Robert Eller Associates, Inc.

CONSULTANTS TO THE PLASTICS AND RUBBER INDUSTRIES

TPE MARKET SHIFT TO CHINA: PRELIMINARY FINDINGS REGARDING MARKET IMPLICATIONS, INDUSTRY STRUCTURE, SUPPLY CHAIN

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JAPAN TPE SEMINAR
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INTRODUCTION

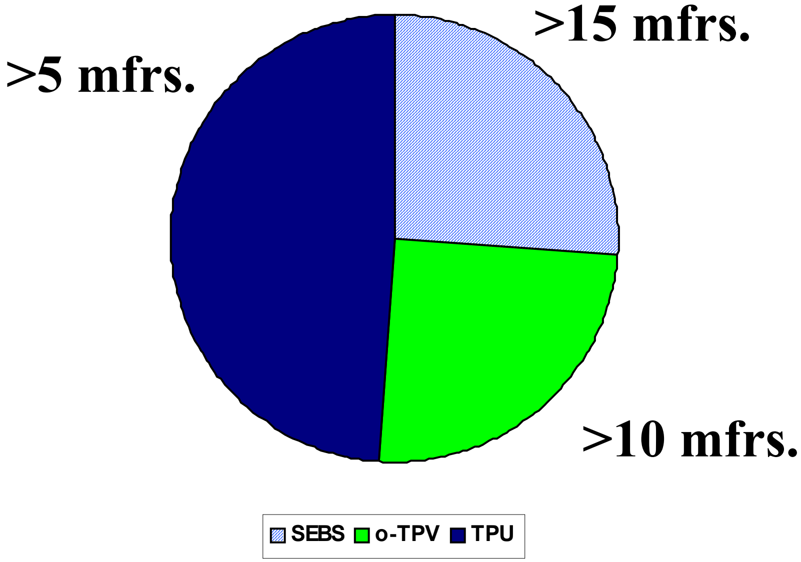
- **PRELIMINARY BRIEF GLIMPSE OF SOME OF THE ISSUES ANALYZED IN REA'S CHINA TPE MULTICLIENT STUDY THAT IS NEARING COMPLETION**
- **INDUSTRY STRUCTURE**
- **SBCs**
- **o-TPVs**
- **TPUs**
- **THE SHIFT WEST**
- **CHINA vs. INDIA**
- **CONCLUSIONS**

SOURCES

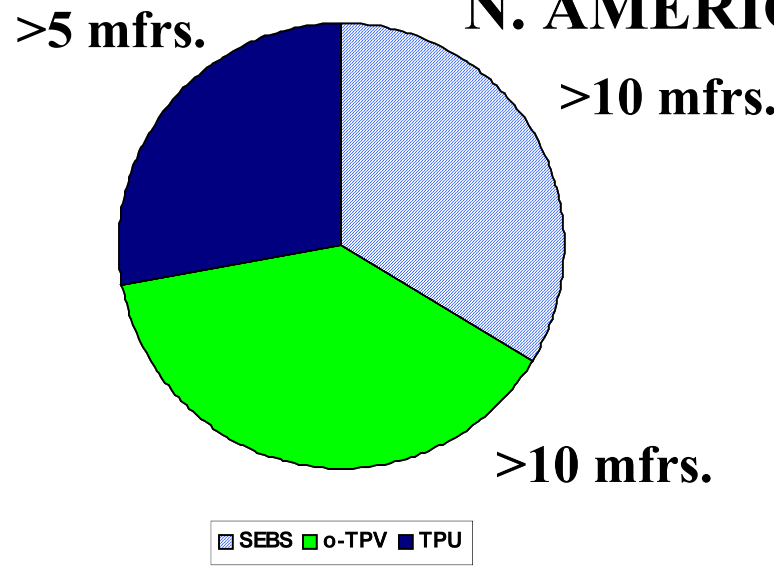
- **REA TPE MULTICLIENT STUDY, 2006**
- **REA TPE CHINA MULTICLIENT STUDY, 2006**
- **REA AUTOMOTIVE SOFT TRIM MULTICLIENT STUDY, 2003**
- **ROBERT ELLER & ROGER YOUNG, "OUTLOOK FOR TPEs IN ASIA," 2ND ASIA/CHINA SPECIALTY ELASTOMERS MARKETS CONFERENCE (SHANGHAI), OCTOBER 20, 2005**

