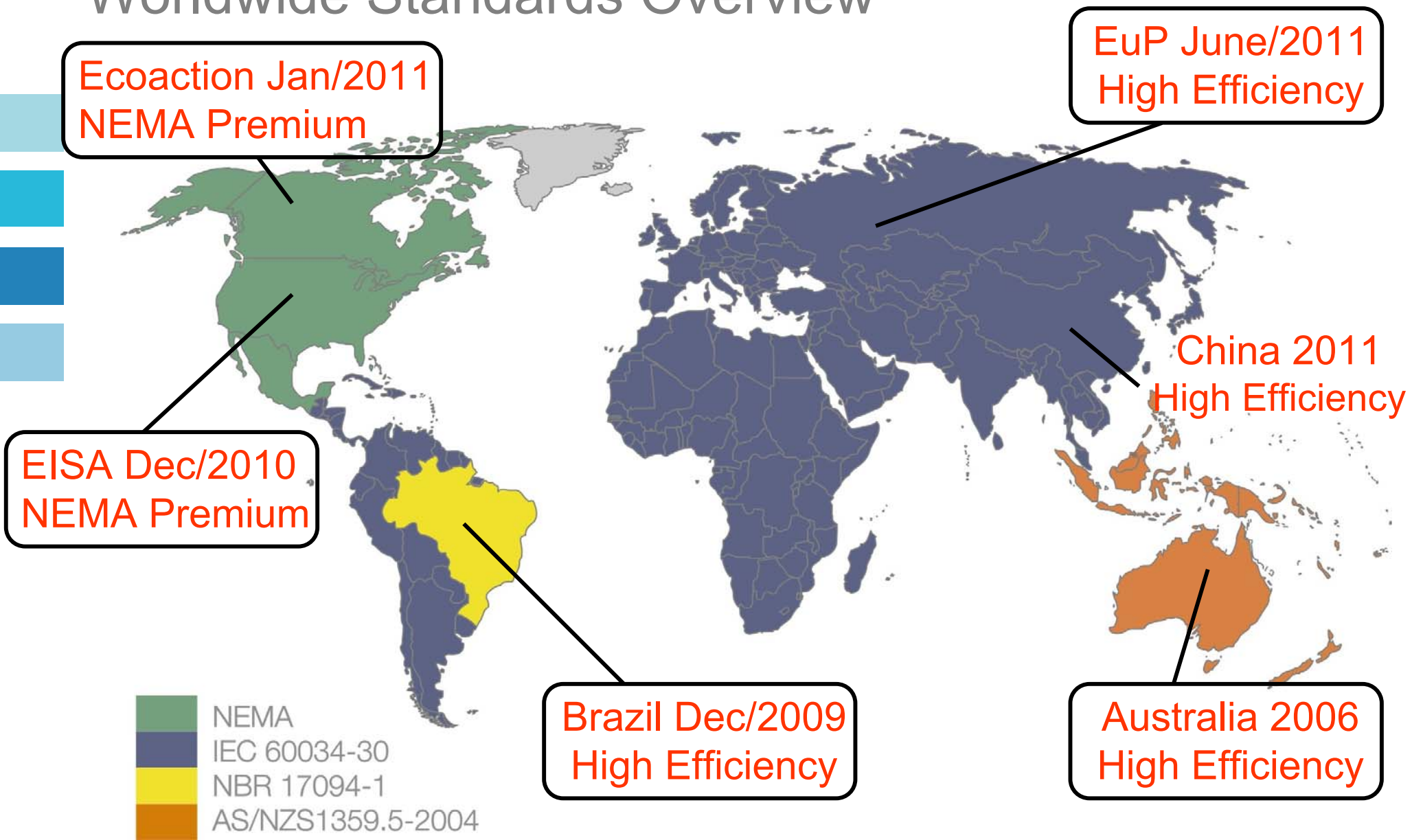




# Energy Efficient Programs



# Worldwide Standards Overview



**IEC and NEMA are the two major standards covering electric machines.**

# CEMEP, NEMA and IEC60034-30

	<b>CEMEP*</b>	<b>USA</b>	<b>IEC 60034-30</b>
<b>Super Premium Efficiency</b>			<b>IE4**</b>
<b>Premium Efficiency</b>		<b>NEMA Premium</b>	<b>IE3</b>
<b>High Efficiency</b>	<b>EFF1</b>	<b>EPAct</b>	<b>IE2</b>
<b>Standard Efficiency</b>	<b>EFF2</b>		<b>IE1</b>
<b>Below Standard Efficiency</b>	<b>EFF3</b>		

\* CEMEP declared that from 16 June, 2011 the “EFF” trademark is no longer permitted.

