



embraco POWER **IN.**
CHANGE **ON.**



HC's HAVE BEEN APPROVED BY THE EPA



HC's HAVE BEEN APPROVED BY THE EPA
AND WHAT DOES IT
MEAN FOR THE
REFRIGERATION MARKET?

IT MEANS

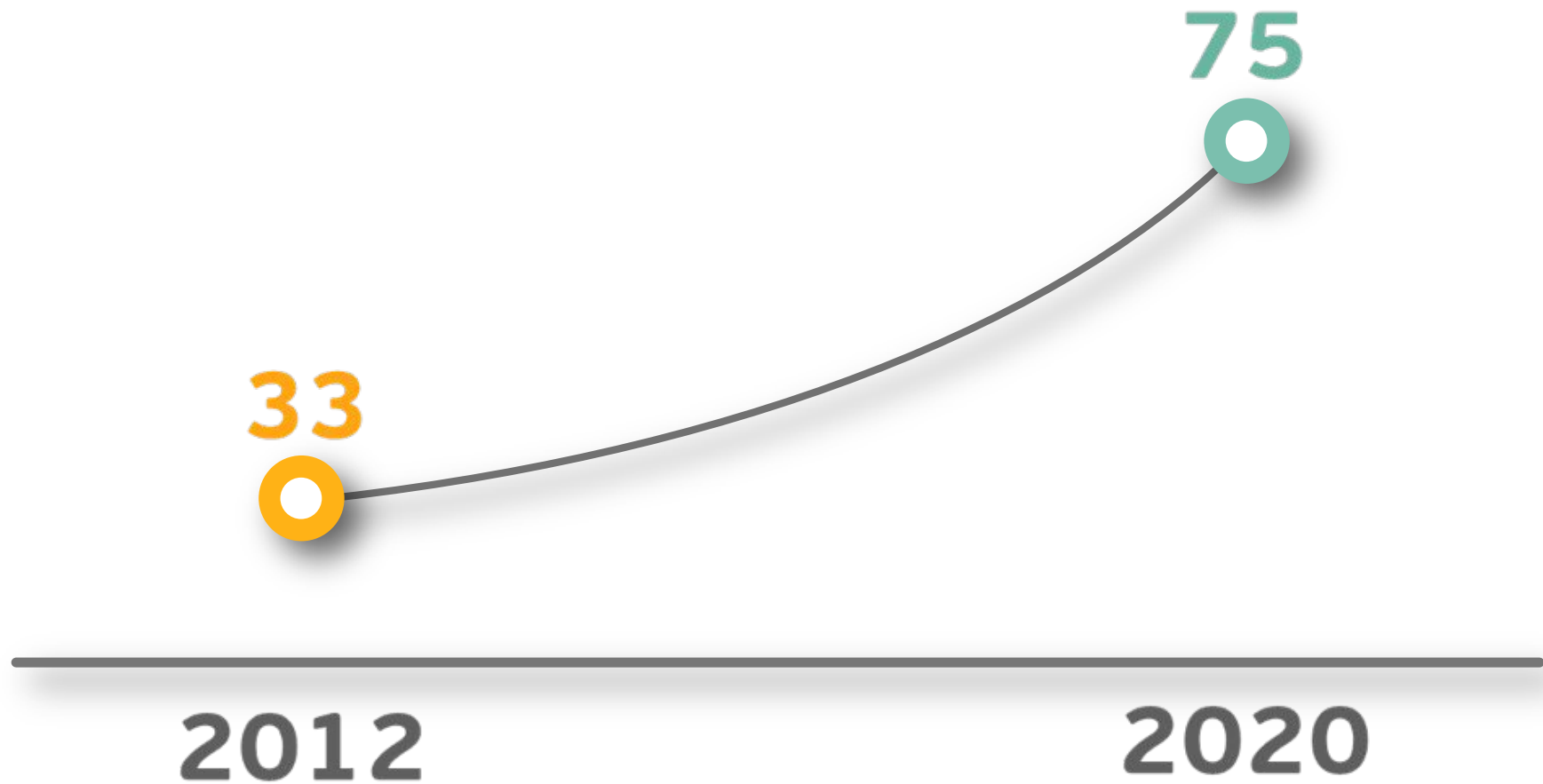
17 MILLION

COMMERCIAL AND HOUSEHOLD APPLIANCES IN NORTH AMERICA 2012



ISOBUTANE FORECAST

USAGE %



SOURCE: UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP) 2010

WHICH IS THE
BEST
TRACK?