COMPARATIVE INDUSTRY STRUCTURE

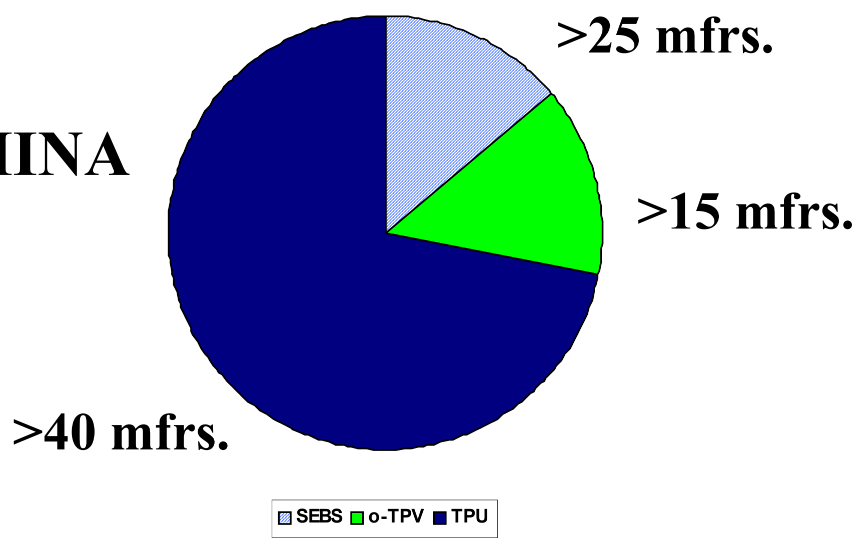
EUROPE



N. AMERICA

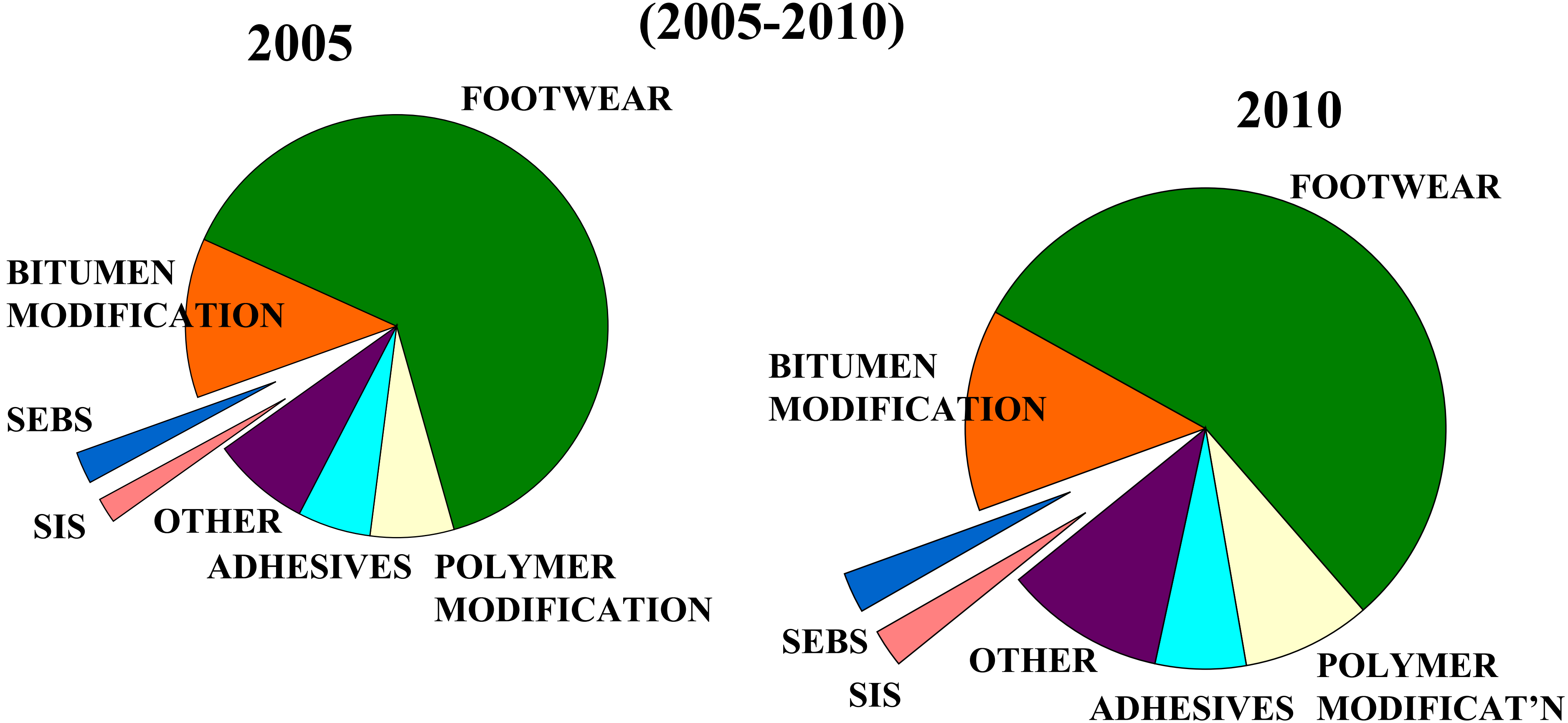


CHINA



CHINA MARKET WITH MANY PRODUCERS? CONSOLIDATION OPPORTUNITY?

SBCs IN CHINA
(2005-2010)



	2005	2010
DOMESTIC SUPPLY	270 kT	680 kT
IMPORTS	215 kT	120 kT
EXPORTS	(-5 kT)	(-60 kT)
DEMAND (TOTAL)	**490 kT**	**740 kT**

SBCs

- **SHIFT FROM AN EXPORT MKT. TO DOMESTIC PROD'N**
  - NEW CAPACITY FROM WESTERNERS
    - LCY (HUIZHOU)- +100 kT
    - KRATON (HUIZHOU/NANTONG?)- +100 kT
    - SPECULATIVE: TSRC (NANTONG?)- +100 kT
- **DRIVING FOR SBS**
  - ONLY SINOPEC BALING & THE WESTERN MANUF'RS (KRATON, TSRC & KURARAY) HAVE HYDROGENATION CAPABILITIES
- **ROLE OF WIDE SPEC**
  - BOTH KRATON & TSRC HAVE USED CHINESE DOMESTIC MARKET FOR WIDE SPEC PLACEMENT
  - STARTUP OF SINOPEC BALING
    - DOMESTICALLY
    - GLOBALLY?
- **NON-DOMESTIC MAT'LS PREFERRED BY DOMESTIC CMPDERS FOR PRODUCING QUALITY PRODUCTS**