\*\* According to IEC 60034-31 ed. 1 - DTS – FE.

# USA

- **December 2010 will occurs some changes in the Government requirements**
- **Scope:**
  - General purpose electric motor (subtype I) - any electric motor that meets the definition of “general purpose” motor as established by DOE in its final rule in effect on December 19, 2007.
  - General purpose electric motor (subtype II) – any electric motor incorporating the design elements of a general purpose electric motor (subtype I) that are configured as:
    - U-Frame motor
    - Design C motor
    - Close-coupled pump motor
    - Footless motor
    - Vertical solid shaft normal thrust motor (tested in a horizontal configuration)
    - 8-pole motor (900 rpm)
    - Poly-phase motor with voltage no more than 600 volts (other than 230 or 460 V)



# USA

## **The EPC Act (or EISA) shall not apply to:**

- Motors with a special customer flange;
- Vertical Motors;
  - Hollow shaft
  - P-Base solid shaft (HP, LP...) different from “Normal thrust”
- Special shaft motors (Typically TZ, TCZ, TDZ, TY, LPZ...);
- 201 HP – 500HP design A or Medium Voltage;
- Brake motors with an integral brake design that is factory built within the motor;



# USA

- **Effective dates:**

- General purpose motors (subtype I) manufactured in US or imported by December 19, 2010, with a power rating of 1 HP or greater, but not greater than 200 HP shall have a nominal full load efficiency that is not less than as defined in Table 2
- General purpose motor (subtype II) with a power rating of 1 HP or greater, but no more than 200 HP, manufactured in US or imported by December 19, 2010, shall have a nominal full load efficiency that is not less than as defined in Table 1
- Fire pumps motor manufactured in US or imported by December 19, 2010 shall have nominal full load efficiency no less than as defined in Table 1
- NEMA Design B, general purpose electric motor with a power rating of more than 200 HP, but no more than 500 HP, manufactured in US or imported by December 19, 2010, shall have a nominal full load efficiency that is not less than as defined in Table 1



# USA – Efficiency Levels

Output Hp	Energy Efficient Motors							
	Poles							
	2		4		6		8	
	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed
1	-	75,5	82,5	82,5	80,0	80,0	74,0	74,0
1,5	82,5	82,5	84,0	84,0	84,0	85,5	75,5	77,0
2	84,0	84,0	84,0	84,0	85,5	86,5	85,5	82,5
3	84,0	85,5	86,5	87,5	86,5	87,5	86,5	84,0
5	85,5	87,5	87,5	87,5	87,5	87,5	87,5	85,5
7,5	87,5	88,5	88,5	89,5	88,5	89,5	88,5	85,5
10	88,5	89,5	89,5	89,5	90,2	89,5	89,5	88,5
15	89,5	90,2	91,0	91,0	90,2	90,2	89,5	88,5
20	90,2	90,2	91,0	91,0	91,0	90,2	90,2	89,5
25	91,0	91,0	91,7	92,4	91,7	91,7	90,2	89,5
30	91,0	91,0	92,4	92,4	92,4	91,7	91,0	91,0
40	91,7	91,7	93,0	93,0	93,0	96,0	91,0	91,0
50	92,4	92,4	93,0	93,0	93,0	93,0	91,7	91,7
60	93,0	93,0	93,6	93,6	93,6	93,6	92,4	91,7
75	93,0	93,0	94,1	94,1	93,6	93,6	93,6	93,0
100	93,0	93,6	94,1	94,5	94,1	94,1	93,6	93,0
125	93,6	94,5	94,5	94,5	94,1	94,1	93,6	93,6
150	93,6	94,5	95,0	95,0	94,5	95,0	93,6	93,6
200	94,5	95,0	95,0	95,0	94,5	95,0	93,6	94,1
250	94,5	95,4	95,4	95,0	95,4	95,0	94,5	94,5
300	95,0	95,4	95,4	95,4	95,4	95,0	-	-
350	95,0	95,4	95,4	95,4	95,4	95,0	-	-
400	95,4	95,4	95,4	95,4	-	-	-	-
450	95,8	95,4	95,8	95,4	-	-	-	-
500	95,8	95,4	95,8	95,8	-	-	-	-

