

U.S. Ductile Iron Metalcasting: Competing Globally

Al Spada, AFS, MODERN CASTING & ECS

Chandra Rajan, Foseco Metallurgical

Patrico Gil, Blackhawk de Mexico



Anatomy of the Presentation

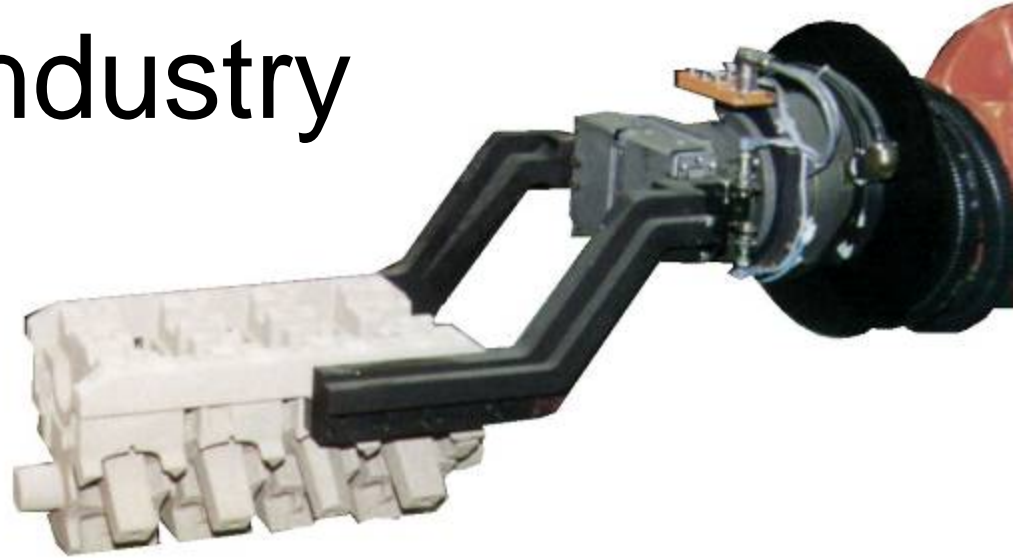
- **U.S. Metalcasting Profile & Forecast**
 - Spada
- **Global Profile**
 - Spada
- **Europe & Asia**
 - Rajan
- **Latin America**
 - Gill



Profile of the U.S. Metalcasting Industry

2130 Casting Facilities

- 700+ Ferrous;
1400+ Nonferrous
- Employs More Than 200,000
- 80% Are Small Businesses
(less than 100 employees)
- 2007: Adjusted to \$31.8 Billion; 13 Million Tons
- 2008: Adjusted to \$31.5 Billion; 12.6 Million Tons
- 2nd in Production



U.S. Production

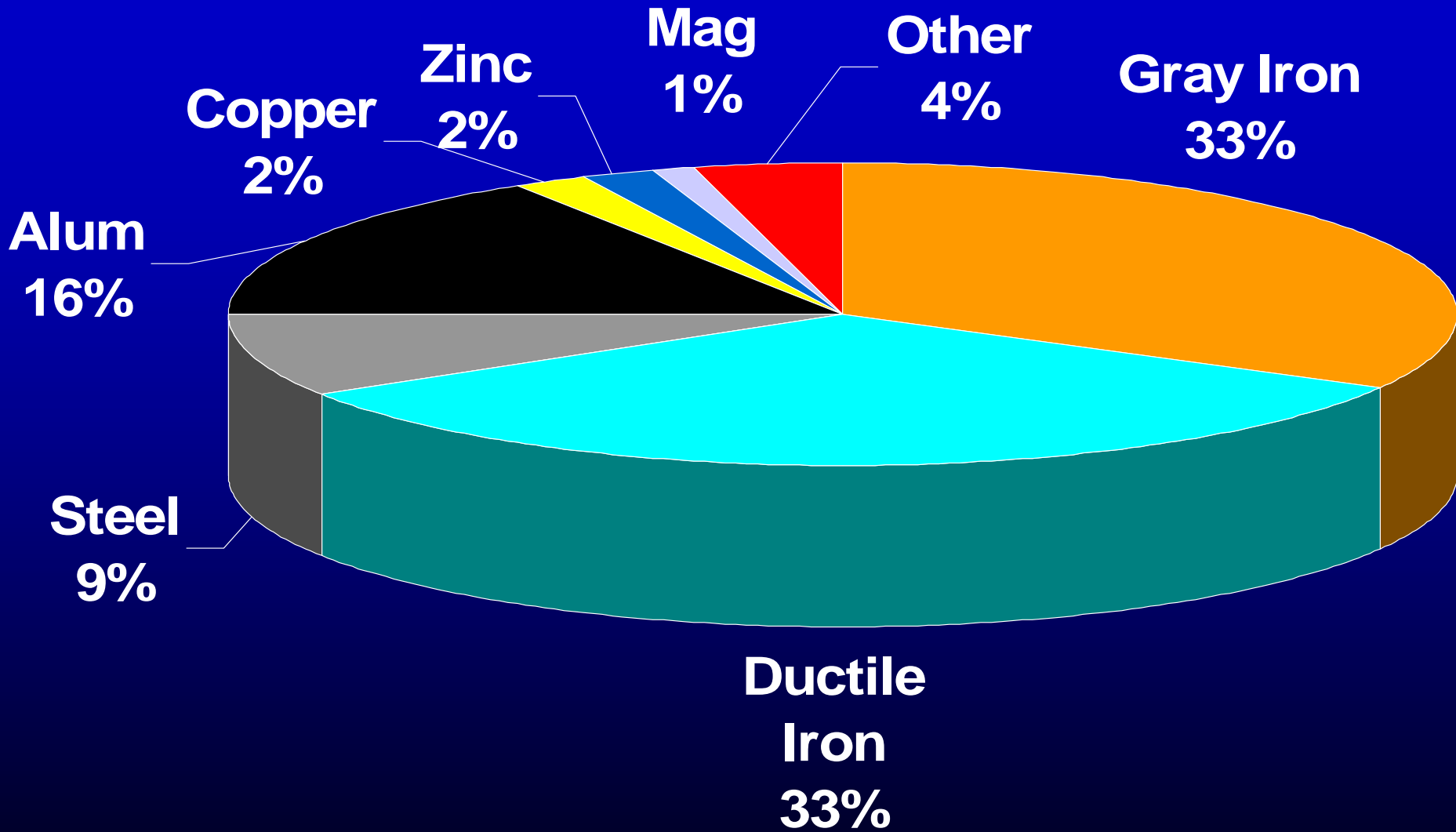
- 1955—6150 Plants
- 1991—3200 Plants
- 2008—2130 Plants
- From '91-'07, production capacity off only 4%
- From '91-'07, Alum growth at 80%+
- From '91-'07, Mg growth at 300%+
- Greater number of castings produced today than in '91



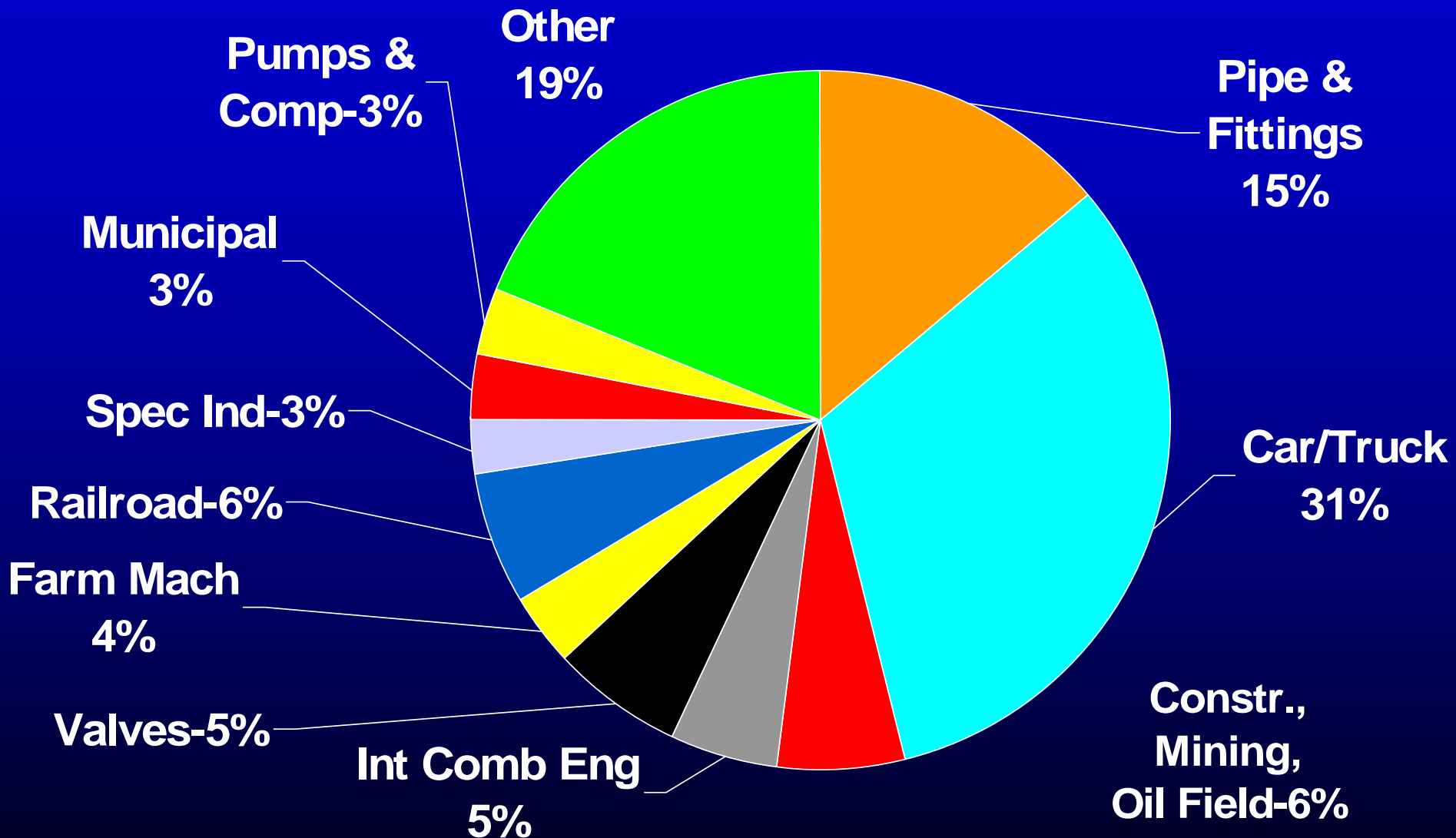
2008-09 Capacity & Utilization

Metal	Capacity (Tons)	Utilization (%)
Iron	11,100,000	78
Steel	1,650,000	80
Aluminum	2,550,000	80
Copper Base	370,000	85
Magnesium	170,000	76
Zinc/Lead	350,000	85
Other Nonferrous	70,000	87
Investment	190,000	76
TOTAL	16,470,000	79

