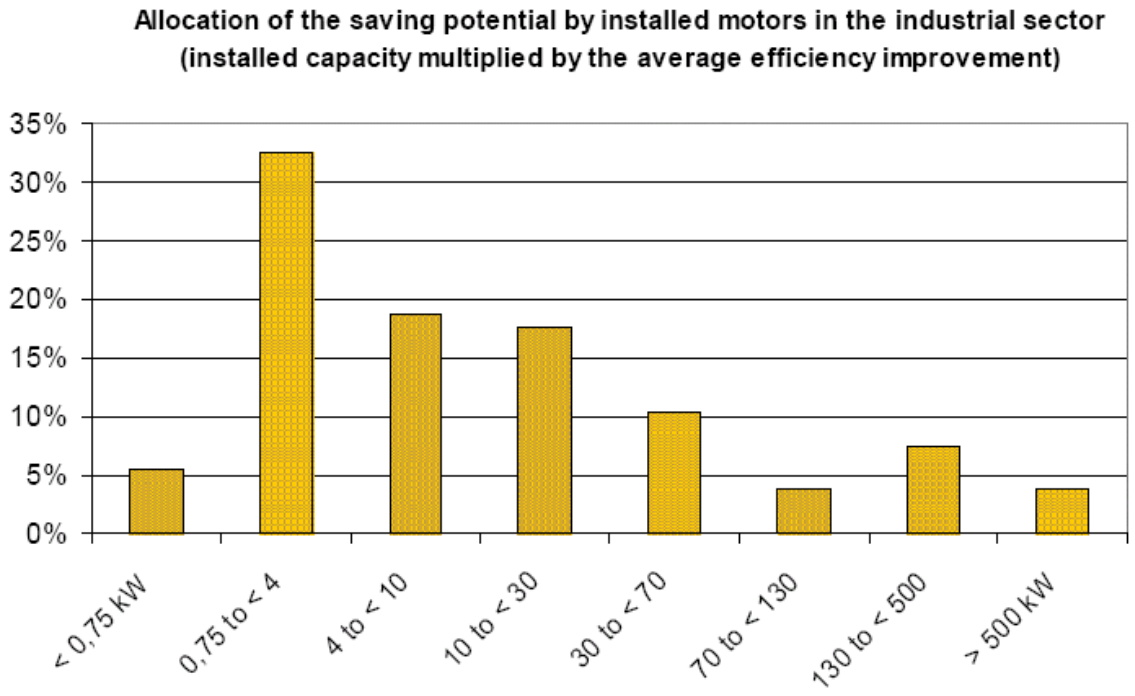


OUTPUT:	3400.0 kW
VOLTAGE:	6000.0 V
FREQUENCY:	50.0 Hz
CONNECTION:	Star
CURRENT:	399.1 A
TORQUE:	65442.8 Nm
SPEED:	496.1 rpm
POLES:	12
WEIGHT	
Rotor	0 kg
Total	23190 kg
LOSSES	
Friction	9.00 kW
Iron	22.25 kW
Stator	31.66 kW
Rotor	26.78 kW
Additional	17.54 kW
Total	107.26 kW
Weighted to stator	53.83 kW

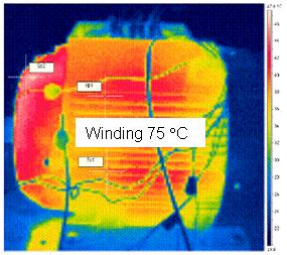
El nuevo código IE - IEC 60034-30

Futuros requerimientos de eficiencia energética para la CE	
Año 2011	Los motores deben exceder o igualar rangos de eff. IE2 (0.75-370kW)
Año 2015	Los motores deben exceder o igualar rangos de eff. IE3 (0.75-370kW)
Marquillado	
Año 2011	Motores con código IE implementado y comercializados