**Table 1**

Output Hp	NEMA Premium Efficiency Motors					
	Poles					
	2		4		6	
	Open	Enclosed	Open	Enclosed	Open	Enclosed
1	77,0	77,0	85,5	85,5	82,5	82,5
1,5	84,0	84,0	86,5	86,5	86,5	87,5
2	85,5	85,5	86,5	86,5	87,5	88,5
3	85,5	86,5	89,5	89,5	88,5	89,5
5	86,5	88,5	89,5	89,5	89,5	89,5
7,5	88,5	89,5	91,0	91,7	90,2	91,0
10	89,5	90,2	91,7	91,7	91,7	91,0
15	90,2	91,0	93,0	92,4	91,7	91,7
20	91,0	91,0	93,0	93,0	92,4	91,7
25	91,7	91,7	93,6	93,6	93,0	93,0
30	91,7	91,7	94,1	93,6	93,6	93,0
40	92,4	92,4	94,1	94,1	94,1	94,1
50	93,0	93,0	94,5	94,5	94,1	94,1
60	93,6	93,6	95,0	95,0	94,5	94,5
75	93,6	93,6	95,0	95,4	94,5	94,5
100	93,6	94,1	95,4	95,4	95,0	95,0
125	94,1	95,0	95,4	95,4	95,0	95,0
150	94,1	95,0	95,8	95,8	95,4	95,8
200	95,0	95,4	95,8	96,2	95,4	95,8
250	95,0	95,8	95,8	96,2	95,4	95,8
300	95,4	95,8	95,8	96,2	95,4	95,8
350	95,4	95,8	95,8	96,2	95,4	95,8
400	95,8	95,8	95,8	96,2	95,8	95,8
450	95,8	95,8	96,2	96,2	96,2	95,8
500	95,8	95,8	96,2	96,2	96,2	95,8

**Table 2**



# Canada

- **In January 2011 new requirements will go into effect.**
- **Scope:**
  - Electric induction motor of a poly-phase, squirrel cage type design
  - Output rating of size greater than 1HP (0.746 kW) and up to and including 500 HP (375 kW)
  - Rated voltage of not more than 600 V AC
  - Rated frequency of 50/60 Hz or 60 Hz
  - Open or enclosed construction and includes explosion-proof enclosures
  - Constructed to NEMA T frame or U frame dimensions or constructed to IEC equivalent dimensions
  - NEMA design A, B or C, or IEC design N or H
  - Designed to operate at a single speed
  - 2, 4, 6 or 8 poles construction
  - Foot mounted construction or flange mounted construction with or without feet or detachable feet
  - IP code from 00 to 66
  - A motor includes any such product that is incorporated into any other product, whether or not the other product is an energy-using product and subject to the Regulation



# Canada

- **Effective date:**

- The regulation is coming into effect in **January 2011**;
- A motor, as defined in the scope, with all of the following classifications, including integral gear assemblies, must meet or exceed the minimum efficiency levels in Table 2:
  - Rated size greater than 1 HP and up to and including 200 HP or IEC design motor of size greater than 0.746 kW and up to and including 150 kW;
  - 2, 4, or 6 poles;
  - NEMA T frame or IEC frame designation of 90 or above;
  - NEMA design A or B, or IEC design N;
  - Standard shaft, R-shaft or S-shaft or an IEC equivalent;



# Canada

- A motor, as defined in the previous product description, with any of the following classifications must meet or exceed the minimum efficiency levels in Table 1:
  - 8-pole construction;
  - U frame or equivalent IEC dimensions;
  - NEMA design C or IEC design H;
  - close-coupled pump motor;
  - fire pump duty motor;
  - vertically-mounted solid shaft normal thrust motor, as tested in the horizontal configuration;
  - footless construction;
  - 2, 4, or 6-poles, NEMA design B motor of size greater than 200 HP and up to and including 500 HP or IEC design N motor of size greater than 150 kW and up to and including 375 kW.



# Mexico

- In December 2010 new requirements will go into effect
- Directive **PROY-NOM-016-ENER-2009** (NEMA Epact, EISA 2007 Premium Efficiency)
- **Scope:**
  - Three-phase squirrel-cage induction motors:
  - 2, 4, 6 and 8 poles
  - Has a single frequency
  - Rated voltage of  $U_n$  up to 600 V
  - Rated output  $P_n$  between 0,746 kW and 373 kW
  - Rated on the basis of continuous duty operation
  - Opened or enclosed
  - Horizontal or vertical mounting;



# European Union

- **Directive 640/2009 is based on IEC 60034-30**

Establishes ecodesign requirements for the placing on the market and for the putting into service of motors, including where integrated in other products.