2008 Shipment Mix: Tons



Casting End-Use Markets



Projected Shipments

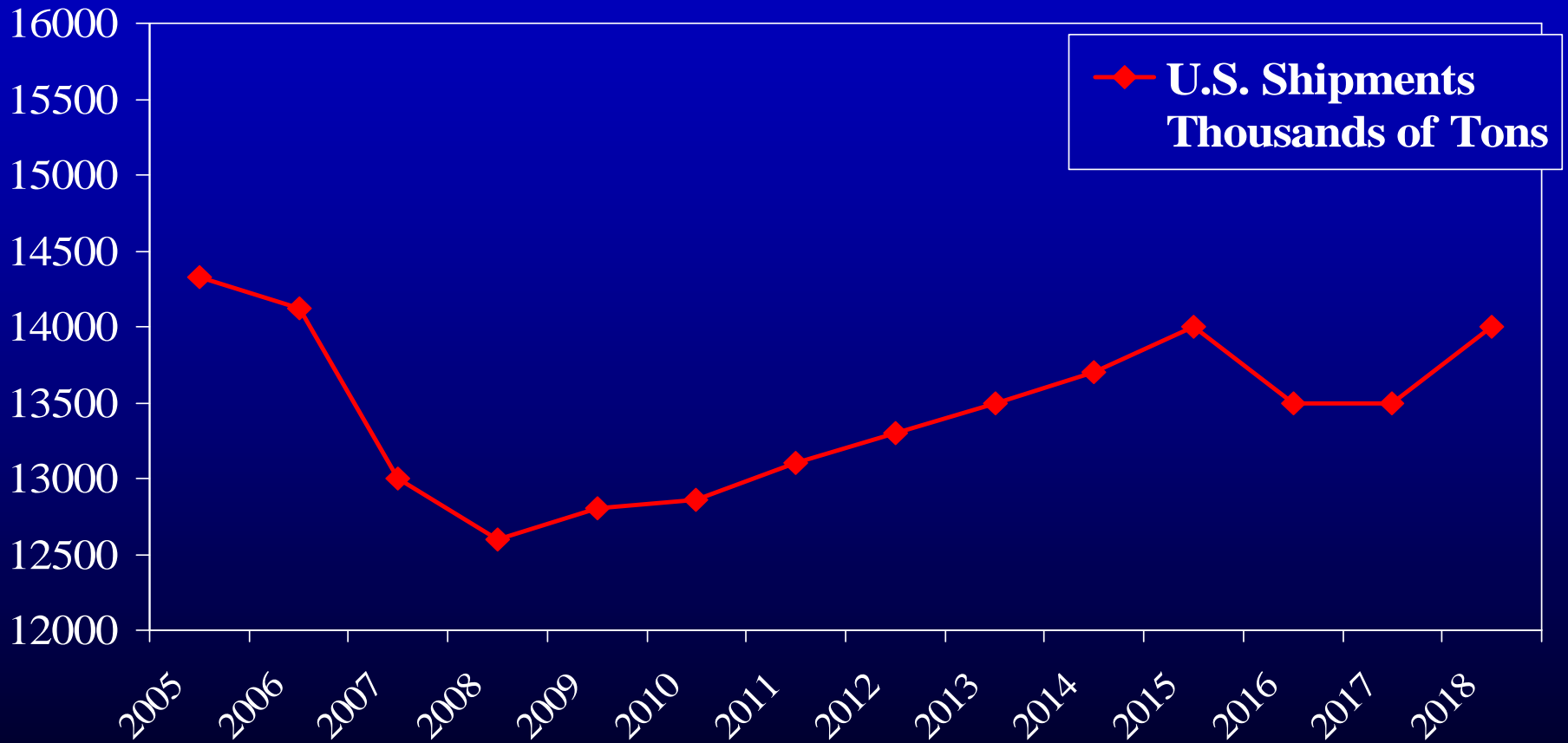
(all metals)



- 2009: 12.8 million tons
\$32 Billion in sales
- 2011: 13.1 million tons;
\$33.7 Billion in sales
- 2018: 14 million tons
\$42 billion in sales

Forecast based on GDP, housing starts, auto, railcar and truck production, construction activity, end-user and supplier interviews.

Shipment Forecast Through 2017



*2008 Keith Millis Symposium on Ductile Cast Iron
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Gray & Ductile Iron

- 2008 Shipments: 4.125 million tons gray iron (-3.8%); 4.084 million tons ductile iron (-2%)
- 2009 Forecast: 4.234 million tons gray; 4.236 million tons ductile
- 2018 Forecast: 4.138 million gray (0.3% AGR); 4.761 million ductile (1.6% AGR)

DI Markets (STG '08-'10/LTG to '18)

- **Construction (6.3%/1.8%)**—replace steel, malleable, gray
- **Med to Hvy Truck (39.8%/4.3%);**
- **Farm Equip (5.5%/0.8%)**—replace gray iron
- **Light Vehicles (7.9%/1.2%)**—loss to alum in suspension/diff parts ad cranks to steel; gain on malleable and ADI growth
- **Valves/Fittings (7.1%/1.2%)**—replace malleable, gray
- **Int. Com. Eng (1.8%/0.5%)**—truck growth
- **All Major markets show growth (7.3%/1.6%)**
- **190 lb of ductile iron per vehicle in 2003 to 150 lb. by 2016**

ADI & CGI

ADI: finding new inroads replacing forgings, steel weldments in farm and construction

- 200,000 tons in 2008
- 250,000 tons in 2018

CGI: Markets in motor vehicles and internal combustion engines (engine blocks and heads in diesel engines, bedplates, gear covers)

- 127,000 tons in 2008



**Rangeland Planter
Boot Casting
redesigned from fab**

DI Demand Supply in U.S.

- 2009 Vertically-Parted—1.68 million tons supply, 1.34 million demand
- 2009 Horizontally Parted—600,000 tons supply, 492,000 demand



The Switch to Aluminum

A red sports car with a smiling face, driving on a road in a desert landscape with jagged rock formations in the background.

<u>Part</u>	<u>2005</u>	<u>2008</u>	<u>2009</u>
Engine Block	50%	65%	75%
Cylinder Head	93%	97%	98%
Intake Manifold	33%	24%	17%
Wheels	75%	70%	70%
Suspension	30%	50%	60%

130 lb Al Castings/vehicle in 1992; 260 lb. in 2007; 280 lb by 2016

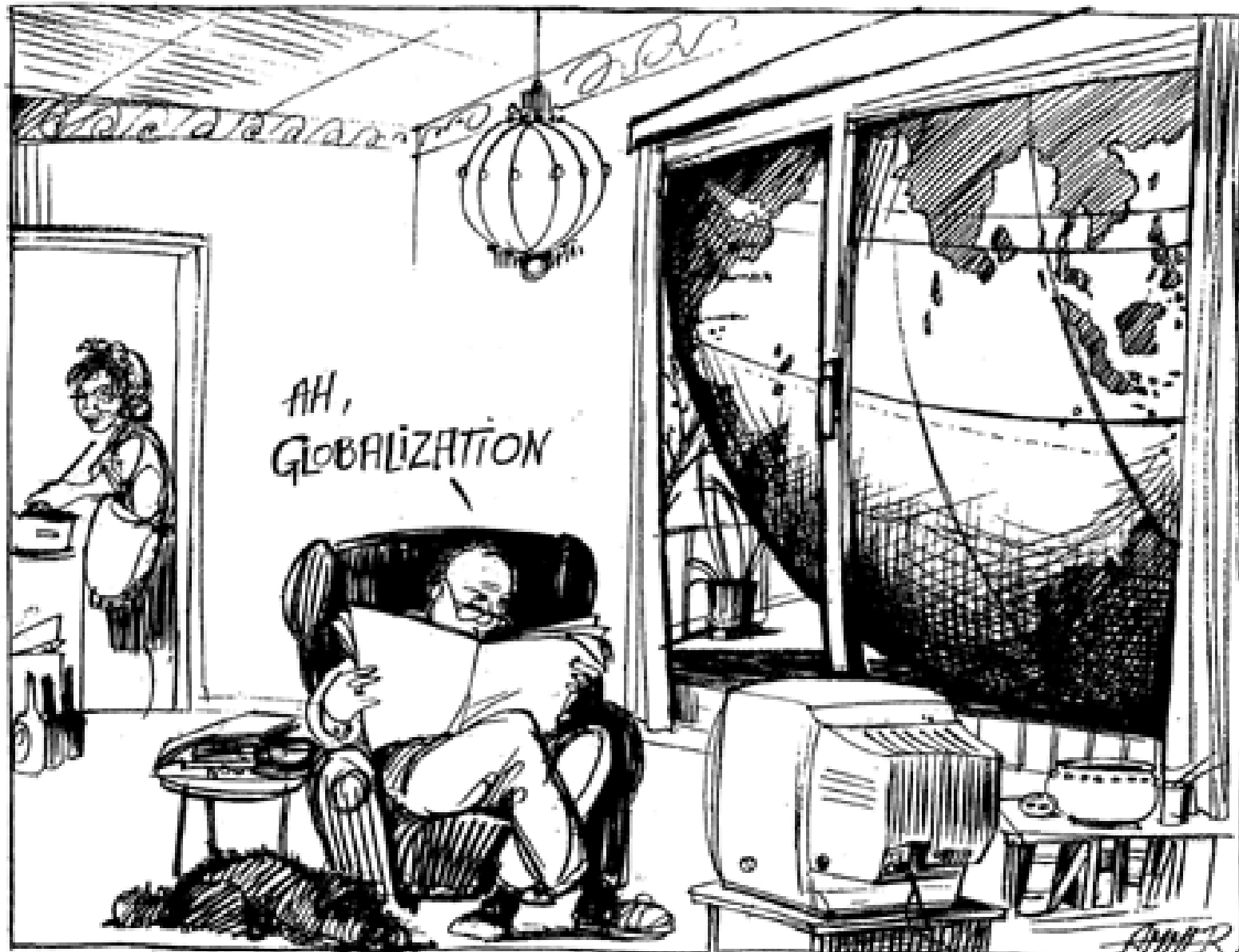
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Energy & Material Costs in U.S. (2008)

Electricity	.05 EUR/KWh (.08 \$/KWh)
Gas	22.18 EUR/m³(\$10/ decatherm)
Oil	.22 EUR/l (\$1.30/gallon)
Coke 80+	414 EUR/tonne (\$600/short ton)
Steel Scrap	622 EUR/tonne (\$900/short ton)
Pig iron	518 EUR/tonne (\$750/short ton)