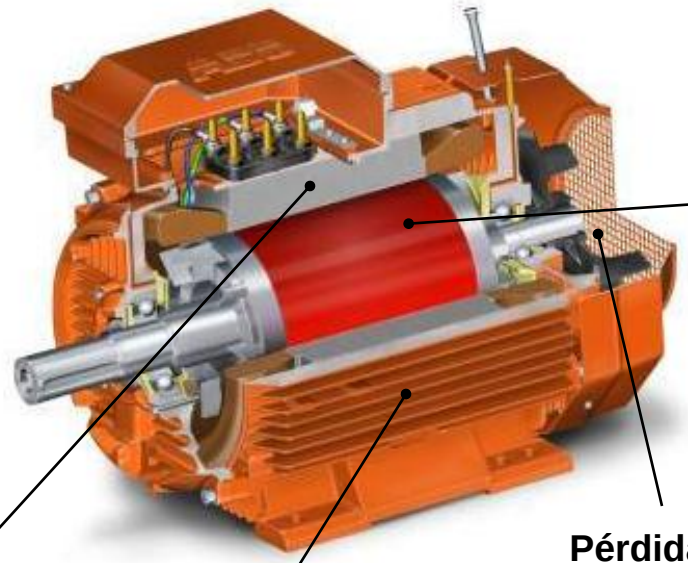
	IEC	NEMA
~~EFF3~~		
EFF2	IE1	
EFF1	IE2	E-PAct
	IE3	Premium
	IE4	S Premium



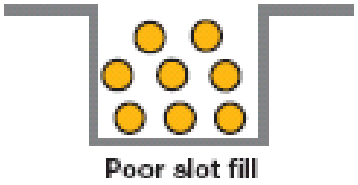
De que manera el fabricante mejora la eficiencia



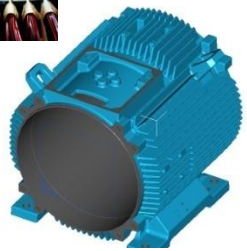
Distribución uniforme de la temperatura

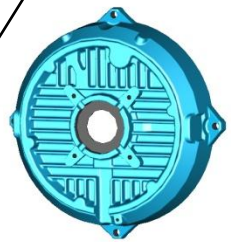


Rotor
-Material y sección barras de la jaula
-Mayor sección anillo de cortocircuito



Estator
Sis. aislamiento
Utilización de slots



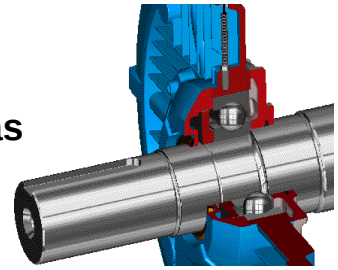


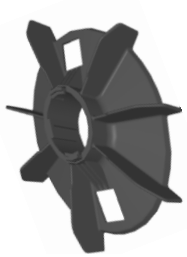
Pérdidas mecánicas

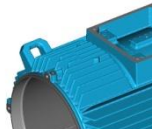
Diseño ventilador

Calidad rodamiento

Precisión en el balanceo de rotor







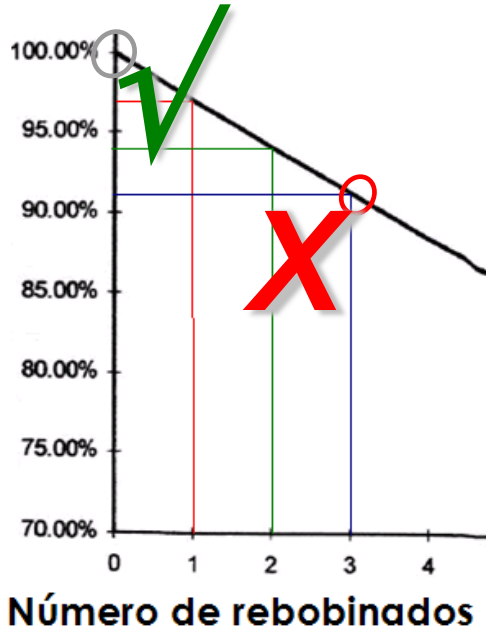
Optimización refrigeración
Reducción de niveles de ruido