TPVs

- **EXXONMOBIL (SSP) DOMINATES (50% MKT. SHARE)**
- **SK, SOLVAY ENG. PRODUCTS, NANTEX (TAIWAN) OTHER WESTERN COMPOUNDERS PLAYING SIGNIFICANT ROLE**
- **NJOP & SHANGDONG DAWN ARE THE TWO SIGNIFICANT DOMESTIC PLAYERS**
- **JAPANESE SUPPLIERS (MITSUI & SUMITOMO) FOCUSED PRIMARILY ON JAPANESE AUTOMAKERS**
  - **MITSUI PURSUING DOMESTIC BUSINESS**
- **MANY p-TPVs (NOT FULLY VULCANIZED) PRODUCED BY DOMESTIC COMPOUNDERS**

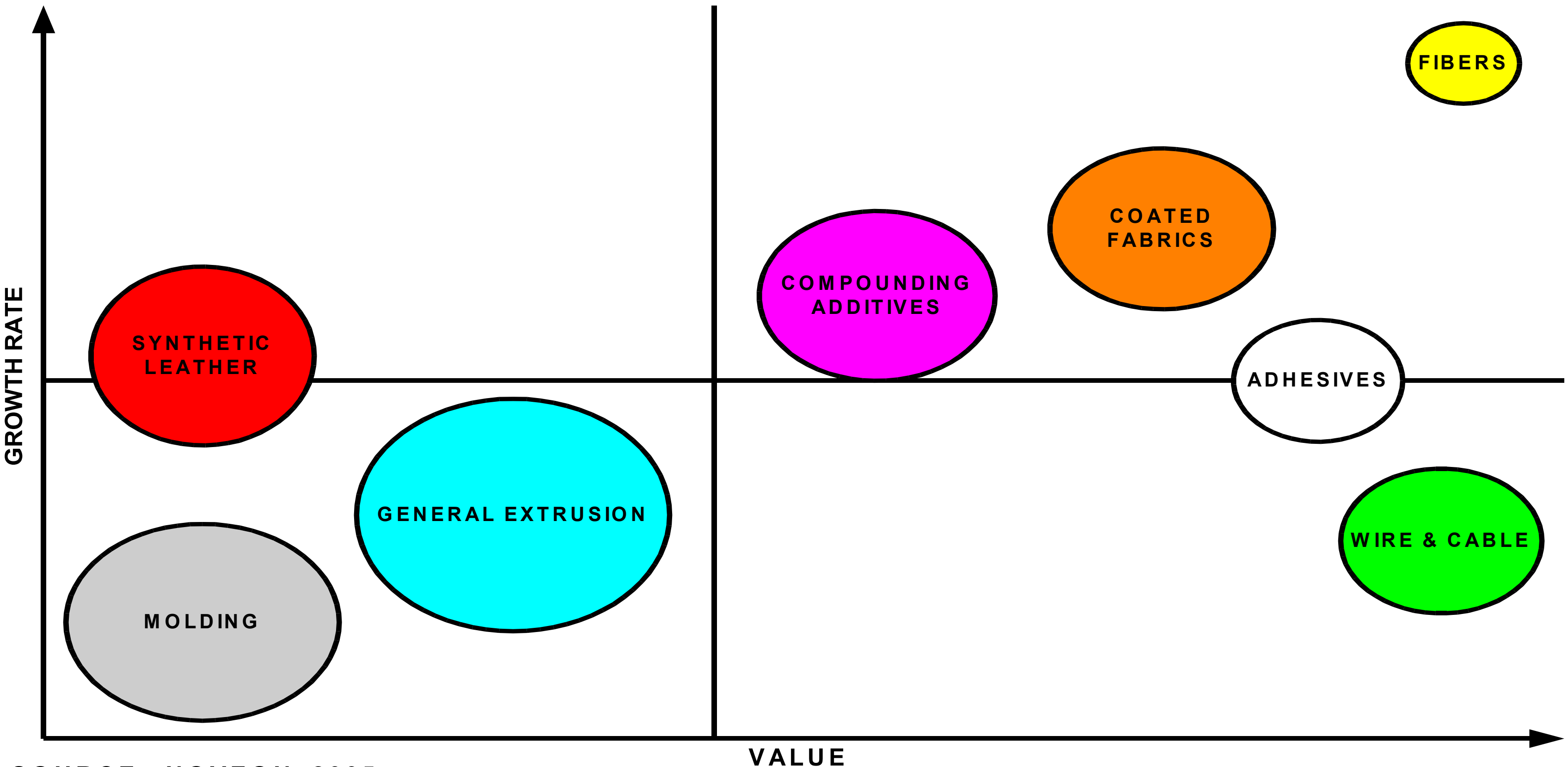
TPUs

- FOOTWEAR DRIVING FORCE
- SPORTS/LEISURE SEGMENT & MULTIMATERIAL APPLICATIONS GROWING
- WESTERN COMPANIES EMPHASIZE MOVING UP THE VALUE CHAIN
- MANY COMPOUNDERS (CONSOLIDATION LIKELY?)