- **Scope:**

- Single speed, three-phase 50 Hz or 50/60 Hz, squirrel cage induction motor
- 2, 4 and 6 poles
- Rated voltage of  $U_n$  up to 1000 V
- Rated output  $P_n$  between 0,75 kW and 375 kW
- Rated on the basis of continuous duty operation S1 or S3 with cyclic duration factor of 80% or higher

- **Effective dates:**

- from **June 16, 2011**, motors shall not be less efficient than the IE2
- from **January 1, 2015** motors with a rated output of **7,5-375 kW** shall not be less efficient than the **IE3** or meet the IE2 efficiency and be equipped with a variable speed drive;
- from **January 1, 2017** all motors with a rated output of **0,75-375 kW** shall not be less efficient than the **IE3** or meet the IE2 and be equipped with a variable speed drive.



# European Union

## The directive 640/2009 shall not apply to:

- Motors designed to operate wholly immersed in a liquid;
- Motors completely integrated into a product (for example gear, pump, fan or compressor) of which the energy performance cannot be tested independently from the product;
- Motor specifically designed to operate:
  - At altitudes exceeding 1000 metres above sea-level;
  - Where ambient air temperatures exceed 40 °C;
  - In maximum operating temperature above 400 °C;
  - Where ambient air temperatures are less than -15 °C for any motor or less than 0 °C for a motor with air cooling;
  - Where the water coolant temperature at the inlet to a product is less than 5 °C or exceeding 25 °C;
  - In potentially explosive atmospheres as defined in Directive 94/9/EC of the European Parliament and of the Council;
- Brake motors.



# European Union – Efficiency Level

Output	IE1 - Standard Efficiency			IE2 -High Efficiency			IE3 - Premium Efficiency		
	Poles			Poles			Poles		
kW	2	4	6	2	4	6	2	4	6
0,75	72,1	72,1	70,0	77,4	79,6	75,9	80,7	82,5	78,9
1,1	75,0	75,0	72,9	79,6	81,4	78,1	82,7	84,1	81,0
1,5	77,2	77,2	75,2	81,3	82,8	79,8	84,2	85,3	82,5
2,2	79,7	79,7	77,7	83,2	84,3	81,8	85,9	86,7	84,3
3	81,5	81,5	79,7	84,6	85,5	83,3	87,1	87,7	85,6
4	83,1	83,1	81,4	85,8	86,6	84,6	88,1	88,6	86,8
5,5	84,7	84,7	83,1	87,0	87,7	86,0	89,2	89,6	88,0
7,5	86,0	86,0	84,7	88,1	88,7	87,2	90,1	90,4	89,1
11	87,0	87,6	86,4	89,4	89,8	88,7	91,2	91,4	90,3
15	88,7	88,7	87,7	90,3	90,6	89,7	91,9	92,1	91,2
18,5	89,3	89,3	88,6	90,9	91,2	90,4	92,4	92,6	91,7
22	89,9	89,9	89,2	91,3	91,6	90,9	92,7	93,0	92,2
30	90,7	90,7	90,2	92,0	92,3	91,7	93,3	93,6	92,9
37	91,2	91,2	90,8	92,5	92,7	92,2	93,7	93,9	93,3
45	91,7	91,7	91,4	92,9	93,1	92,7	94,0	94,2	93,7
55	92,1	92,1	91,9	93,2	93,5	93,1	94,3	94,6	94,1
75	92,7	92,7	92,6	93,8	94,0	93,7	94,7	95,0	94,6
90	93,0	93,0	92,9	94,1	94,2	94,0	95,0	95,2	94,9
110	93,3	93,3	93,3	94,3	94,5	94,3	95,2	95,4	95,1
132	93,5	93,5	93,5	94,6	94,7	94,6	95,4	95,6	95,4
160	93,8	93,8	93,8	94,8	94,9	94,8	95,6	95,8	95,6
200 up to 375	94,0	94,0	94,0	95,0	95,1	95,0	95,8	96,0	95,8