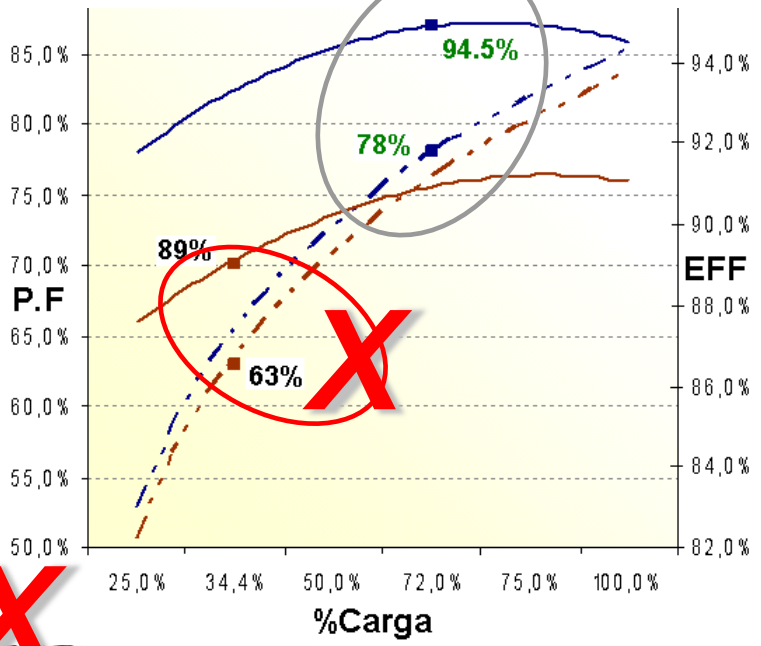
Area de refrigeración

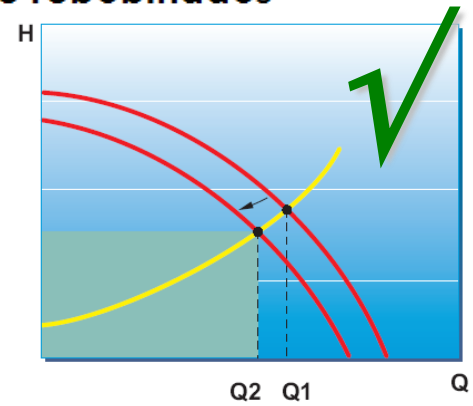
5 – 10 °C Reducción temp. Rod.

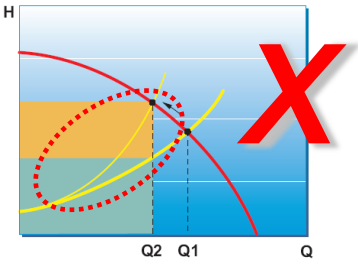
20 – 40 % Incremento tiempo med entre fallas

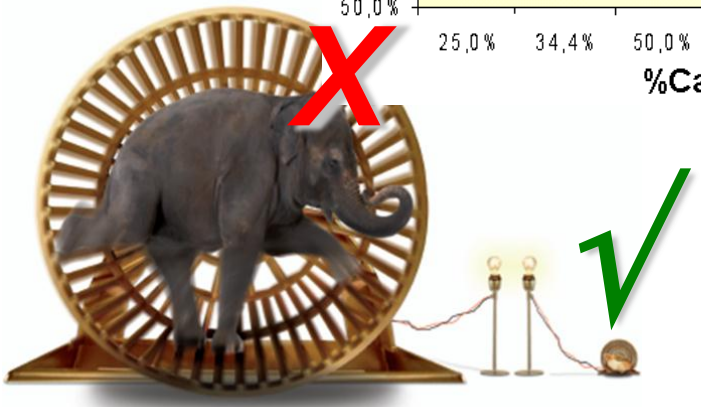
De que manera el usuario optimiza el uso del motor