Imports & Globalization

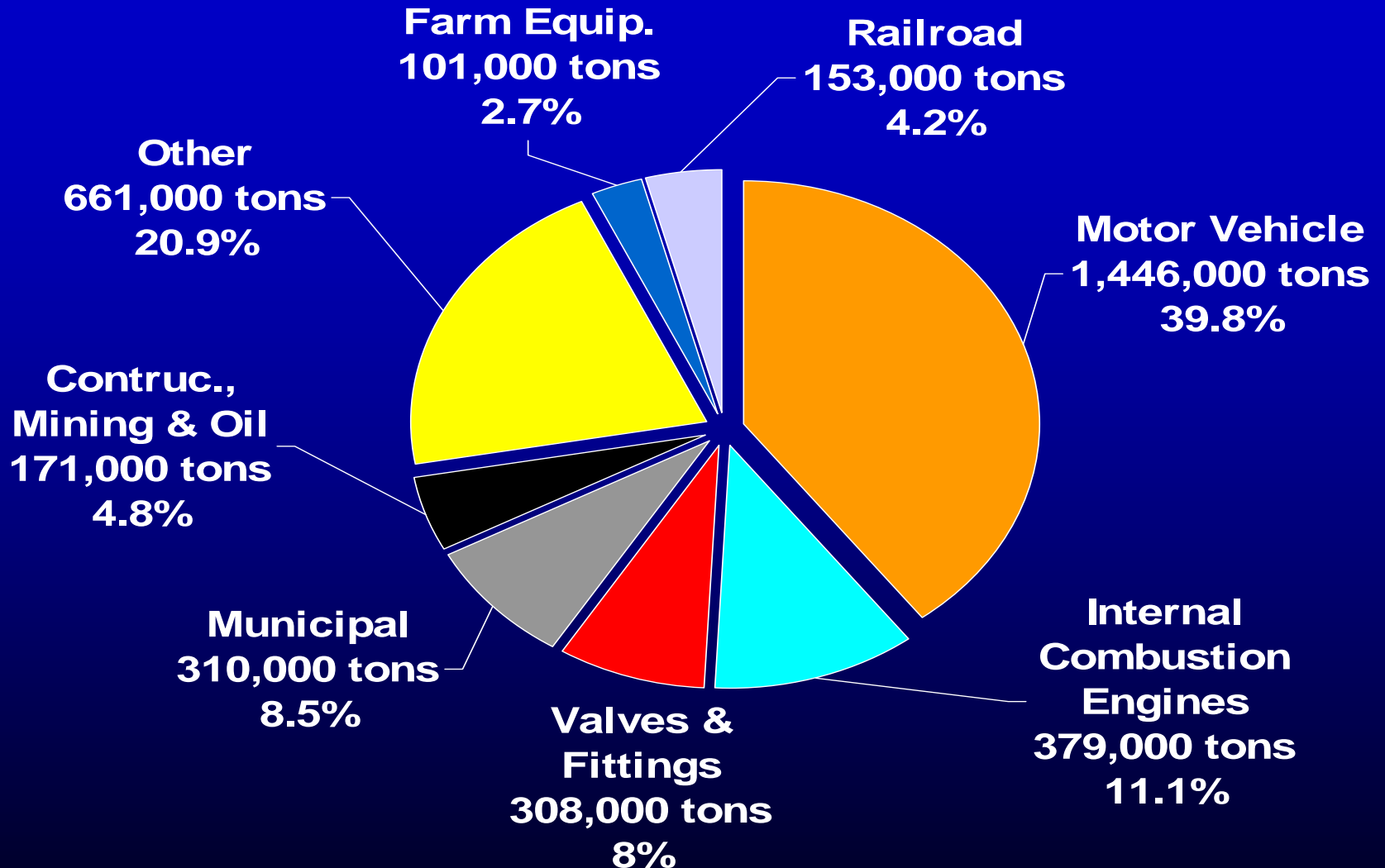




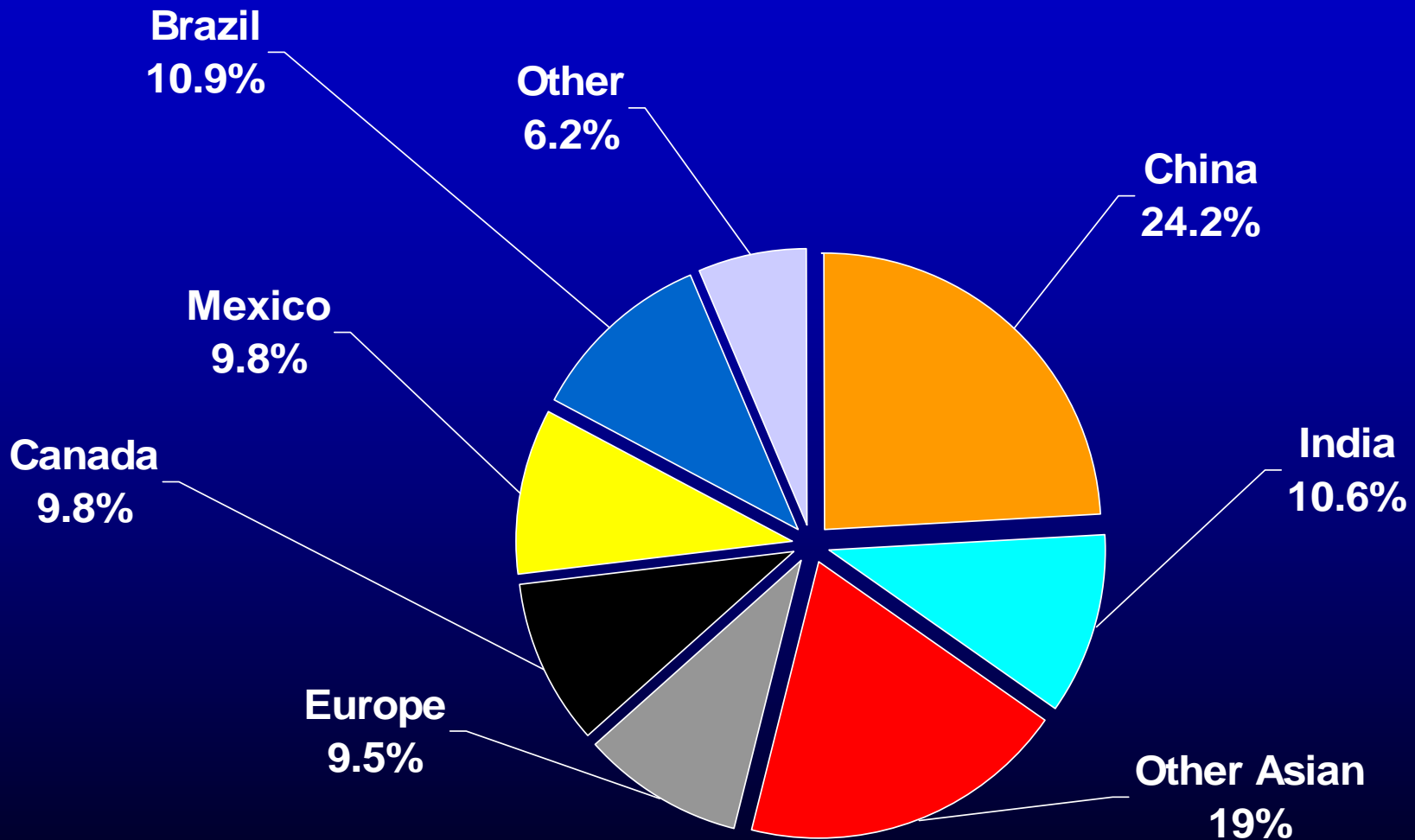
Imports 2008

**3+ million tons
of castings
23% of demand
(from 7% in 1998)**

Imports to U.S. By Market: 2008



Imports to U.S. By Country: 2008



Global Production

(in 000s metric tons)

	2004	2005	2006
Gray Iron	40,435	40,788	42,539
Ductile Iron	18,706	19,591	21,685
Mall. Iron	1,122	1,233	1,150
Steel	6,594	9,002	9,938
Cu-base	1,239	1,511	1,485
Aluminum	10,357	11,718	12,278
Mag	134	239	1,256
Zinc	907	936	941
TOTAL	79,745	85,741	91,368

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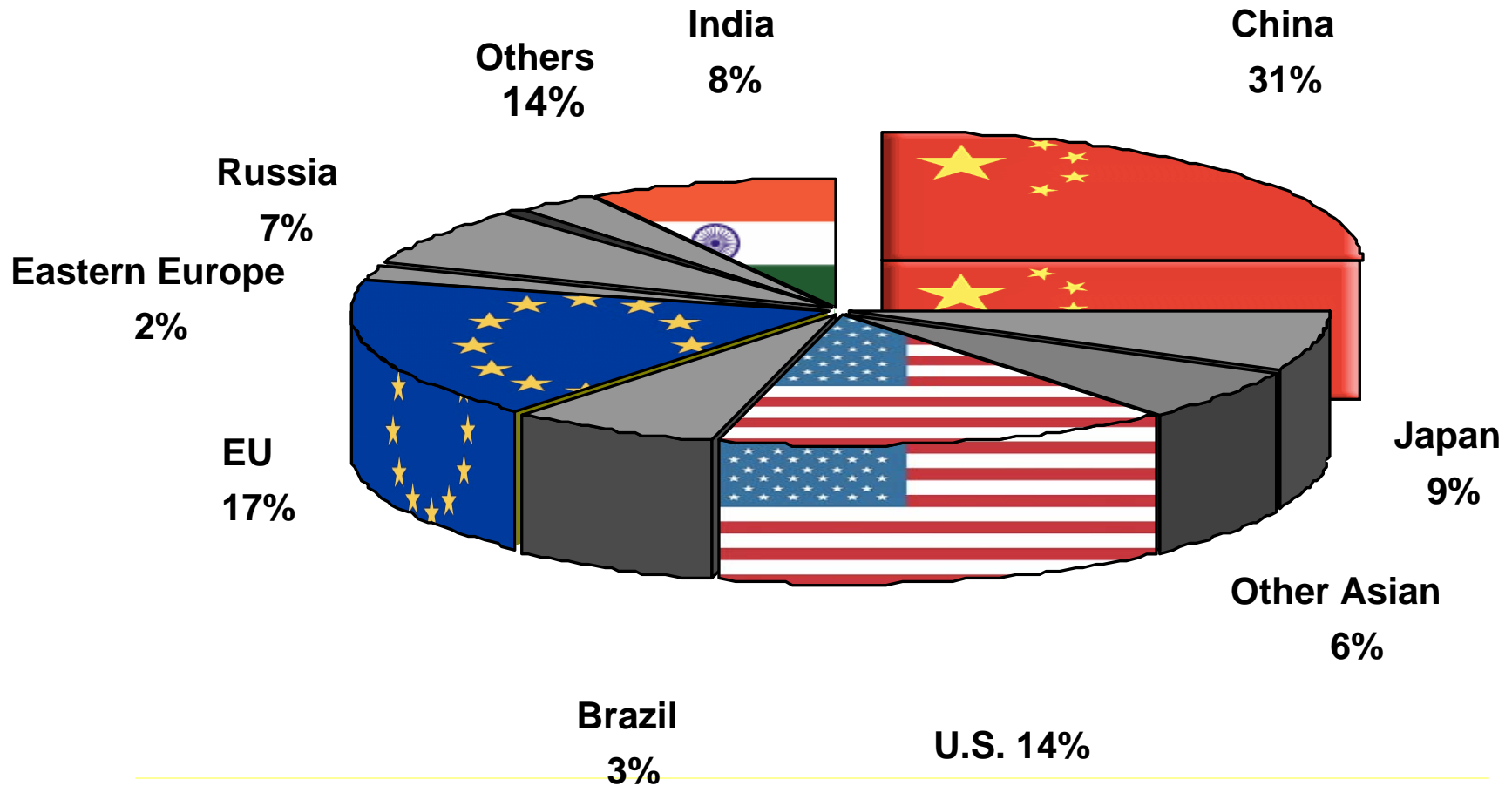
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Global Production

2006 (metric tons)