**Table 3**



# Brazil

- From the beginning of 2010 all motors sold in Brazil must meet the High efficiency Level.
- **Scope:**
  - Motors with electric single speed, three-phase 60 Hz, squirrel cage induction
  - 2 to 8 poles
  - Rated voltage of  $U_n$  up to 600 V
  - Rated output  $P_n$  between 1 up to 250 HP (0,75 up to 185 kW) for 2 and 4 poles, 1 up to 200 HP (0,75 up to 150 kW) for 6 poles and 1 up to 150 HP (0,75 kW up to 110 kW) for 8 poles
  - Rated on the basis of continuous duty operation
  - Cat N, H (ABNT - IEC) or design A, B or C (NEMA);
  - Motors with intermediate power;
  - Motors with special bearings;
  - Close coupled pump (JM and JP);
  - Totally Enclosed Fan Cooled motors;



# Brazil

- **Effective date:**

In the **beginning of 2010** all motors sold in Brazilian Market must be High Efficiency Motors as presented on the Table 4.

- **The Directive 553 shall not apply to:**

- Direct drive motors;
- Motor design to operating in potentially explosive atmospheres (except Ex-n).



# Brazil – Efficiency Levels

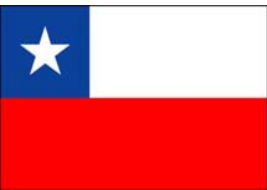
Output		Standard Efficiency				High Efficiency			
		Poles				Poles			
cv	kW	2	4	6	8	2	4	6	8
1	0,75	77,0	78,0	73,0	66,0	80,0	80,5	80,0	70,0
1,5	1,1	78,5	79,0	75,0	73,5	82,5	81,5	77,0	77,0
2	1,5	81,0	81,5	77,0	77,0	83,5	84,0	83,0	82,5
3	2,2	81,5	83,0	78,5	78,0	85,0	85,0	83,0	84,0
4	3	82,5	83,0	81,0	79,0	85,0	86,0	85,0	84,5
5	3,7	84,5	85,0	83,5	80,0	87,5	87,5	87,5	85,5
6	4,5	85,0	85,5	84,0	82,0	88,0	88,5	87,5	85,5
7,5	5,5	86,0	87,0	85,0	84,0	88,5	89,5	88,0	85,5
10	7,5	87,5	87,5	86,0	85,0	89,5	89,5	88,5	88,5
12,5	9,2	87,5	87,5	87,5	86,0	89,5	90,0	88,5	88,5
15	11	87,5	88,5	89,0	87,5	90,2	91,0	90,2	88,5
20	15	88,5	89,5	89,5	88,5	90,2	91,0	90,2	89,5
25	18,5	89,5	90,5	90,2	88,5	91,0	92,4	91,7	89,5
30	22	89,5	91,0	91,0	90,2	91,0	92,4	91,7	91,0
40	30	90,2	91,7	91,7	90,2	91,7	93,0	93,0	91,0
50	37	91,5	92,4	91,7	91,0	92,4	93,0	93,0	91,7
60	45	91,7	93,0	91,7	91,0	93,0	93,6	93,6	91,7
75	55	92,4	93,0	92,1	91,5	93,0	94,1	93,6	93,0
100	75	93,0	93,2	93,0	92,0	93,6	94,5	94,1	93,0
125	90	93,0	93,2	93,0	92,5	94,5	94,5	94,1	93,6
150	110	93,0	93,5	94,1	92,5	94,5	95,0	95,0	93,6
175	132	93,5	94,1	94,1	-	94,7	95,0	95,0	-
200	150	94,1	94,5	94,1	-	95,0	95,0	95,0	-
250	185	94,1	94,5	-	-	95,4	95,0	-	-

Table 4



# Chile

- In the beginning of 2009, Chile has implemented a regulation requiring that all electric motors sold in the country must be certified in accordance with the efficiency levels presented on the IEC 60034-30 (Table 3)
- **Scope:**
  - Three-phase squirrel-cage induction motors that:
  - 2, 4 and 6 poles
  - Has a frequency of 50 Hz
  - Rated voltage of  $U_n$  up to 690 V
  - Rated output  $P_n$  between 0,75 kW and 75 kW
  - Rated on the basis of continuous duty operation
  - Opened or enclosed



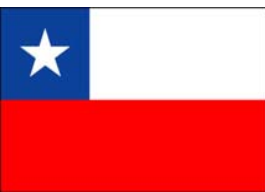
# Chile

- **Effective date:**

From the date **January 4, 2011** all motors sold in the Chile must be certified in accordance the requirements presented in the Protocol PE N° 7/01/2. The efficiency levels are presented on the Table 3 (the levels are the same of IEC standard).