BUILDING VALUE WITH TPU

COMPANY	% MKT. SHR. BASED ON VOLUME	% MKT. SHR. BASED ON VALUE
NOVEON	15%	20%
BAYER	14%	16%
BASF	18%	19%
DOW	9%	9%
HUNTSMAN	7%	8%
MERQUINSA	5%	4%
COIM	3%	5%
OTHERS	30%	2%

TURNING UNIQUENESS INTO VALUE

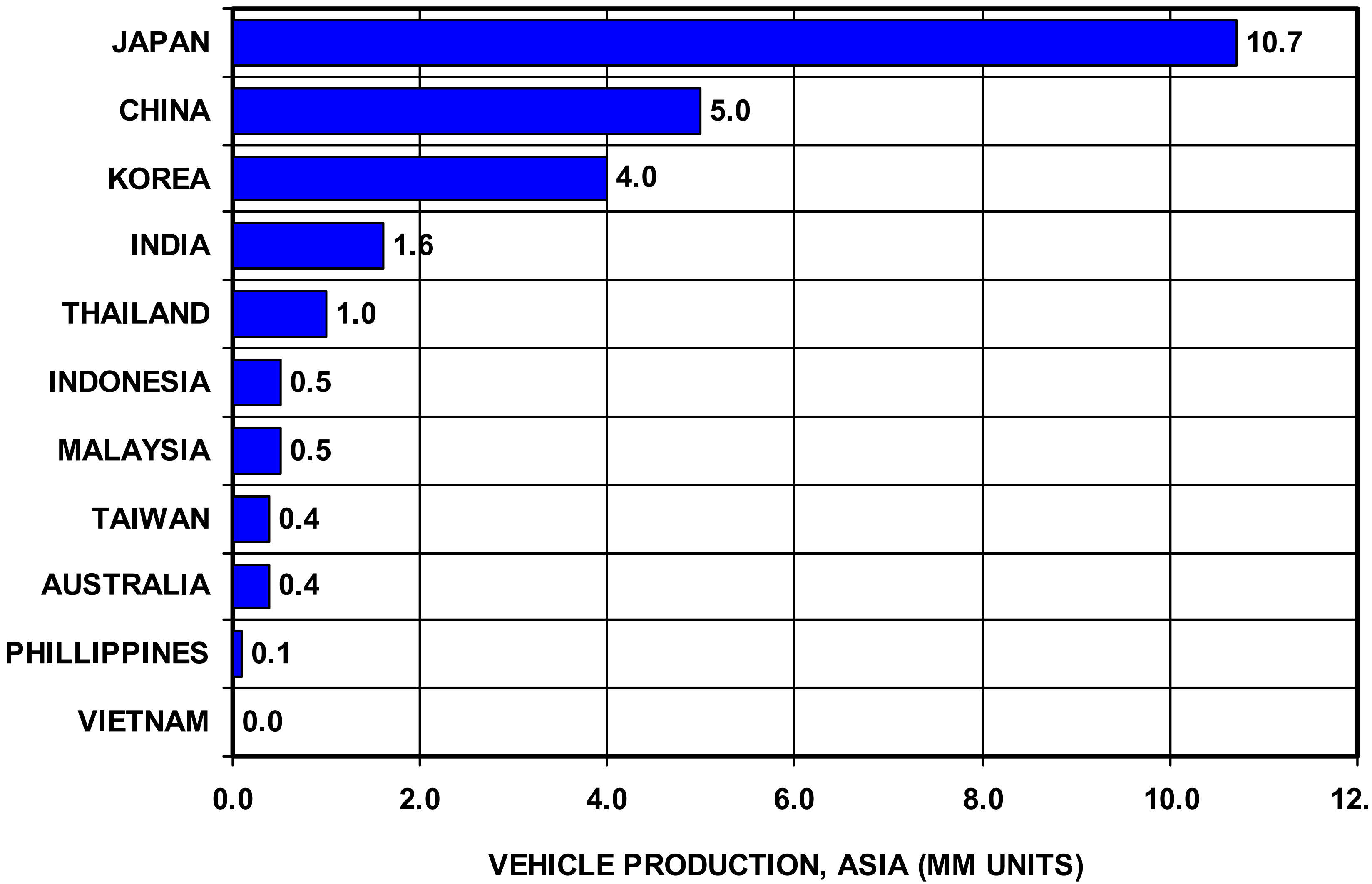


SOURCE: NOVEON, 2005

TPU MANUFACTURER'S TECHNICAL CAPABILITIES (# SUPPLIERS/TOTAL)