PROPANE

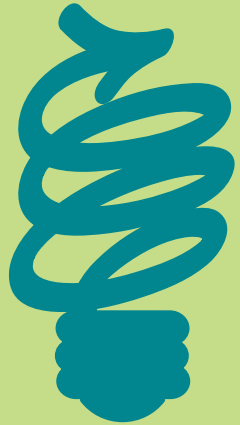


EFFICIENCY

POWER PLANTS

INVESTMENTS

PROPANE



SUSTAINABILITY

FOOTPRINT CO₂ / GWP

PROPANE



SAVING

MONEY

FOR RETAILERS

STAKEHOLDERS



GOVERNMENT

embraco



END CUSTOMER



SPECIFIERS



OEMS



RETAILERS

INDUSTRIAL PARTNERS IN US MARKET PROPANE DEVELOPMENTS



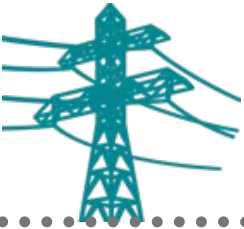
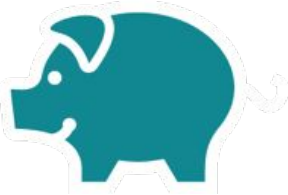

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CASE STUDY #1

SMALL (10 CUFT)

ICE CREAM CHEST FREEZER



	R404A	R290	Savings
	1650 kWh/year	1387 kWh/year	263 kWh/year
	221 USD	186 USD	18M USD/year
	9000 kg CO ₂	7046 kg CO₂	977 kton CO₂ in 10 years

- US\$ per kwh (Washington DC) = 0.1342
- Number of chest freezers in US 2012 = 500,000

CASE STUDY #2

MEDIUM (26 CUFT)

GLASS DOOR MERCHANDIZER



Energy Star

R290

Savings



1559
kWh/year

810
kWh/year

384
kWh/year



148
USD

107
USD

30M
USD/year



6394
kg CO₂

4117
kg CO₂

772 kton CO₂
in 10 years

- R290 tests considering LED and ECM fans
- US\$ per kwh (Washington DC) = 0.1342
- Number of reach in refrigerator and freezer in US 2012 = 750,000

CASE STUDY #3

SMALL (10 CUFT)

GLASS DOOR MERCHANDIZER



R134a
Energy Star

R290

Savings



901 kWh/year
509 kWh/year

250 kWh/year



102 USD

68 USD

25M USD/year



4150 kg CO₂

2585 kg CO₂

1174 kton CO₂
in 10 years

- R290 tests considering LED and ECM fans
- US\$ per kwh (Washington DC) = 0.1342
- Number of reach in refrigerator and freezer in US 2012 = 750,000