- **The Protocol PE 7/01/2 shall not apply to:**

- Direct drive motors;
- Brake Motors.



# China

- In September of 2008 China implemented the China Energy Label Scheme.
- This program request that all low voltage motors manufactured in or imported into China must be provided with an energy label confirming that they meet certain efficiency standard presented in the Table 5.
- **Scope:**
  - Motors with electric single speed close fan cooled, three-phase 50 Hz, squirrel cage induction
  - 2 to 6 poles
  - Rated voltage of  $U_n$  up to 690 V
  - Rated output  $P_n$  up to 315 kW (0.55 up to 315 kW – grade 2 and 3, 3 up to 315 kW – grade 1)
  - N design
- **Effective date:**
  - This program was implemented in September 1, 2008. All motors of Chinese Market must be in accordance of the efficiency levels presented in Table 5. Grade 3 will be eliminated from the China Energy Label scheme by 2011.



# China – Efficiency Levels

Output kW	Grade 3 Poles			Grade 2 Poles			Grade 1 Poles		
	2	4	6	2	4	6	2	4	6
0,55	-	71,0	65,0	-	80,7	75,4	-	-	-
0,75	75,0	73,0	69,0	77,5	82,3	77,7	-	-	-
1,1	76,2	76,2	72,0	82,8	83,8	79,9	-	-	-
1,5	78,5	78,5	76,0	84,1	85,0	81,5	-	-	-
2,2	81,0	81,0	79,0	85,6	86,4	83,4	-	-	-
3	82,6	82,6	81,0	86,7	87,4	84,9	-	-	86,9
4	84,2	84,2	82,0	87,6	88,3	86,1	89,3	89,9	87,9
5,5	85,7	85,7	84,0	88,6	89,2	87,4	90,1	90,7	89,1
7,5	87,0	87,0	86,0	89,5	90,1	89,0	90,9	91,5	90,6
11	88,4	88,4	87,5	90,5	91,0	90,0	91,9	92,2	91,4
15	89,4	89,4	89,0	91,3	91,8	91,0	92,5	92,9	92,3
18,5	90,0	90,0	90,0	91,8	92,2	91,5	92,9	93,3	92,7
22	90,5	90,5	90,0	92,2	92,6	92,0	93,3	93,6	93,1
30	91,4	91,4	91,5	92,9	93,2	92,5	93,9	94,2	93,6
37	92,0	92,0	92,0	93,3	93,6	93,0	94,2	94,5	94,0
45	92,5	92,5	92,5	93,7	93,9	93,5	94,6	94,8	94,4
55	93,0	93,0	92,8	94,0	94,2	93,8	94,9	95,0	94,7
75	93,6	93,6	93,5	94,6	94,7	94,2	95,4	95,5	95,0
90	93,9	93,9	93,8	95,0	95,0	94,5	95,5	95,7	95,2
110	94,0	94,5	94,0	95,0	95,4	95,0	95,8	96,1	95,7
132	94,5	94,8	94,2	95,4	95,4	95,0	96,1	96,1	95,7
160	94,6	94,9	94,5	95,4	95,4	95,0	96,1	96,1	95,7
200	94,8	94,9	94,5	95,4	95,4	95,0	96,1	96,1	95,7
250	95,2	95,2	94,5	95,8	95,8	95,0	96,1	96,1	95,7
315	95,4	95,2	-	95,8	95,8	-	96,1	96,1	-

Table 5



# South Korea

- The Korean government introduced the certification of high efficiency motors in 1996, and financial rebates to certified high efficiency motors
- On August 25, 2004, the National Energy Saving Implementation Committee (Chaired by the Prime Minister) decided as mandatory the produce/sell of High Efficiency Motors only from 2008
- **Scope:**
  - Under a normal test condition in and at refrigerant temperature under 50°C low voltage 3 phase cage induction motor at the rated frequency of 60 Hz and under the rated voltage of 600 V shall be satisfied with following requirements :
  - Type: Protector Type or Hermetic type
  - Rated output:  $0.75 \text{ kW} \leq \text{Rated output} \leq 200 \text{ kW}$
  - 2, 4, 6 and 8 poles
  - Frame: General frame
  - Speed: Constant
  - Category: Foot mount or Plunge
  - Design A or B
  - Inverter-driven motor with continuous operating



# South Korea

- **Effective date:**

In **2008**, all motors sold in Korean Market must meet the **High Efficiency levels** presented in the Table 6.