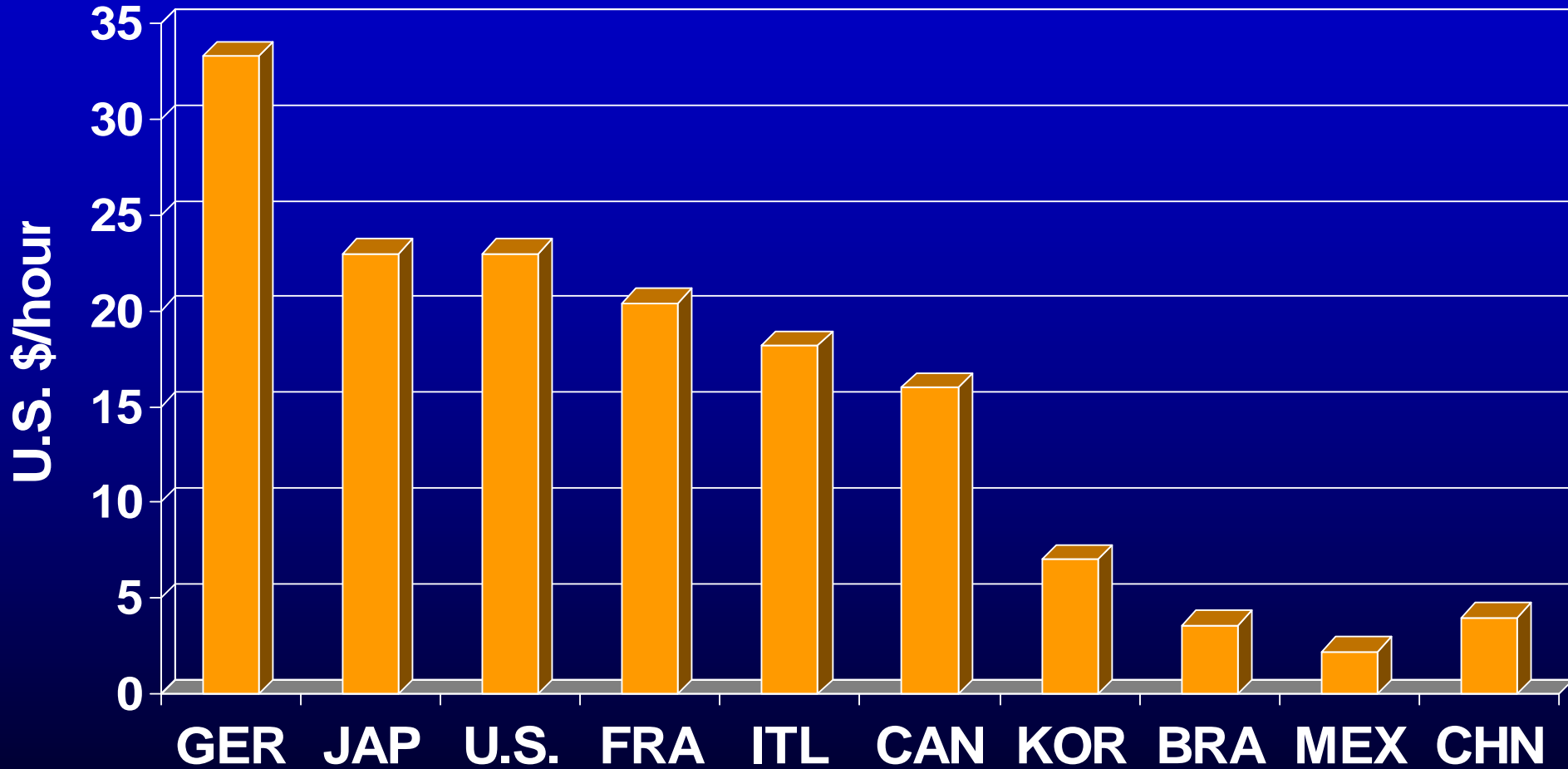
1. **China: 28.1 million—26,000 plants**
2. **U.S.: 12.5 million—2190 plants**
3. **Japan: 7.9 million—1701 plants**
4. **India: 7.2 million—4750 plants**
5. **Russia: 6.9 million—1900 plants**
6. **Germany: 5.5 million—619 plants**
7. **Brazil: 3.1 million—1372 plants**
8. **Italy: 2.6 million—1171 plants**
9. **France: 2.4 million—469 plants**
10. **Korea: 1.9 million—851 plants**

The Global Pie



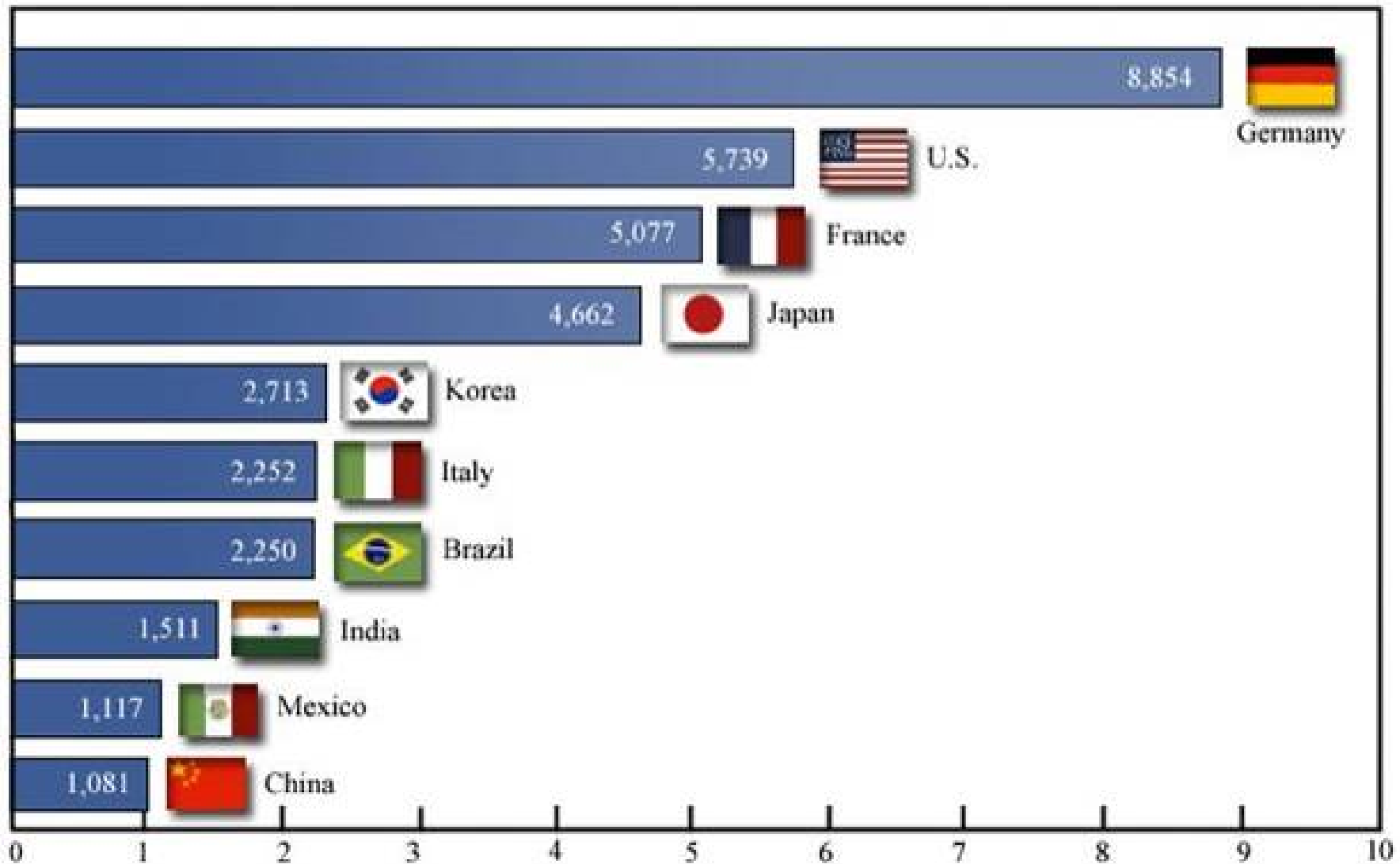
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Comparison of Casting Labor/Benefit Rates 2008



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Global Production Per Plant





Metalcasting Around the Globe

**EUROPE
ASIA
ROW
LATIN AMERICA**

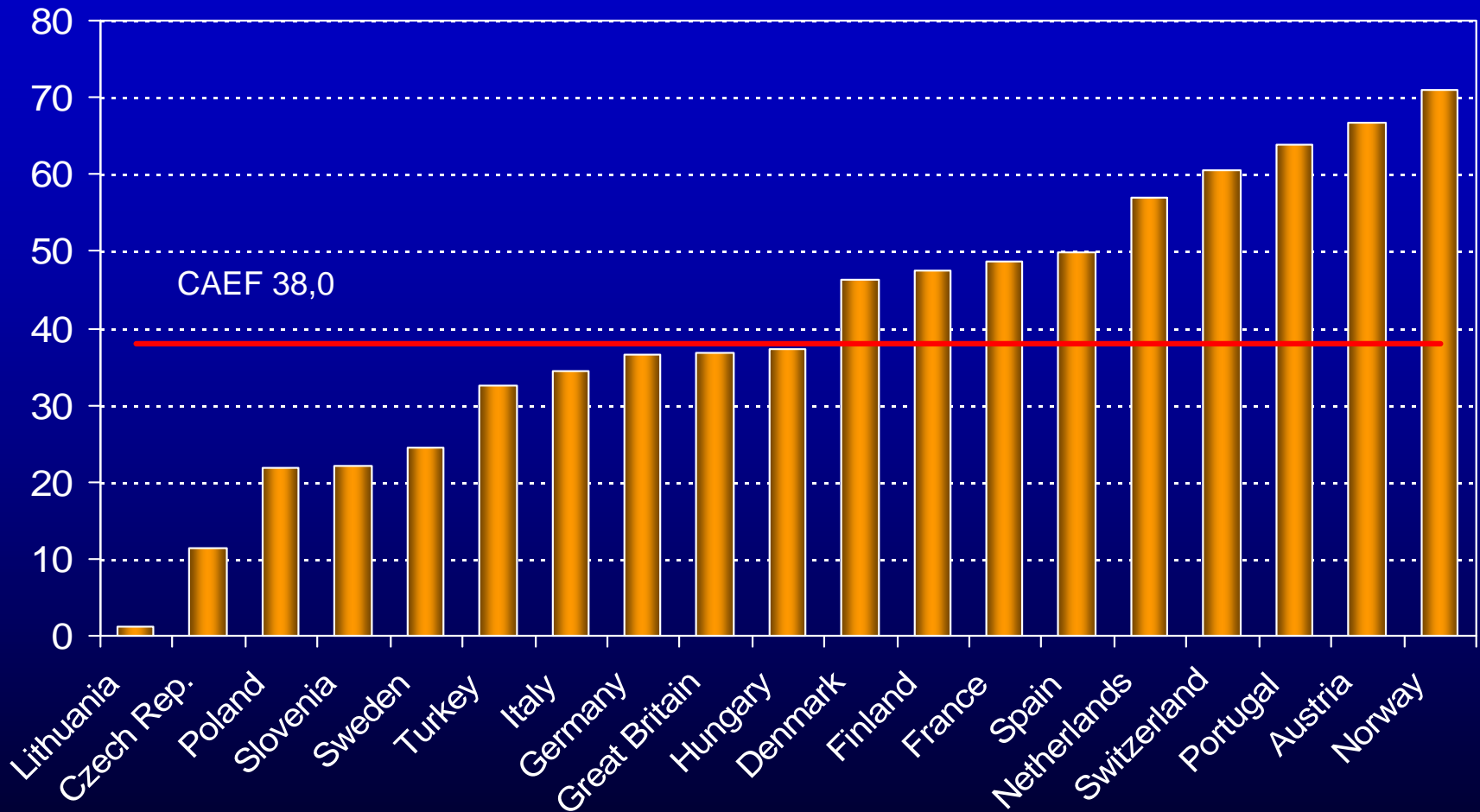
Germany



- Capacity Utilization: 92% for ductile iron, 83% for gray iron, 90% for aluminum; Maybe Higher, very mature
- 2007: 1.5 million tons ductile, 2.4 million gray, 730,000 aluminum
- Highest productivity per plant by 30%
- Forecast to 2017: Total same, growth in DI and alum, loss in gray