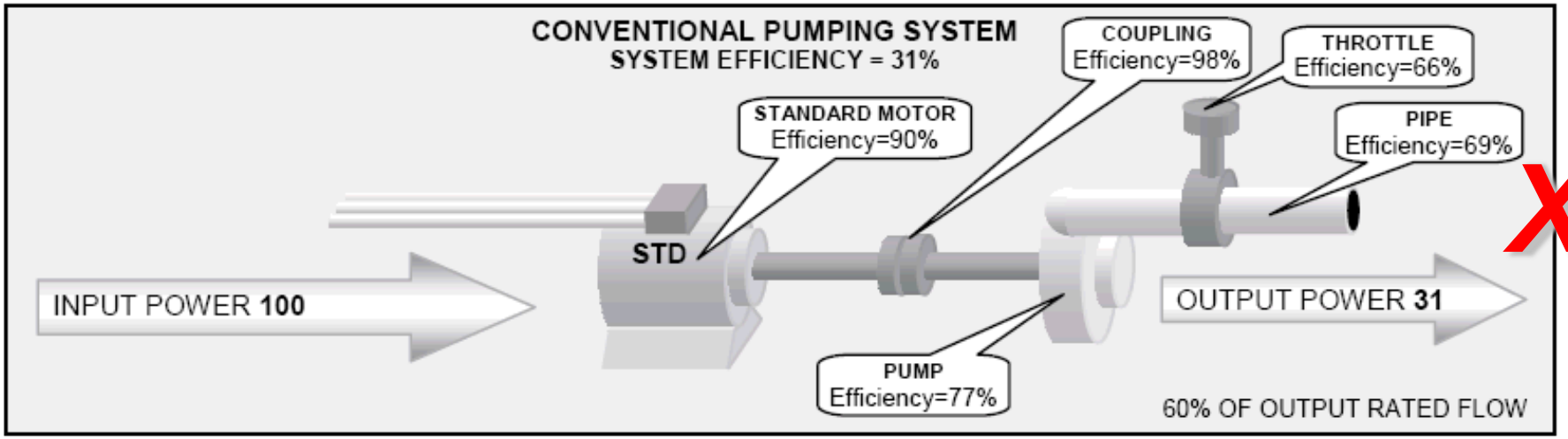


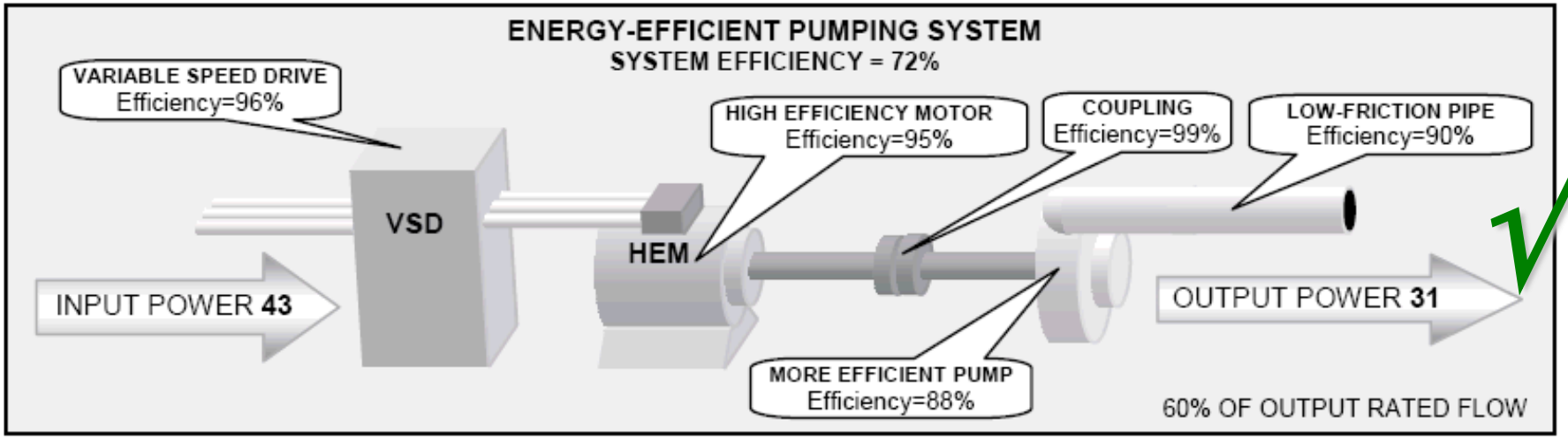






De que manera el usuario optimiza el uso del motor





Source: Energy Efficient Motor Driven Systems, 2004, by European Copper Institute