- **The MKE's notification 2008-99 shall not apply to:**

- Special purpose electric motor which is satisfied with general requirements, but can not be used in general;  
(Ex: close coupled pump motor);
- The special purpose electric motor which is satisfied with general requirements;
- The special purpose electric motor: Except the general electric motor and the special purpose electric motor which is designed with special operating characteristic and the special mechanical structure at abnormal operating condition (Ex: electric motor for thrust bearing);
- The electric motor which is not satisfied with general requirements (Ex: multi-speed electric motor);



# South Korea – Efficiency Levels

Output kW	Protective Type Motors				Closed Type Motors			
	Poles				Poles			
	2	4	6	8	2	4	6	8
0,75	75,5	82,5	80,0	74,0	75,5	82,5	82,0	74,0
1,5	84,0	84,0	85,5	85,5	84,0	84,0	86,5	82,5
2,2	84,0	86,5	86,5	86,5	85,5	87,5	87,5	84,0
3,7	85,5	87,5	87,5	87,5	87,5	87,5	87,5	85,5
5,5	87,5	88,5	88,5	88,5	88,5	89,5	89,5	85,5
7,5	88,5	89,5	90,2	89,5	89,5	89,5	89,5	88,5
11	89,5	91,0	90,2	89,5	90,2	91,0	90,2	88,5
15	90,2	91,0	91,0	90,2	90,2	91,0	90,2	89,5
18,5	91,0	91,7	91,7	90,2	91,0	92,4	91,7	89,5
22	91,0	92,4	92,4	91,0	91,0	92,4	91,7	91,0
30	91,7	93,0	93,0	91,0	91,7	93,0	93,0	91,0
37	92,4	93,0	93,0	91,7	92,4	93,0	93,0	91,7
45	93,0	93,6	93,6	92,4	93,0	93,6	93,6	91,7
55	93,0	94,1	93,6	93,6	93,0	94,1	93,6	93,0
75	93,0	94,1	94,1	93,6	93,6	94,5	94,1	93,0
90	93,6	94,5	94,1	93,6	94,5	94,5	94,1	93,6
110	93,6	95,0	94,5	93,6	94,5	95,0	95,0	93,6
132	93,6	95,0	94,5	-	94,5	95,0	95,0	-
160	94,5	95,0	94,5	-	95,0	95,0	95,0	-
200	94,5	95,0	-	-	95,0	95,0	-	-

Table 6



# Australia

- Australia has an Energy Efficiency program implemented since 2001. This program was updated in 2006
- The Australian Program request that all motors sold in the country must meet the efficiency levels defined in the Table 7 and Table 8. The program defines two test methods to determine the motor efficiency level, Test Method A (based on standard AS/NZS 1359.102.3) and Test Method B (based on standard AS 1359.102.1)
- **Scope:**
  - Three-phase electric motors from 0.73 kW to <185 kW manufactured in or imported into Australia must comply with Minimum Energy Performance (MEPS)
- **Effective date:**
  - The Energy Efficiency Program was implemented in 2001 and revised in 2006. **Actually**, all motors sold in Australia must meet the Efficiency levels presented in Table 7 or Table 8



# Australia

The MEPS **shall not apply** to:

- Submersible motors;
- Integral motor-gear systems (non separable);
- Variable or multi-speed motors;
- Motor rated only for short duty cycles (IEC 60034-2 duty rating S2);
- Rewound motors or motors sold as second hand;