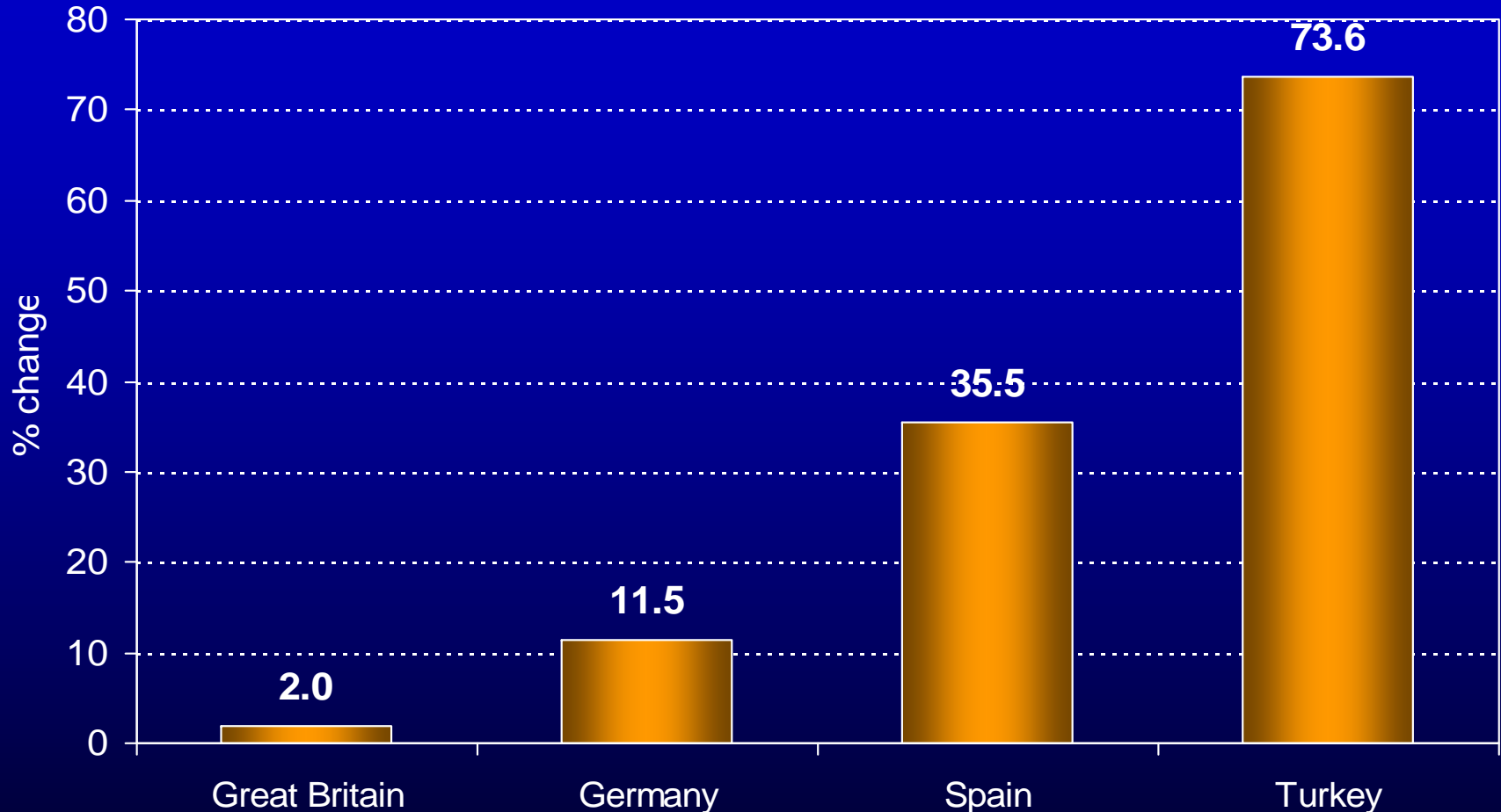
Ductile Iron Castings Share of Production Total



Source: CAEF, * = 2004

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Production of Ductile Castings in the European Foundry Industry



Source: CAEF

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Turkey

- 1262 Plants (7th most in world), 1.2 million tons production (13th in the world)
- Capacity Utilization: 83% for ductile, 77% for gray iron, 78% for aluminum
- Doktas Group: Now Part of Componenta (second largest Europe Group)
- One of the youngest workforces in the world





Russia



- Produced 26 million tons in 1991 as Soviet Union; 7 million tons in 2007 just as Russia
 - 3.8 million gray
 - 850,000 ductile
 - 1.1 million aluminum
- Suppliers love the possibilities
- Forecast to 2017: growth to 8+ million tons (more than 1% per year)





JFSinc

(Japan Foundry Society, Inc.)

Japan



- **Mature market—in 2007, 7 million tons**
 - 2.86 million gray
 - **2.1 million ductile**
 - 1.56 million aluminum
 - Forecast 0.5% long-term growth, aluminum 1.2%
- **Forecast 0.5% long-term growth, aluminum 1.2%**

SWOT

- **S-HIGH QUALITY
AUTOMOTIVE/GREAT WORK
ETHICS**
- **W-HIGH LABOR COSTS/SCARCE
AREA**
- **O-OUTSOURCING FROM
CHINA/TAIWAN/S.KOREA**
- **T-LOW COST ASIAN EMERGING
LIKE INDO CHINA/RAW MATERIAL
SQUEEZE**

China

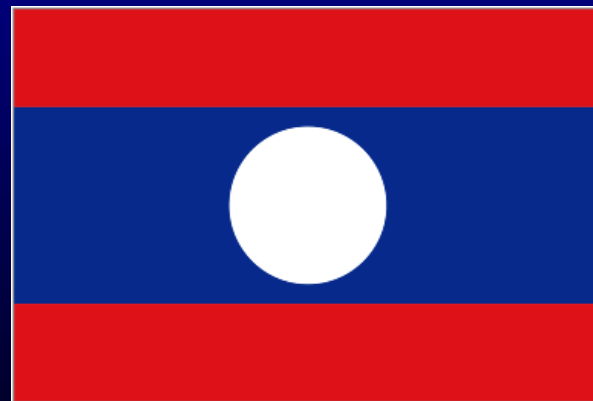
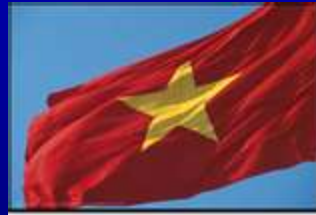
- 26,000 plants
(50% are state-owned)
- 29.7 million tons in 2007
- 14.3 million tons gray,
7.2 million ductile,
3.8 million steel,
2.5 million aluminum
- 20+% growth from 2005-07
- Export 3.5 million tons in 2007
- Forecast to 2017: 33 million
tons production (growth of
1%/yr)



SWOT OF DEVELOPED ASIA

- S-LOW LABOR COSTS/HIGH PRODUCTIVITY
- W-CONSISTENCY OF QUALITY
- O-LOW COST NEIGHBORS
- T-RISING LABOR COSTS/TRAINING COSTS/CAPTIVE DEMAND/BOYCOTT

VIETNAM-INDOCHINA-THAILAND



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SWOT OF EMERGING ASIA(INDOCHINA)/EUROPE(BALKANS/STAN S)/LATIN AMERICA(COLOMBIA/CHILE)

- **S-VERY LOW COSTS**
- **W-AVAILABILITY OF
INFRASTRUCTURE/RM'S/SKILLED
LABOR**
- **O-NICHE 'COMMODITY' CASTINGS
MARKET/SPECIALTY CASTINGS**
- **T-LABOR UNREST,JIT,CASH
FLOW,INTELLECTUAL PROPERTY**



CHALLENGES



AND OPPORTUNITIES



Photo/Video of Indian Metalcasting



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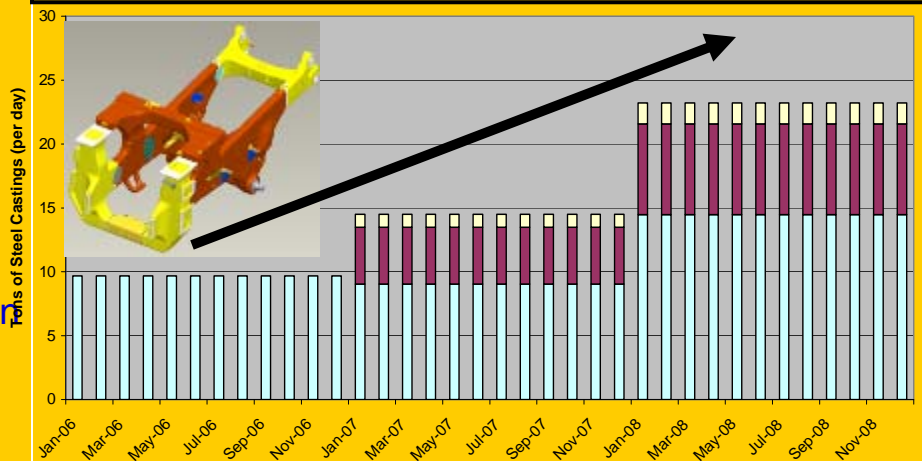
Impressive Numbers

- 350k hrs. to design & test.
- 47' long, 30' wide, 23' tall
- 500 lbs. weld wire = 2.5 miles
- 125 gallons of paint
- 3,550 Hp engine
- 1,800 gallons diesel fuel
- 13'x5', 11,700 lbs. tires
- 380T payload
- Tot Opr. Weight = 1.4M lbs.
- Over 300 switches/sensors
- 12 onboard computers
- 6.2M lines of s/w code (about = Space Shuttle)
- \$3.5M suggested retail
- 12 truck trailers to transport

World's largest concentration
Of 797's (~100 trucks) in
Alberta, Canada Oil Sands



Demand continues to increase on 797's



Each 797 Takes:

Steel Castings
+ Iron Castings
~ 75T Per Machine

2,000 Ton /yr.
to over
9,000 Ton /yr.

ARE YOU READY FOR THE INFLUX & EXPLOSION OF DEMAND IN CHINA?



CAN OUR LEAD TIMES BE IN
SINGLE DIGITS?