Figure 1 - a) Conventional pumping system (total efficiency = 31%)
b) Energy-efficient pumping system combining efficient technologies (total efficiency = 72%)

De que manera el usuario optimiza el uso del motor

Motor, higher efficiency	Type	Power [kW]	Pole number	Efficiency [%]
	High Eff	132	2	95.5

Economy:

Annual energy cost:

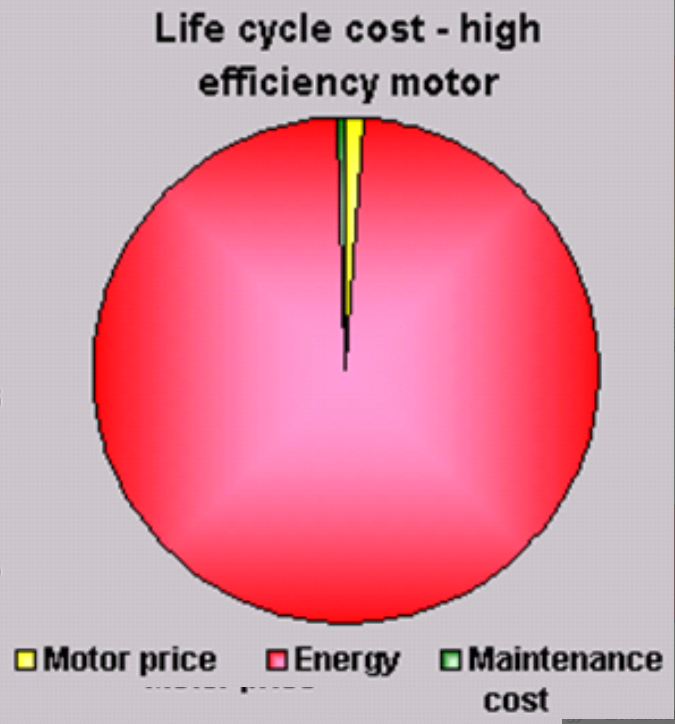
Motor for comparison:	211,370	TCOP
ABB Process Performance Motor:	205,837	TCOP

Life cycle cost (net present value):

Motor for comparison:	1,627,024	TCOP
ABB Process Performance Motor:	1,591,839	TCOP
Annual savings:	4,876	TCOP
Payback period:	12.3	months