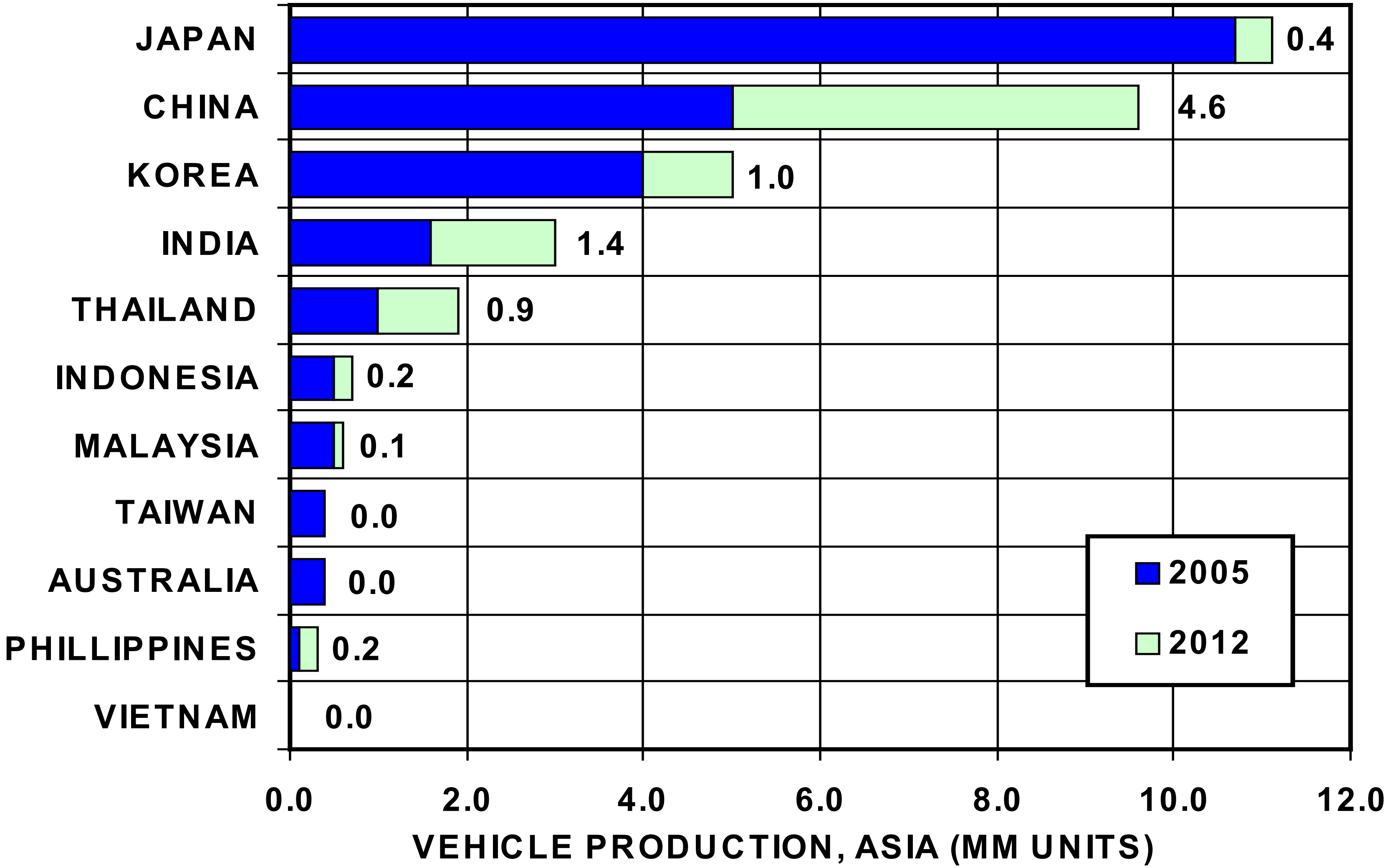
- FIBERS 2/35
- CALENDARING 2/35
- BLOWN FILM 4/35
- WIRE & CABLE 7/35
- FLAT SHEET 13/35
- TUBING 20/35
- SPORT SHOES 20/35
- INJECTION MOLDING 35/35

