

Technical and Economic Feasibility Study for a High Efficiency Compressor Market in Brazil

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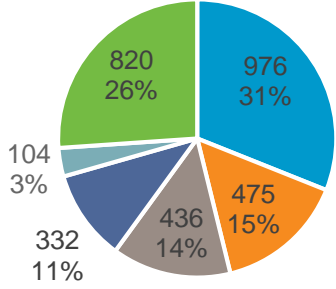
Purpose of this Report

- Availability of high efficiency compressors identified as barrier for higher efficiency ACs
- Address this issue by:
 - Understanding the AC compressors market in Brazil
 - Identifying barriers for efficient compressors
 - Making recommendations on improving access to efficient compressors



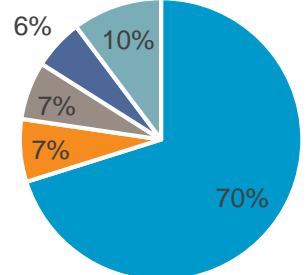
Brazilian AC Industry Overview

Shares of AC Production ('000s)



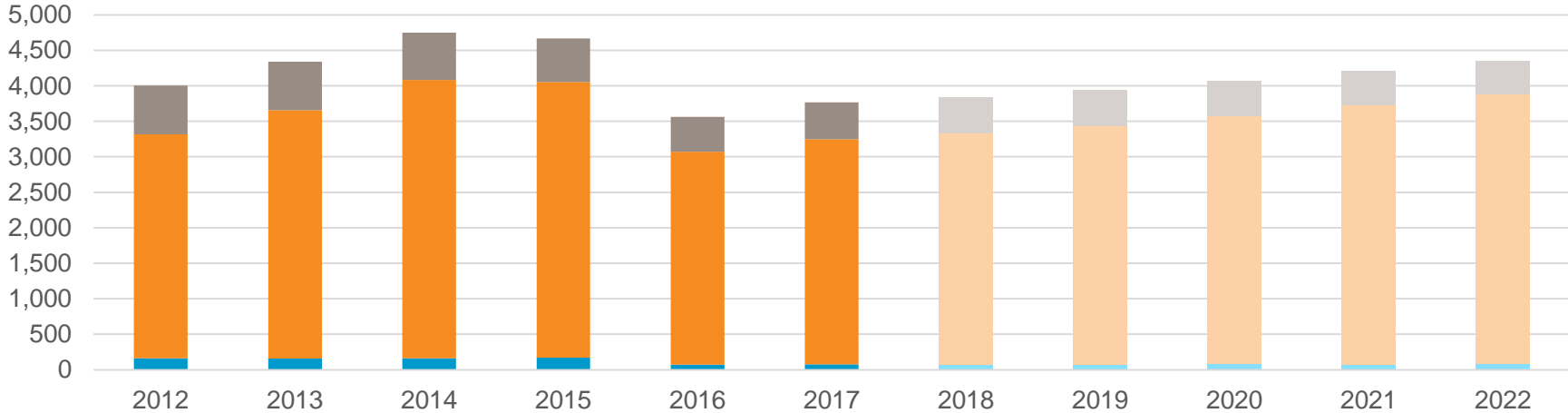
- Midea Group Co Ltd
- Samsung Corp
- Electrolux AB
- LG Corp
- Zhuhai Gree Group Co Ltd
- Others

Sources of AC Imported Components



- China
- Rep. of Korea
- USA
- Thailand
- Others

Brazilian AC Market Size ('000s)



- Portable Air Conditioners
- Split Air Conditioners
- Window Air Conditioners

Zona Franca de Manaus and the PPB

- AC assembly is only viable with tax and tariff incentives
- Incentive policy requires the industry to be located in Manaus
- Cost of incentives is the PPB, including mandate to buy local compressors or invest in R&D
- No PPB means no incentives and no domestic AC industry

**PRODUZIDO NO
PÓLO INDUSTRIAL
DE MANAUS**



Domestic AC Compressor Production: Tecumseh

- Tecumseh makes a variety of compressors around the world
- Tecumseh do Brasil employs 2,800 people in two plants in Sao Carlos, Sao Paulo State
- Tecumseh currently produces 900,000 fixed speed compressors for the domestic AC market
- Tecumseh asserts they have production lines for 100,000 inverter compressors a year, but has only sold fixed speed compressors



Compressor Logistics and the “Custo Brasil”

Manaus and the PPB disrupts AC companies’ supply chains and complicates logistics