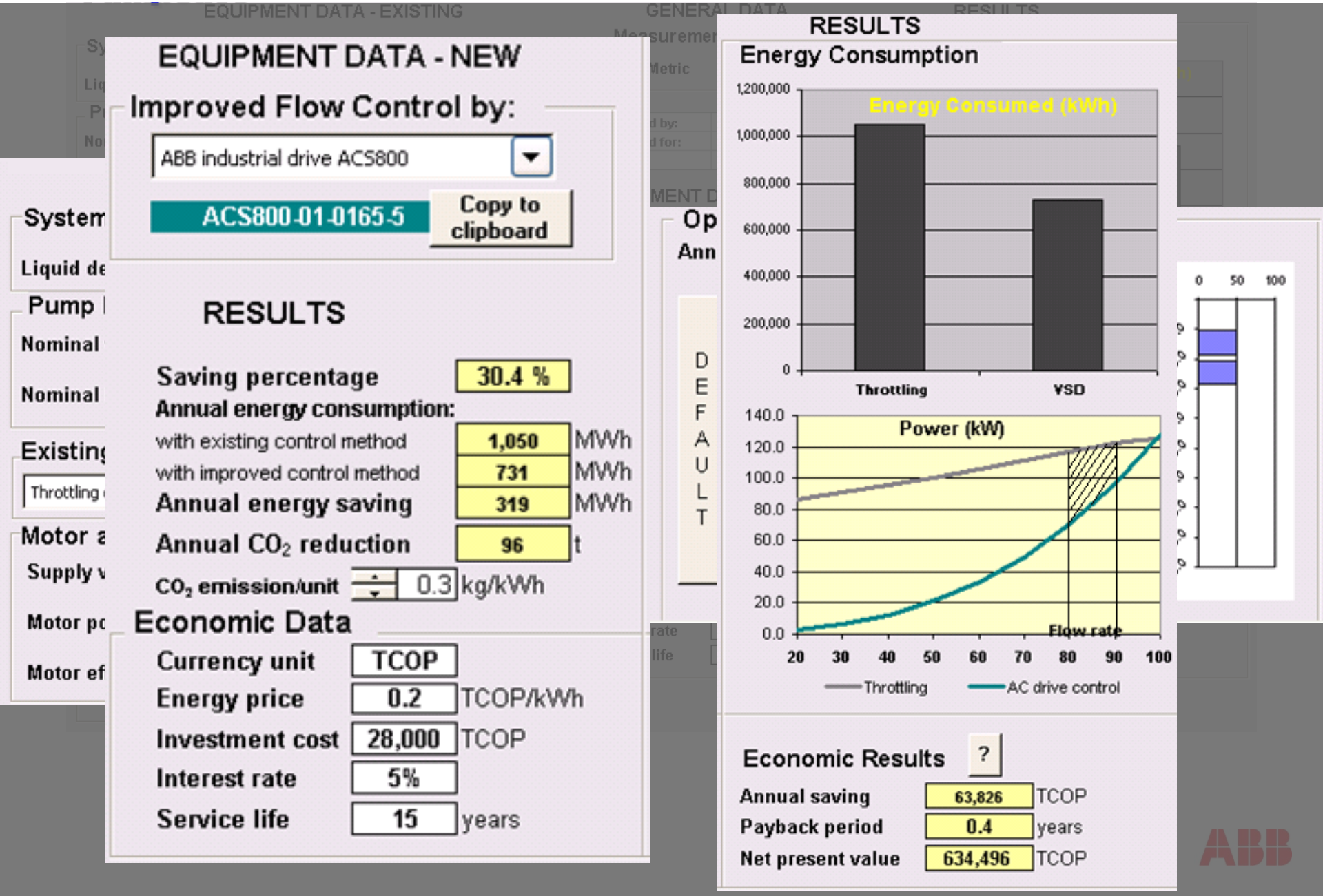
Environment:

Greenhouse gas reduction:	13,833	kg/year
Greenhouse gases:	0.5	kg/kWh



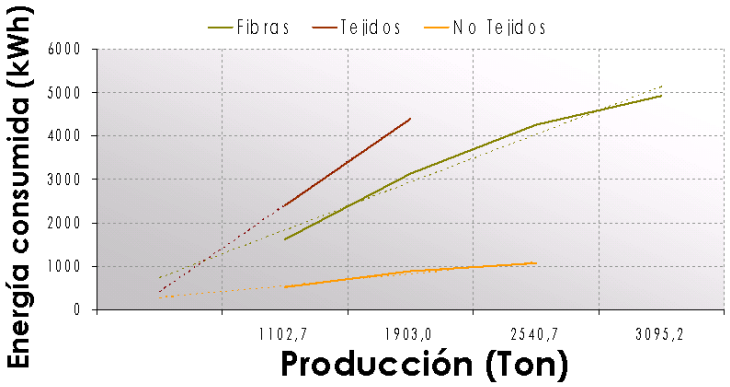
Currency:	TCOP	
Energy price:	0.2	TCOP/kWh
Service life of motor:	15	years
Maintenance cost/year:	5%	of motor price
Interest rate:	10%	