Metalcasting in Latin America

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Ductile Iron in Latin America

Patricio Gil
Blackhawk de México

Latin America



33 countries

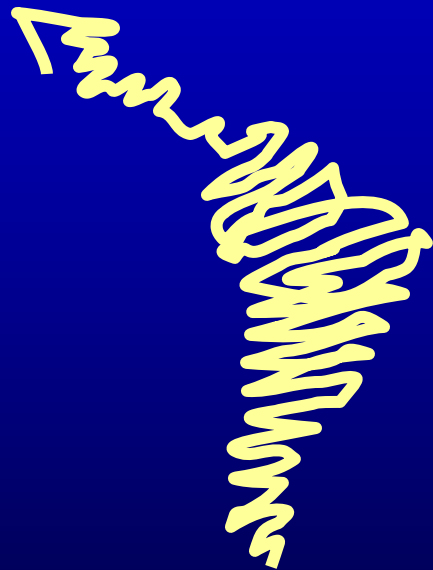
540 million people

Contribution to America

- **50% of territory**
- **63% of population**
- **28% of economy**

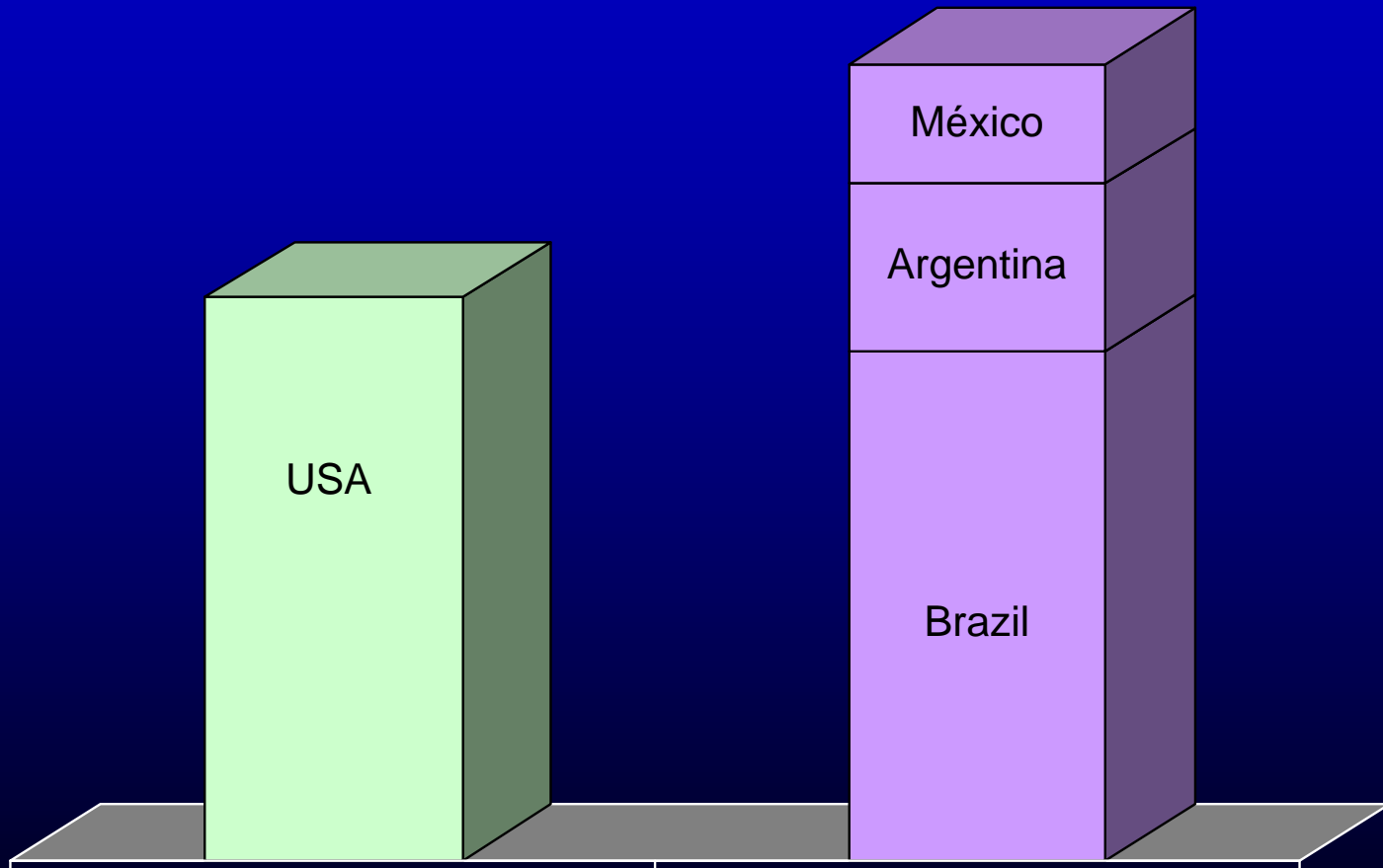
(PPP: Purchasing Power Parity)

Latin America



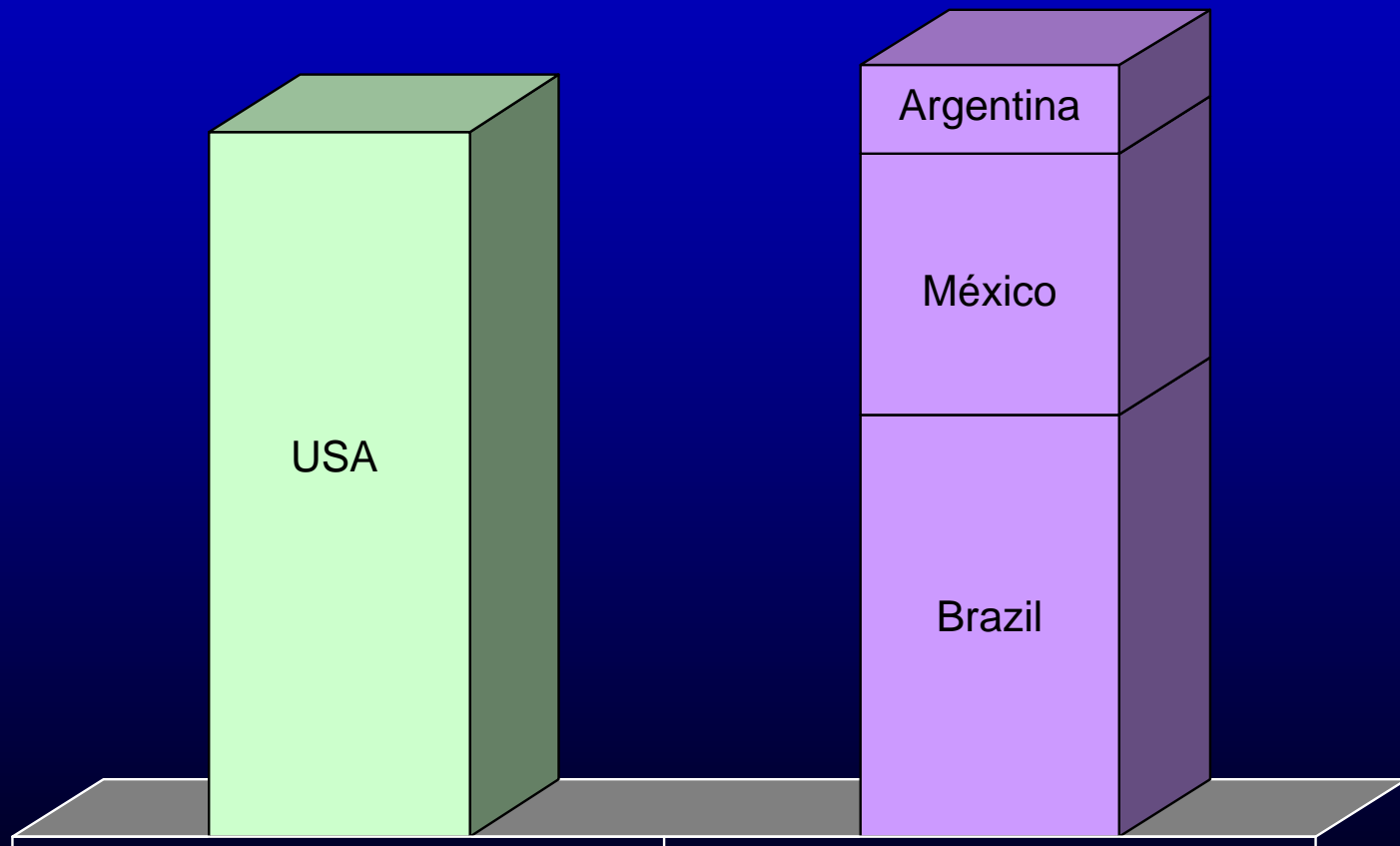
	People	GDP
Brazil	32%	35%
México	20%	22%
Argentina	7%	12%
	59%	69%
30 countries	41%	31%

Geographic Territory



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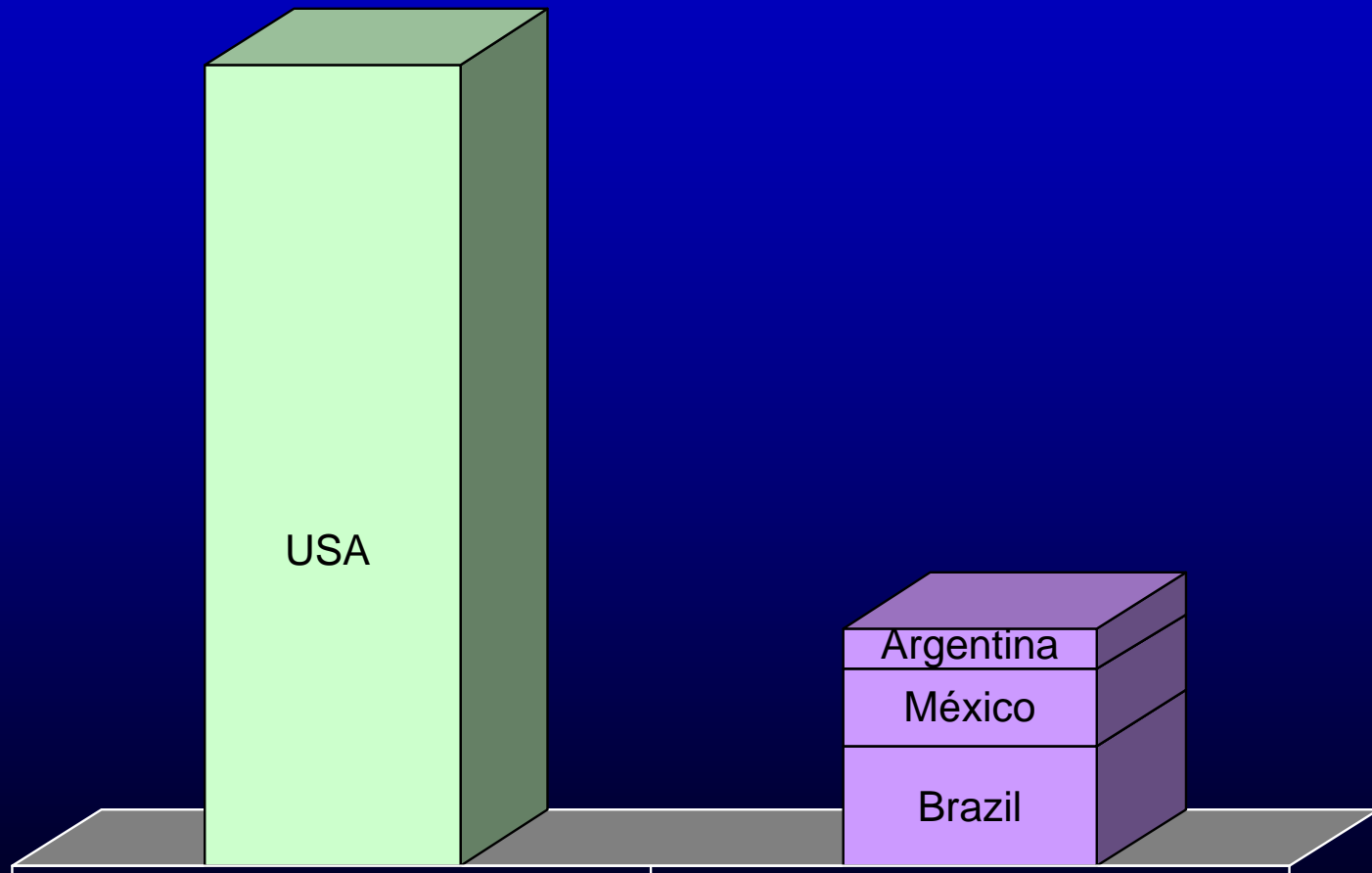
Population