CASE STUDY #4
MEDIUM (14 CUFT)
GLASS DOOR FREEZER



R404A

R290

CEC Savings



5256
kWh/year

3000
kWh/year

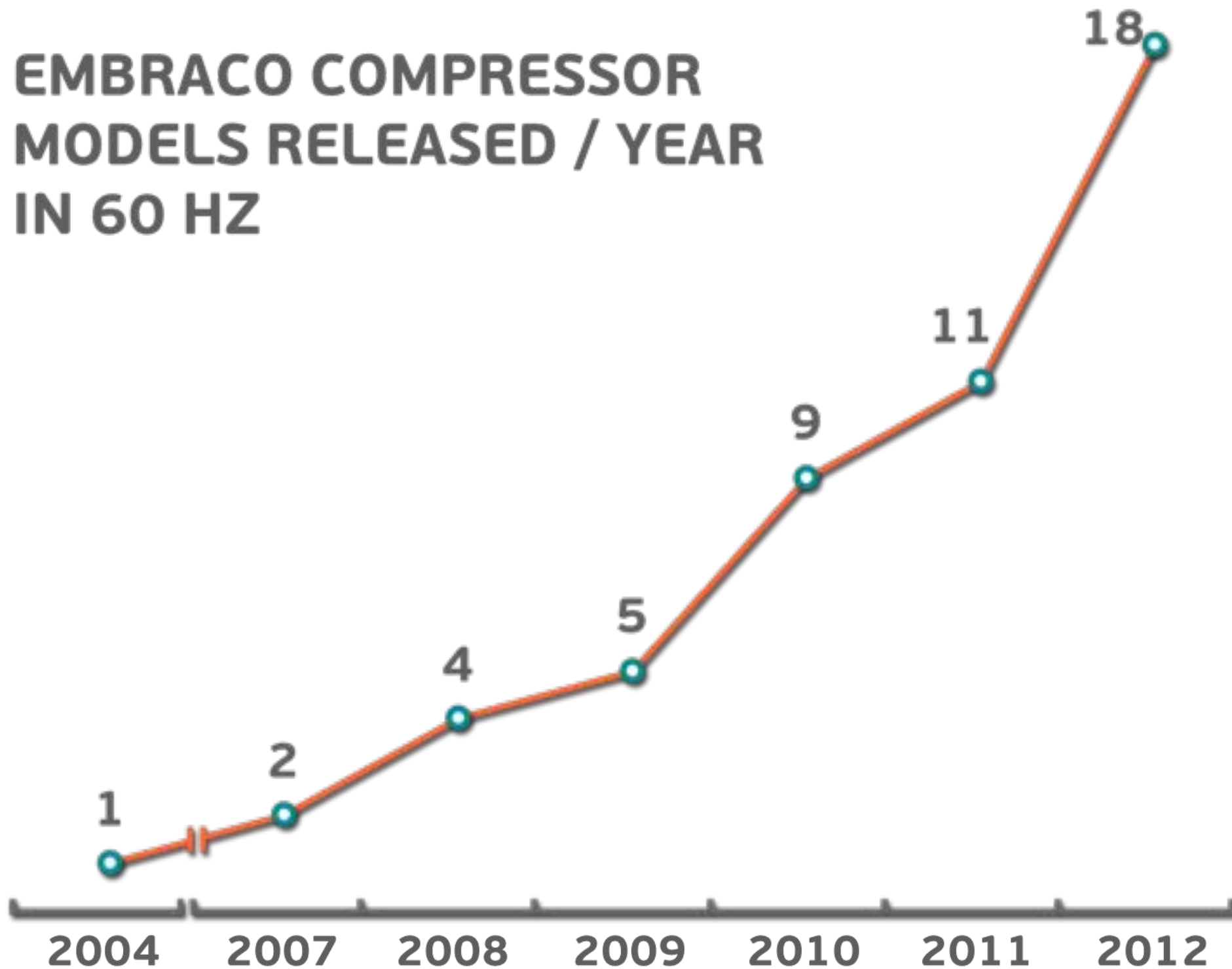
4246
kWh/year

RESULTS ABOVE ARE RELATIVE TO 50 Hz

**VERSION OF THIS APPLIANCE, 60 Hz VERSION,
WILL BE AVAILABLE SOON**

- R290 tests considering LED and ECM fans
- US\$ per kwh (Washington DC) = 0.1342
- Number of reach in refrigerator and freezer in US 2012 = 750,000