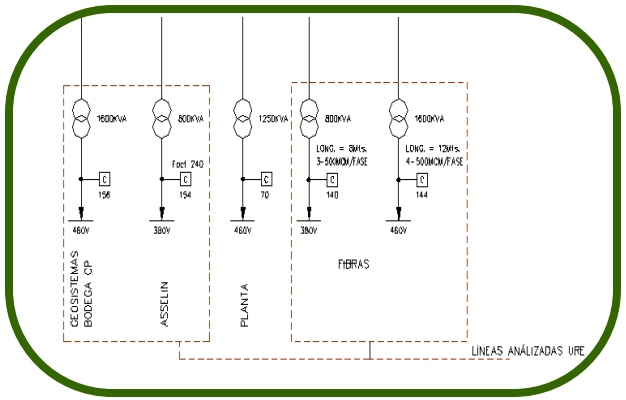
De que manera el usuario optimiza el uso del motor

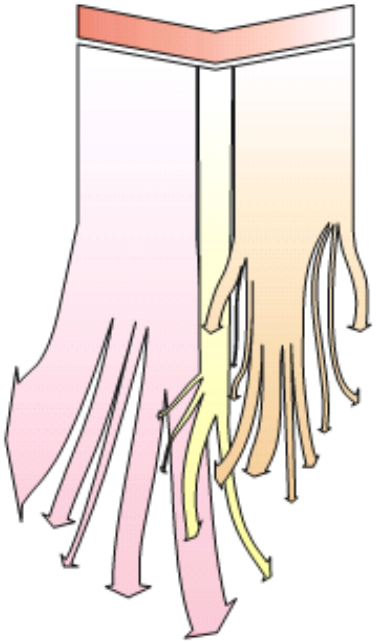


Esquema de gestión energética

Step 1 – Foco del estudio







Step 2 - Información

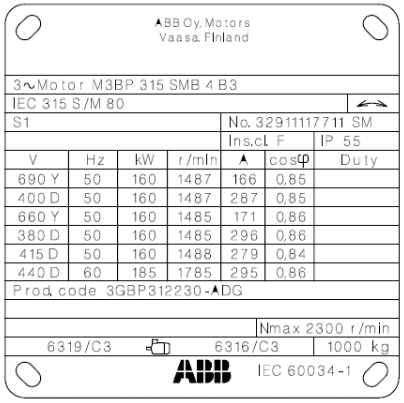


ABB Oy, Motors
Vaasa, Finland

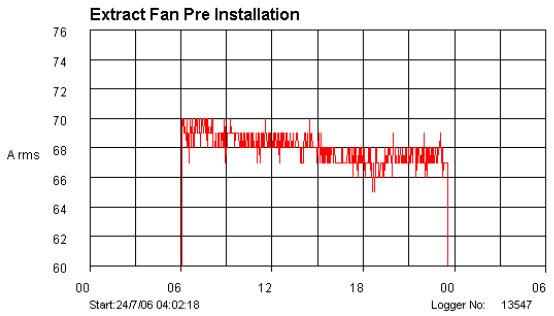
3~Motor M3BP 315 SMB 4 B3
IEC 315 S/M 80
S1 — No. 32911117711 SM
Ins.cl. F — IP 55

V	Hz	kW	r/min	A	cosφ	Duty
690 Y	50	160	1487	166	0,85	
400 D	50	160	1487	287	0,85	
660 Y	50	160	1485	171	0,86	
380 D	50	160	1485	296	0,86	
415 D	50	160	1488	279	0,84	
440 D	60	185	1785	295	0,86	