# Australia – Efficiency Levels

Test Method A								
Output	MEPS 2006 and High Efficiency 2001				High Efficiency 2005			
	Poles				Poles			
	2	4	6	8	2	4	6	8
kW								
0,73	78,8	80,5	76,0	71,8	81,4	82,9	78,8	75,0
0,75	78,8	80,5	76,0	71,8	81,4	82,9	78,8	75,0
1,1	80,6	82,2	78,3	74,7	83,0	84,5	80,9	77,6
1,5	82,6	83,5	79,9	76,8	84,8	85,6	82,4	79,6
2,2	84,0	84,9	81,9	79,4	86,2	86,9	84,2	81,9
3	85,3	86,0	83,5	81,3	87,2	87,8	85,6	83,6
4	86,3	87,0	84,7	82,8	88,1	88,7	86,7	85,0
5,5	87,2	87,9	86,1	84,5	88,9	89,5	87,9	86,5
7,5	88,3	88,9	87,3	86,0	89,9	90,4	89,0	87,8
11	89,5	89,9	88,7	87,7	90,9	91,3	90,2	89,3
15	90,3	90,8	89,6	88,9	91,6	92,1	91,0	90,4
18,5	90,8	91,2	90,3	89,7	92,1	92,4	91,6	91,1
22	91,2	91,6	90,8	90,2	92,4	92,8	92,1	91,5
30	92,0	92,3	91,6	91,2	93,1	93,4	92,8	92,4
37	92,5	92,8	92,2	91,8	93,6	93,8	93,3	92,9
45	92,9	93,1	92,7	92,4	93,9	94,1	93,7	93,5
55	93,2	93,5	93,1	92,9	94,2	94,4	94,1	93,9
75	93,9	94,0	93,7	93,7	94,8	94,9	94,6	94,6
90	94,2	94,4	94,2	94,1	95,0	95,2	95,0	94,9
110	94,5	94,7	94,5	94,5	95,3	95,5	95,3	95,3
132	94,8	94,9	94,8	94,8	95,5	95,6	95,5	95,5
150	95,0	95,2	95,1	95,2	95,7	95,9	95,8	95,9
<185	95,0	95,2	95,1	95,2	95,7	95,9	95,8	95,9

Table 7

Test Method B								
Output	MEPS 2006 and High Efficiency 2001				High Efficiency 2005			
	Poles				Poles			
	2	4	6	8	2	4	6	8
kW								
0,73	80,5	82,2	77,7	73,5	82,9	84,5	80,4	76,5
0,75	80,5	82,2	77,7	73,5	82,9	84,5	80,4	76,5
1,1	82,2	83,8	79,9	76,3	84,5	85,9	82,4	79,1
1,5	84,1	85,0	81,5	78,4	86,2	87,0	83,8	81,0
2,2	85,6	86,4	83,4	80,9	87,5	88,2	85,5	83,3
3	86,7	87,4	84,9	82,7	88,5	89,1	86,9	84,9
4	87,6	88,3	86,1	84,2	89,3	89,9	87,9	86,2
5,5	88,5	89,2	87,4	85,8	90,1	90,7	89,1	87,7
7,5	89,5	90,1	88,5	87,2	90,9	91,5	90,1	88,9
11	90,6	91,0	89,8	88,8	91,9	92,2	91,2	90,3
15	91,3	91,8	90,7	90,0	92,5	92,9	92,0	91,4
18,5	91,8	92,2	91,3	90,7	92,9	93,3	92,5	92,0
22	92,2	92,6	91,8	91,2	93,3	93,6	92,9	92,4
30	92,9	93,2	92,5	92,1	93,9	94,2	93,6	93,2
37	93,3	93,6	93,0	92,7	94,2	94,5	94,0	93,7
45	93,7	93,9	93,5	93,2	94,6	94,8	94,4	94,2
55	94,0	94,2	93,9	93,7	94,9	95,0	94,8	94,6
75	94,6	94,7	94,4	94,4	95,4	95,5	95,2	95,2
90	94,8	95,0	94,8	94,7	95,5	95,7	95,5	95,5
110	95,1	95,3	95,1	95,1	95,8	96,0	95,8	95,8
132	95,4	95,5	95,4	95,4	96,1	96,1	96,1	96,1
150	95,5	95,7	95,6	95,7	96,1	96,3	96,2	96,3
<185	95,5	95,7	95,6	95,7	96,1	96,3	96,2	96,3

Table 8



## Other regulations expected

- **Japan: IE2** expected for **2010 (JIS C 4210 and 4212, based on IEC 60034-30)**
  - 220/220/400/440 V, 50/60 Hz, 0.2 – 160 kW, 2 – 6;
- **Switzerland: IE2** expected for **2011 (based on IEC 60034-30)**
  - 400 V, 50 Hz, 0.75 – 375 kW, 2 – 6 poles;
  - From 2015 until 2017 there will be a revision in the regulation of the country;
- **Indian: IE2** expected for **2013 (based on IEC 60034-30)**
  - 415/690 V, 50 Hz, 0.37 – 315 kW, 2 – 8 poles;
- **Israel: IE3** expected for **2015 (based on IEC 60034-30)**
  - 400 V, 50 Hz, 0.75 – 185 kW, 2 – 8 poles;
- **United Arab Emirates: IE2** expected for **06/2011 (based on IEC 60034-30 and EC Nr. 640/2009 European Union)** with recommendations;
  - 400 V, 50 Hz, 0.75 – 375 kW, 2 – 6 poles;