EMBRACO COMPRESSOR MODELS RELEASED / YEAR IN 60 HZ



2008

PROPANE CLASSIFIED AS REFRIGERANT

**FIRST PROPANE EMBRACO
COMPRESSOR MODEL APPROVED BY UL**

BEN&JERRY's FIELD TESTS BEGIN

2004

2007

2008

2009

2010

2011

2012

2008

COMPRESSOR
RELEASED / YEAR



FIRST PROPANE 60HZ CHEST FREEZER - 10 CUFT



FFU 130 UAX
1400 BTUs
L/MBP

2004 2007 2008 2009 2010 2011 2012

2009

COMPRESSOR
LEASED / YEAR

18

**FIRST MANUFACTURING LINE FOR
PROPANE CABINETS IN US**

2004

2007

2008

2009

2010

2011

2012

2011

COMPRESSOR
RELEASED / YEAR

18

EPA R290 SNAP RELEASED

2004

2007

2008

2009

2010

2011

2012

2011

COMPRESSOR
RELEASED / YEAR

18



NEK2150U
2400 BTUs
LBP

INDUSTRIAL KITCHENS



EM2X1117U
700 BTUs
LBP

UNDERCOUNTERS

2004

2007

2008

2009

2010

2011

2012

2011

COMPRESSOR
REPLACED / YEAR

18



MEDIUM GDM



FFU 130 UAX
1400 BTUs
L/MBP



LARGE GDM



NEK6213U
6300 BTUs
MBP

2004

2007

2008

2009

2010

2011

2012

LESSONS LEARNED

USE OF HYDROCARBON REFRIGERANTS
WORLDWIDE CAN BE CONSIDERED AS A
SUCCESS STORY

LESSONS LEARNED

INDUSTRY LEADERS (MANUFACTURERS & SPECIFIERS) ARE FARTHER AHEAD OF ANY LEGISLATION REGARDING ENERGY STANDARDS

IE) ENERGY CONSUMPTION OF PROPANE APPLIANCES OUT PERFORM ENERGY STAR STANDARDS

LESSONS LEARNED

TAXATION AND EARLY BAN OF HIGH GWP
REFRIGERANTS CAN SPEED THE
REDUCTION OF CO₂ EMISSIONS

LESSONS LEARNED

SIMPLE HYDROCARBON LIGHT COMMERCIAL SYSTEMS HAS SIMILAR COST OF PRESENT SYSTEMS AND LOWER THEN OTHER ECO FRIENDLY ONES

LESSONS LEARNED

PROPER SAFETY RULES AND TRAINED SERVICE PROFESSIONALS CAN SIGNIFICANTLY REDUCE RISK LEVEL ASSOCIATED WITH USE OF FLAMMABLE REFRIGERANTS

BARRIER

OEM INVESTMENTS FOR
MANUFACTURING PROCESS

SOLUTION

- GOVERNMENTAL AND/OR POWER UTILITIES INCENTIVES
- WORLD TRENDS
- EARLY HIGH GWP REFRIGERANTS BAN FOR SMALL APPLIANCES

BARRIER

SAFETY CONCERNS

TRAINING PROCESS

SOLUTION

- MANDATORY PRODUCT & PROCESS RISK ASSESSMENT
- MANUFACTURING TRAINING AND CERTIFICATION OF SERVICE PERSONNEL
- USE OF SAFER ELECTRICAL COMPONENTS THAN MINIMUM STANDARD REQUIREMENTS

BARRIER

LEGISLATION

SOLUTION

- INCREASE CHARGE LIMIT FOR HOUSEHOLD APPLIANCES TO A MINIMUM OF 150 GRAMS, AS PER COMMERCIAL PLUG-INS

PROPANE PORTFOLIO FOR USA

		Capacity (Btu/h)	Efficiency (Btu/wh)	Application	
				LBP	MBP
	EMI50UER	520	4,50	OK	OK
	EMI70UER	700	4,33	OK	OK
	EMI90UEX	945	4,68	OK	OK
NEW	EM2X1117U	705	5,90	OK	
	EM2X1121U	1095	5,93	OK	
	EM2X1125U	1230	5,91	OK	
	FFU130UAX	1360	5,15	OK	OK
	FFU160UAX	1670	5,26	OK	OK
NEW	NEK2134U	1800	4,65	OK	
NEW	NEK2150U	2340	4,47	OK	
	NT2160U	2820	4,57	OK	
	NT2170U	3140	4,44	OK	
NEW	NT2180U	3750	4,56	OK	
NEW	NT2210U	4770	4,80	OK	
NEW	NT2210U (*)	4780	4,80	OK	
NEW	NEK6210U	4706	8,60		OK
	NEK6213U	6280	7,27		OK
NEW	NT6217U	7190	8,80		OK
NEW	NT6222U	10125	8,10		OK

(*) 220V version

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POWER IN.
CHANGE ON.