Prod. code 3GBP312230-ADG

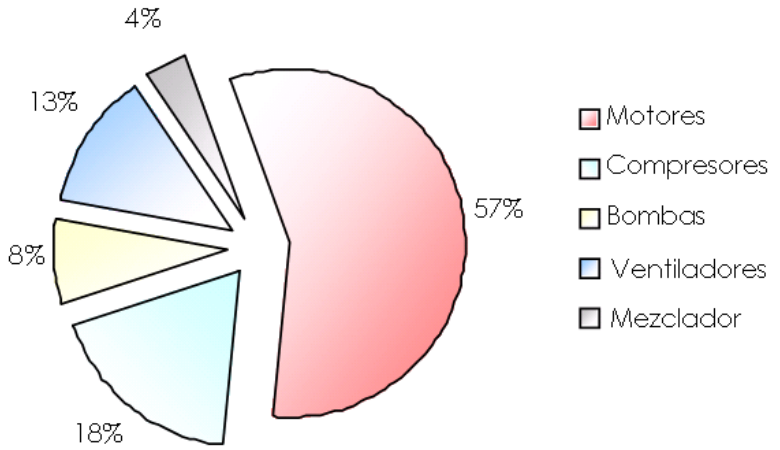
Nmax 2300 r/min
6319/C3 — 6316/C3 — 1000 kg
ABB — IEC 60034-1

Step 3 - Medición



Esquema de gestión energética

Step 4 - Análisis

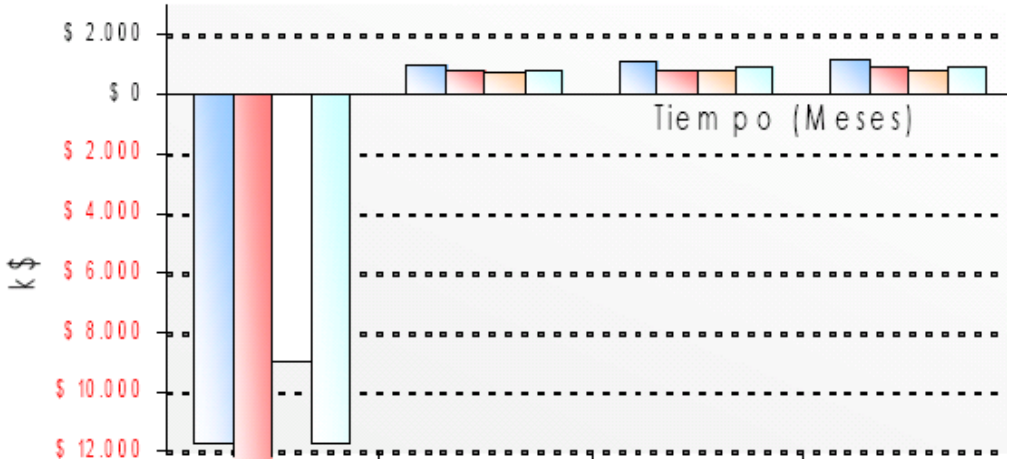


Quantity	ABB Article Id	Pole	Power [kW]	Savings in % of total
50	M3BP 225 SMB	4	45	20.01 %
40	M3BP 160 L	4	15	14.58 %
27	M3BP 250 SMA	6	37	9.87 %
26	M3BP 180 L	4	22	9.07 %
23	M3BP 280 SMA	4	75	5.45 %
42	M2BA 132 S4 A	4	5.5	5.29 %
24	M2BA 132 M6 B	6	5.5	5.18 %
47	M2BA 100 L4 B	4	3	5.11 %
29	M3BP 200 MLA	6	18.5	4.17 %
23	M3BP 160 L	6	11	4.09 %
4	M3BP 315 SMA	4	110	3.10 %
3	M3BP 315 SMA	6	75	2.33 %

USD
kWh
%

Total savings / year: 234,783 USD
1,235,702 kWh

Step 5 – Inversión y seguimiento



1 EL PROBLEMA

2 EL FABRICANTE

3 EL USUARIO

4 LA SOLUCION
GESTIÓN ENERGÉTICA
(FABRICANTE+USUARIO)

ABB

www.abb.com/energyefficiency

BALDOR®

A MEMBER OF THE ABB GROUP

www.baldor.com/support/energy_savings/default.asp

DODGE®

www.dodge-pt.com

ABB

Power and productivity
for a better world™