VEHICLE PRODUCTION IN ASIA: 2005



SOURCE: CSM, ROBERT ELLER ASSOCIATES, INC., 2006

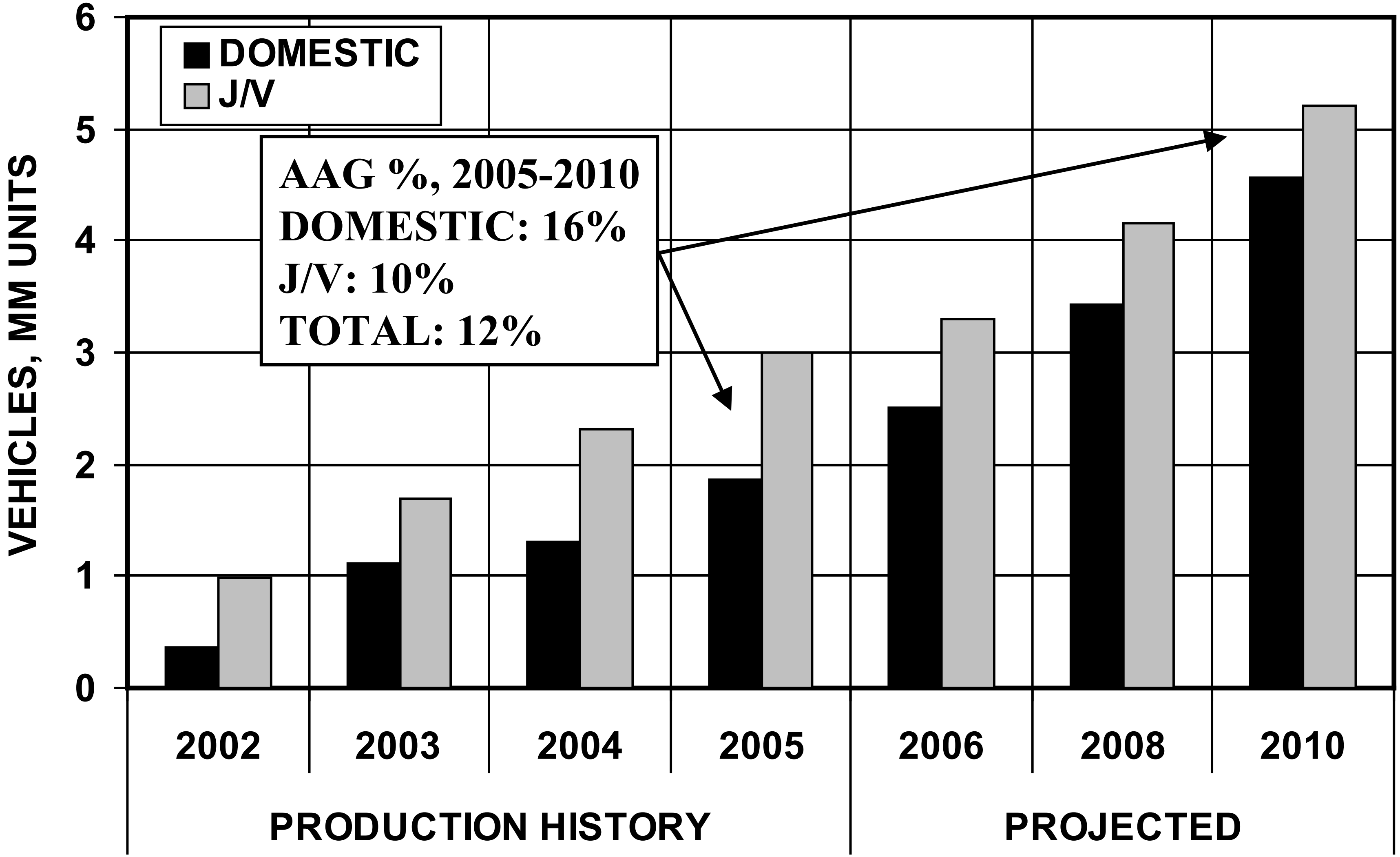
PROJECTED AUTOMOBILE PRODUCTION IN ASIA: 2005-2012



7 MM NEW VEHICLES ARE EXPECTED TO COME FROM CHINA, INDIA, AND THAILAND BY 2012.

SOURCE: CSM, ROBERT ELLER ASSOCIATES,INC., 2006

PROJECTED CHINESE AUTOMOTIVE PRODUCTION: 2002-2010

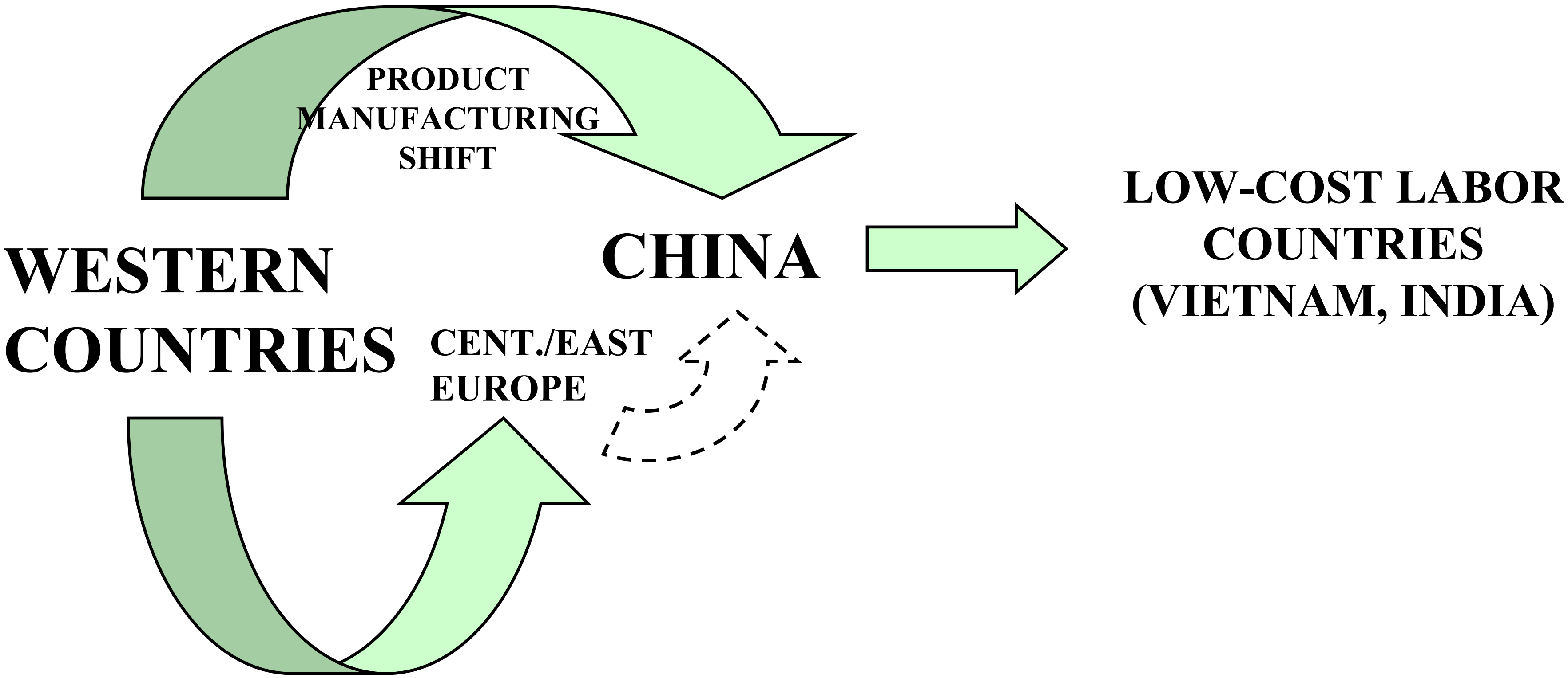


SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006

CHINESE AUTO INDUSTRY

- CURRENTLY 46 OEMs (WILL CONSOLIDATE)
- 2000^{+} DOMESTIC PARTS SUPPLIERS
- PRODUCTION GROWTH
  - ’04 – 3.6 MM VEHICLES
  - ’10 – 9.0? MM VEHICLES (COULD BE HIGHER)
- CURRENTLY 65% JV/35% DOMESTIC OEMs
- JV/DOMESTIC RATIO SHIFTING
- DOMESTIC DEMAND WILL DOMINATE vs. EXPORTS
- SHIFT TO SMALL, LOW COST VEHICLES