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Economy

Purchasing Power Parity



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Currency Stability

Brazilian Real per US Dollar



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Currency Stability

Argentinean Peso per US Dollar

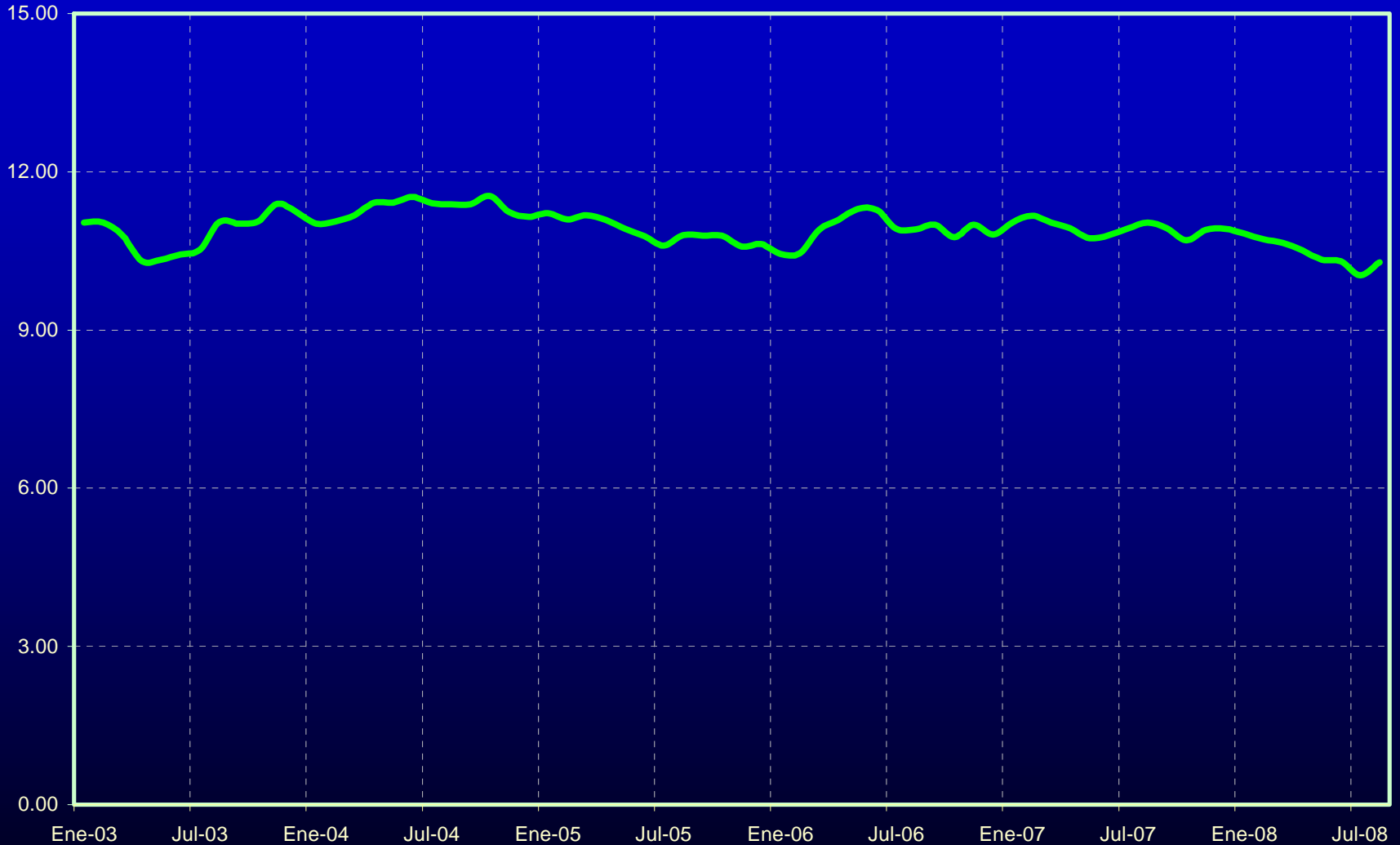


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Currency Stability

Mexican Peso per US Dollar



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World Casting Production Thousand Metric Tons



Argentina

Main Ductile Iron Foundries

		Capacity MT / Yr	Iron Grades
Spicer Ejes Pesados	Captive	30,000	GI & DI
Metalúrgica Tandil		10,000	GI & DI
Fundición San Cayetano		7,500	GI & DI
Dema		7,500	GI & DI
Fundición Santiago Martínez		6,500	GI & DI
Paraná Metal		6,000	GI & DI



Mexico

Main Ductile Iron Foundries

	Capacity MT / Yr	Iron Grades
Cifunsa	250,000	GI+ & DI
Novocast	70,000	DI
Tisamatic*	60,000	GI+ & DI
Blackhawk	25,000	GI & DI+
Teknik	9,000	DI
GM	Captive	GI & DI
VW	Captive	GI & DI
Nissan	Captive	GI & DI



TISAMATIC



Brazil

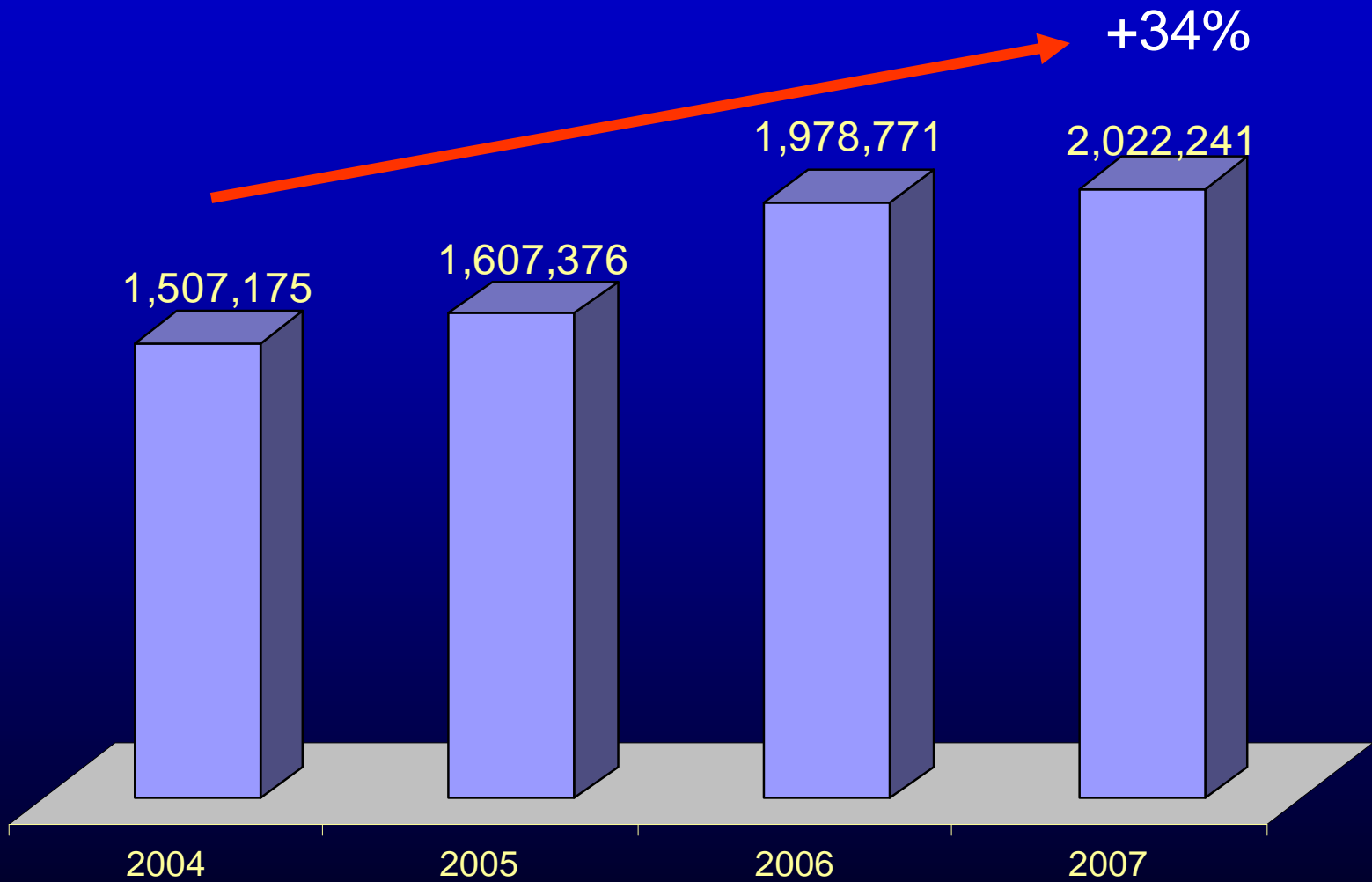
Main Ductile Iron Foundries

	Capacity MT / Yr	Iron Grades
Tupy S.A	500,000	GI+ & DI
Br Metals Fundições Ltda	120,000	GI & DI+
Durametal S.A	60,000	GI & DI
Tekfund Ind. E Com. Ltda	45,000	GI & DI
Inds. Romi S.A	40,000	GI & DI
Fagor Ederlan Brasileira Ltda	35,000	GI & DI
Dedini S.A. Industriais De Base	30,000	GI & DI
Fundimig Ltda	25,000	GI & DI
Fund. Sideral Ltda	25,000	GI & DI
Farina S.A Componentes Automotivos	25,000	GI & DI
Intercast S.A	25,000	GI & DI