Brazilian Compressors System of Negotiation

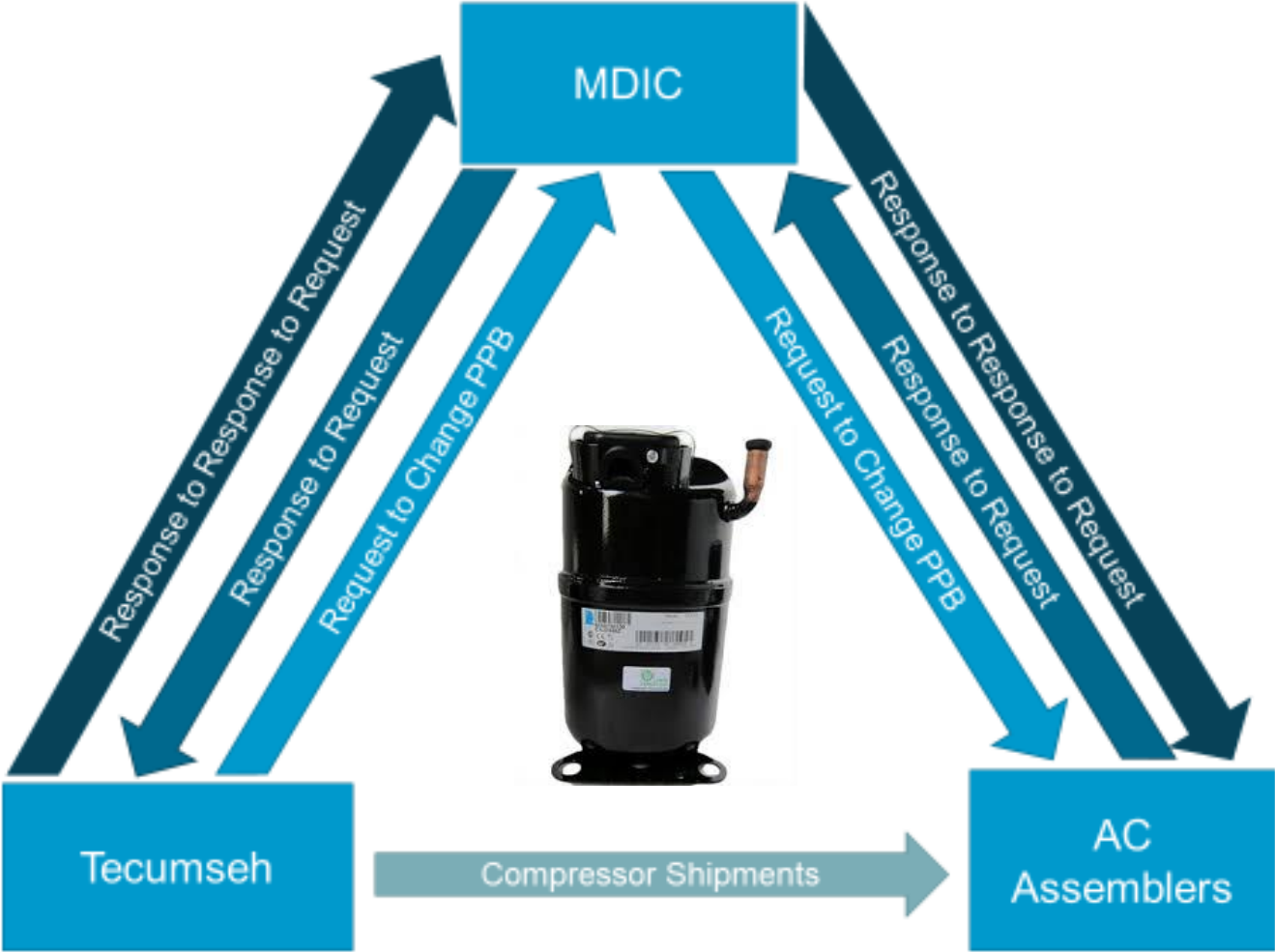


Figure based on a presentation by Homero Cremm Busnello of Tecumseh

No Opportunity for New Entrants to Compressor Market

- Compressor manufacturing requires economies of scale
- Brazilian AC market alone is too small for more than one compressor manufacturer
- The Custo Brasil makes exports difficult; regional export market smaller than Brazilian market

Case	Net Present Value at 6% interest rate (USD\$)	Internal Rate of Return (IRR)
Tecumseh Expands	\$24,707,175.67	36%
Major Manufacturer Invests in New Facility	\$15,440,274.18	15%
Smaller Manufacturer Invests in New Facility	\$(18,621,156.92)	-9%

Options for Revising the PPB

Option	Advantages	Drawbacks
Make the PPB points-based to make it more flexible	Gives options to meet the PPB if a particular component (such as the compressor) cannot meet MEPS	May negatively impact some domestic manufacturers supported by the PPB
Incorporate efficiency into the PPB	Ensures final product or individual components meet efficiency criteria Supports case for PPB at the WTO	Adds to distortions inherent in PPB
Direct R&D spending to efficiency	Creates resource for efficiency	Not enough funding to be meaningful and may disappear