MANUFACTURING DYNAMICS: THE SHIFT TO LOWER-COST LABOR

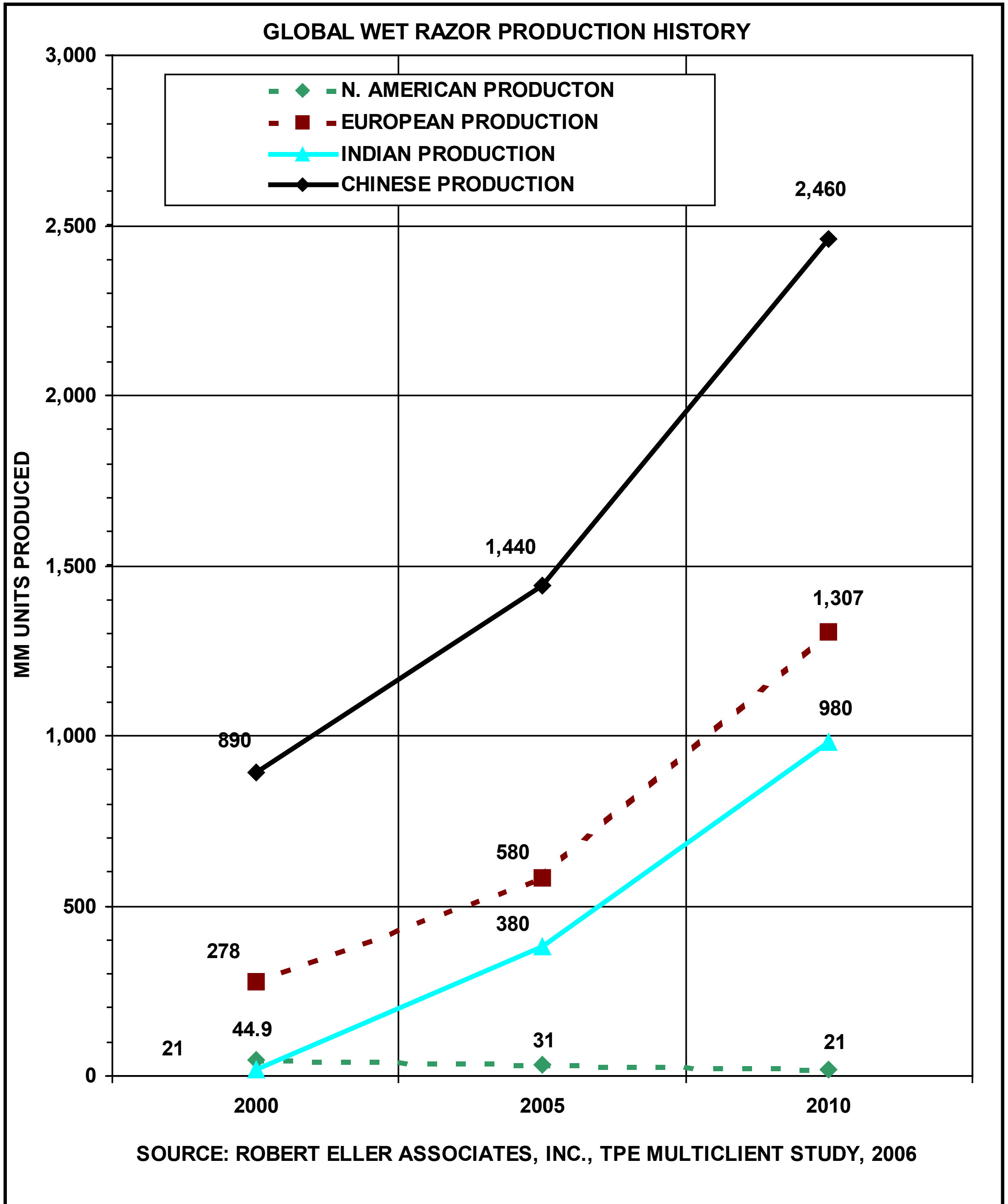


CHINA vs. EAST EUROPE: MORE TECHNICAL APPLICATIONS IN E. EUROPE

- BETTER TOOLING BASE

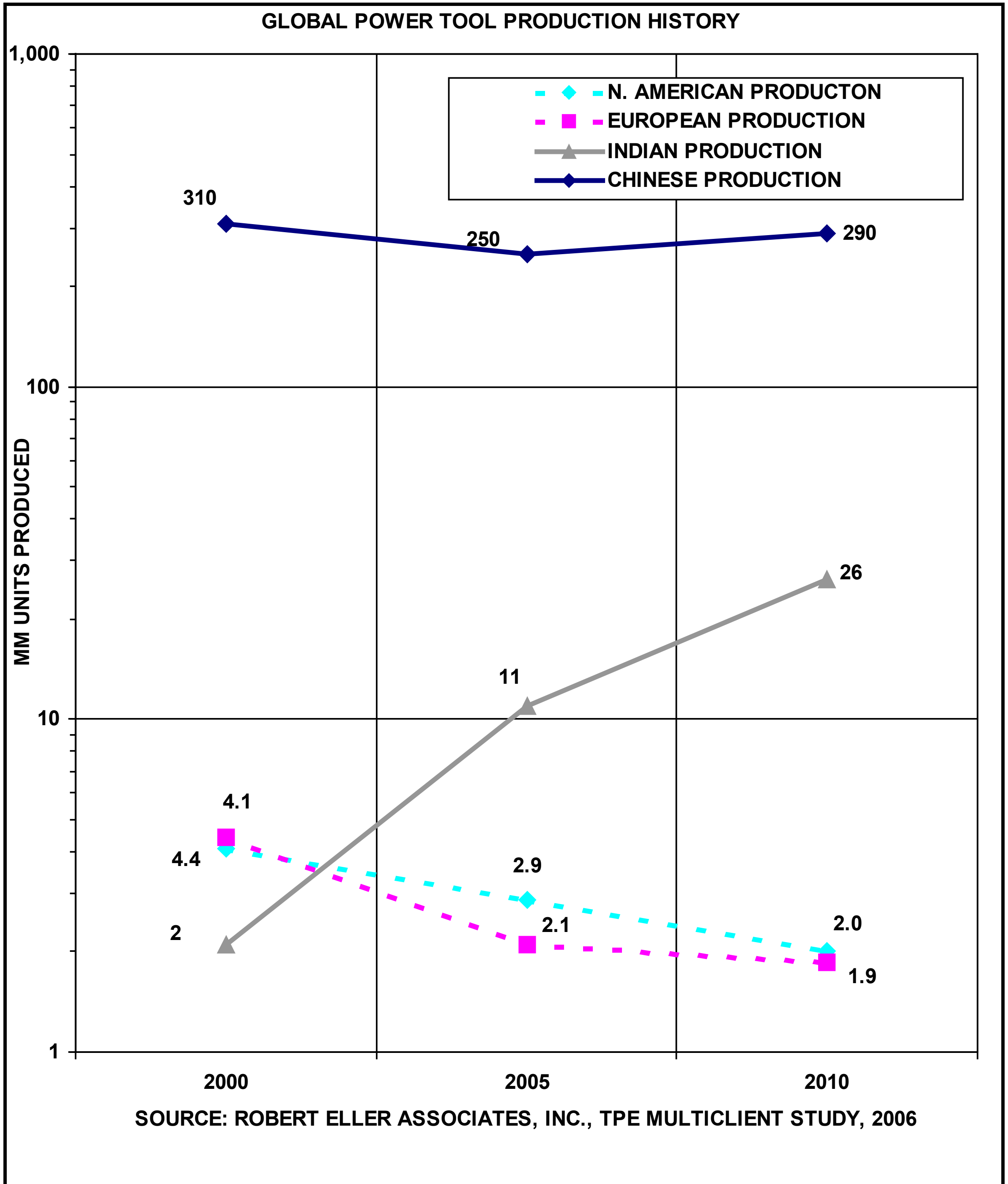
- IP PROTECTION

- MORE CAPITAL INTENSE AUTOMATION (PRODUCTIVITY IMPROVEMENTS vs. LABOR)


GLOBAL WET RAZOR PRODUCTION HISTORY
N. AMERICAN PRODUCTON
EUROPEAN PRODUCTION
INDIAN PRODUCTION
CHINESE PRODUCTION
MM UNITS PRODUCED
3,000
2,500
2,000
1,500
1,000
500
0
2000
2005
2010
890
1,440
2,460
278
580
1,307
21
380
980
44.9
31
21
SOURCE: ROBERT ELLER ASSOCIATES, INC., TPE MULTICLIENT STUDY, 2006

Manufacturer: Gillette
Product Name: Mach 3, Grip
TPE Type: SEBS
Bond Type: Physical
Manufacturer Location: China
Note: Grip and head with different TPEs

Manufacturer: Gillette
Product Name: Venus 3
TPE Type: SEBS
Bond Type: Chemical
Manufacturer Location: Poland


GLOBAL POWER TOOL PRODUCTION HISTORY
MM UNITS PRODUCED
1,000