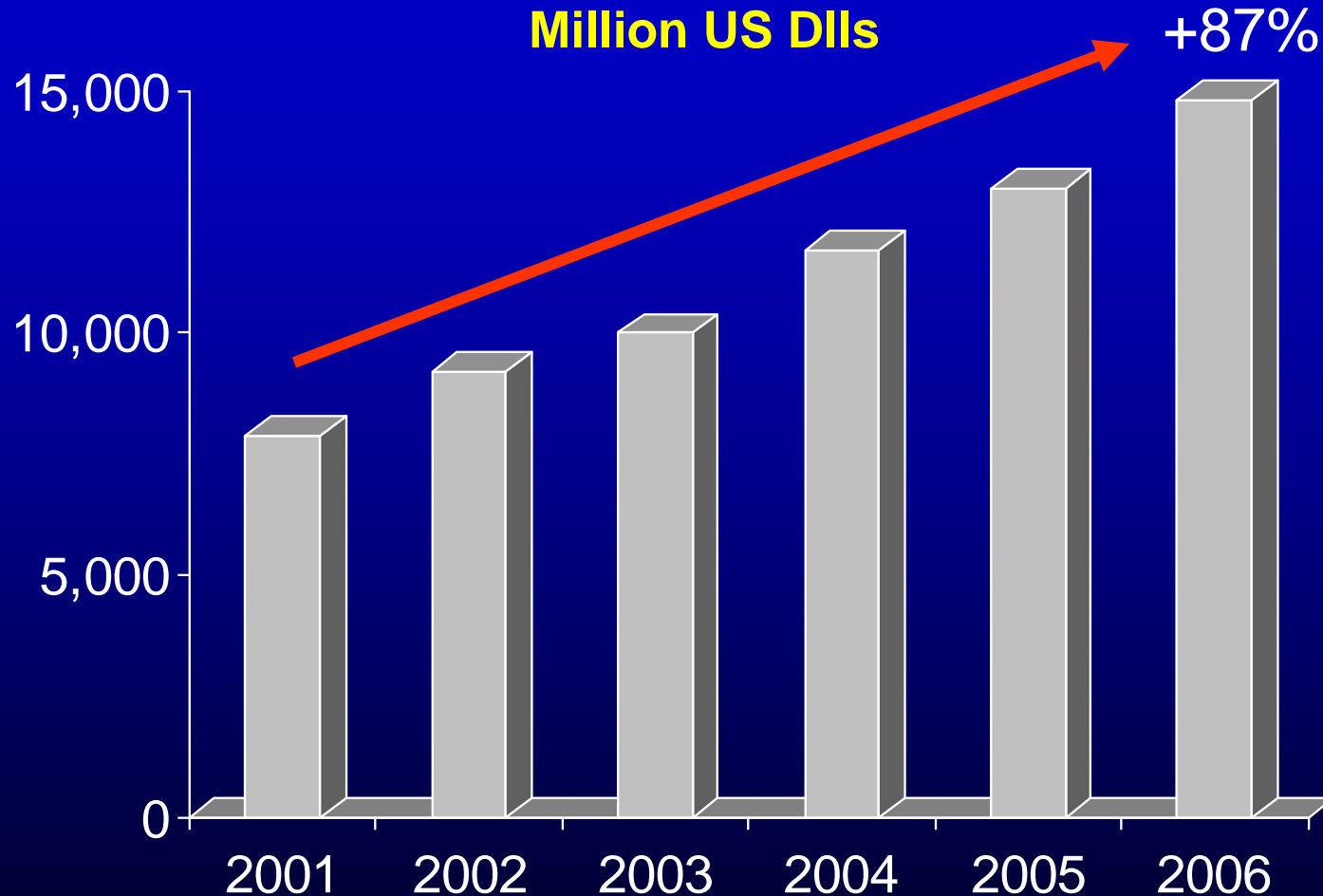
Vehicle Production in Mexico

Units



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Auto Parts Exported From Mexico to USA



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Mexican Economy

Exports

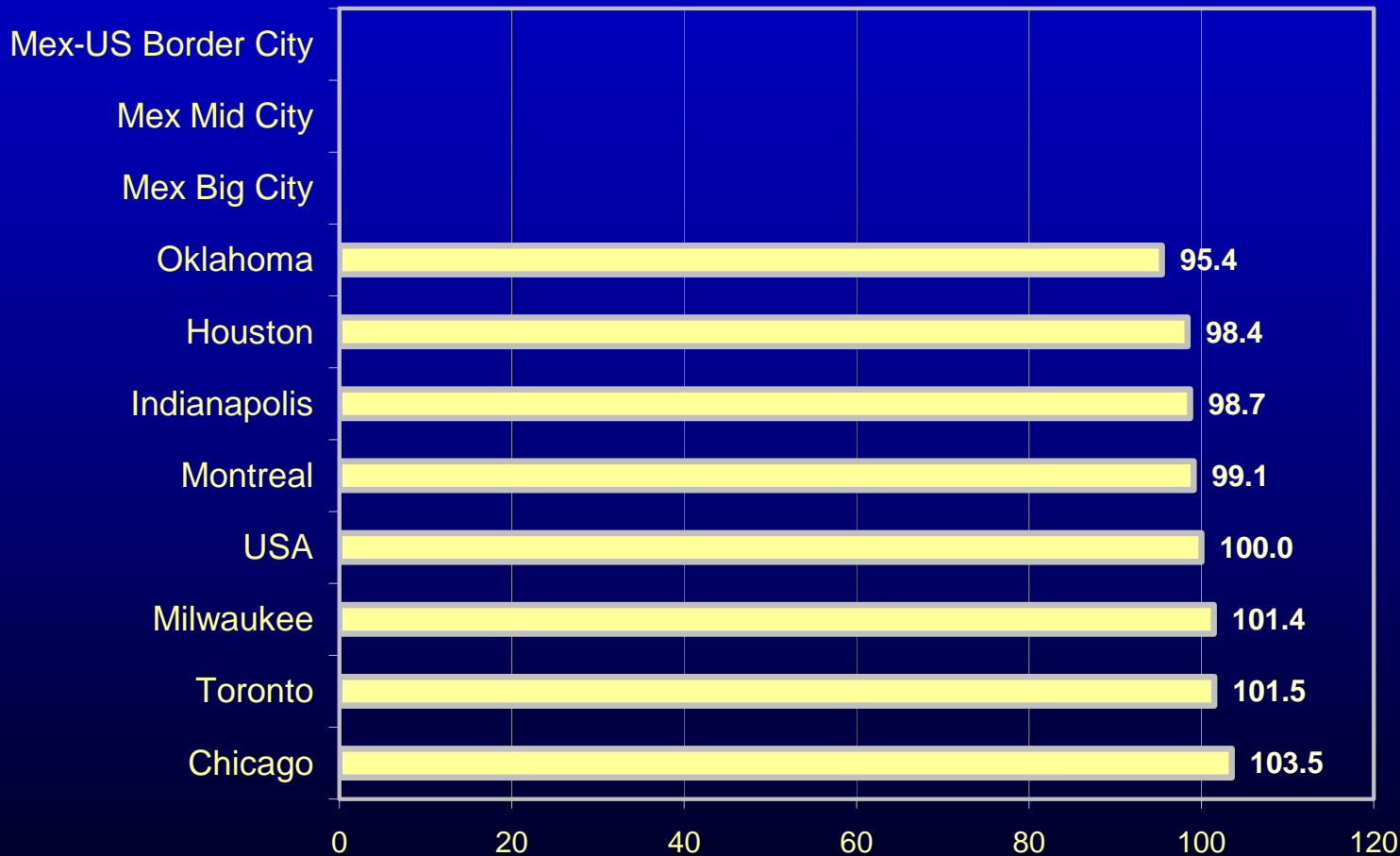


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Mexican Economy

Competitive Alternatives 2008: KPMG's Guide To International Business Location

Operating Cost

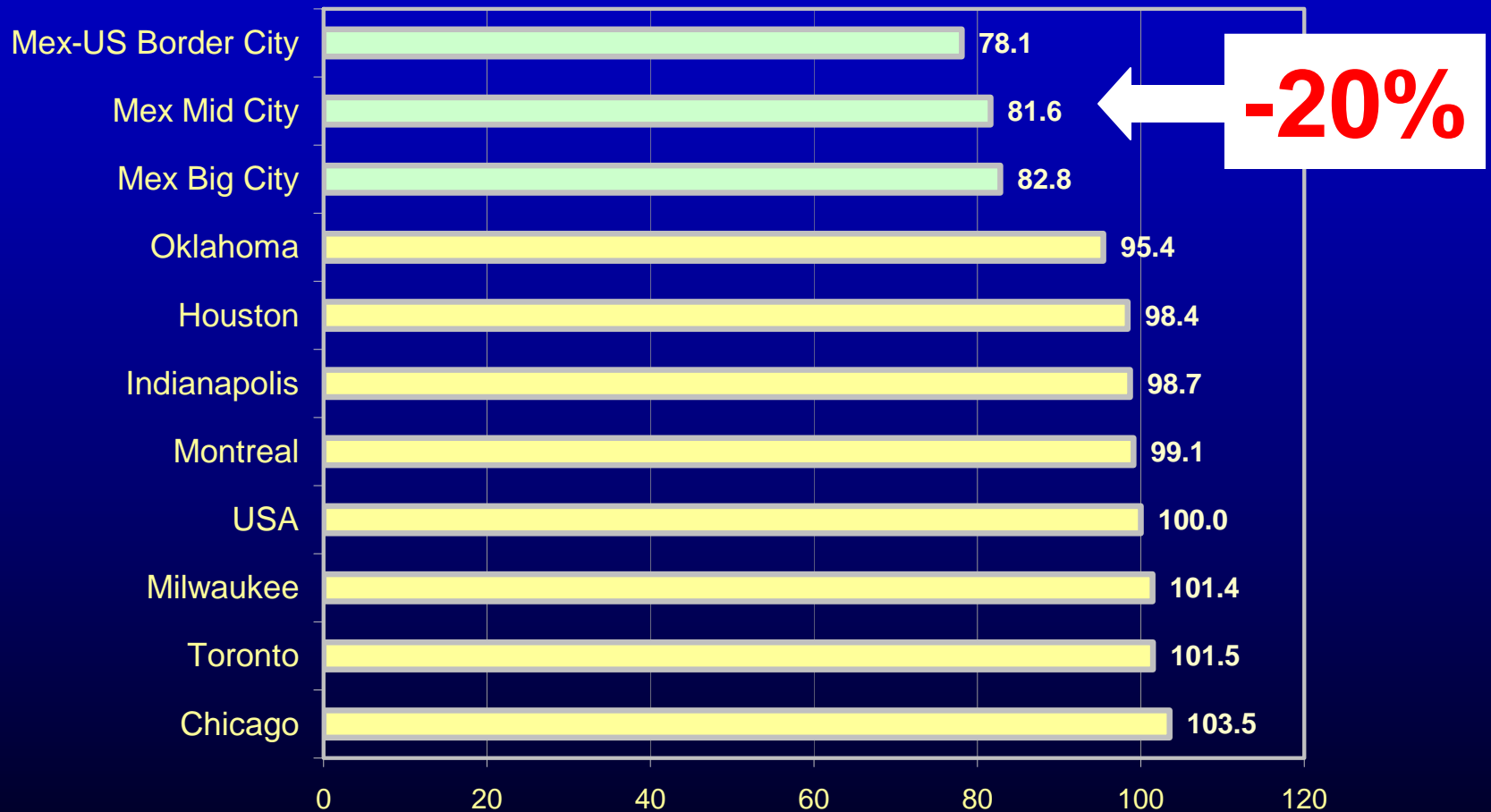


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Mexican Economy

Competitive Alternatives 2008: KPMG's Guide To International Business Location

Operating Cost



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Conclusions



**Mexico is a good
manufacturing option
for North America**

**Brazil is the best option for
South America with good
advantages for export to
Europe and NA.**

Gracias