100
10
1
N. AMERICAN PRODUCTON
EUROPEAN PRODUCTION
INDIAN PRODUCTION
CHINESE PRODUCTION
310
250
290
26
11
4.1
4.4
2.9
2.1
2.0
1.9
2
2000
2005
2010
SOURCE: ROBERT ELLER ASSOCIATES, INC., TPE MULTICLIENT STUDY, 2006

ENTRANCE OF WESTERN TPE SUPPLIERS

Company	TPE TYPE							Mfr/ Import	Notes
	SEBS	TPO	TPV	TPU	Metallo	Eng-TPE	Super TPV		
Compounders:									
Alpha Gary	x							Import	No local AG office/only sales agents (Paeco)
Arkema						x		Import	Nylon based thermoplastic elastomer
Basell		x			x			Import	
BASF				x				Import	
Dow		x			x			Import	
Dow Corning	x		x				x	Import	
DSM	x		x			x		Import	
Dupont						x		Import	ETP-TPV
Exxon/Mobil			x		x			Import	Includes AES
GE						x		Import	Flexible Noryl
GLS	x							Import	Suzhou Plant opening 2006
Merquinsa				x				Import	
Kraiburg (Milton Plastics)	x		x	x				Import	Plant in Southern China (early 2007)
Mitsui			x					Import	
Optatech	x		x					Mfr	JV with Sinopec Jingling Petrochemical
Noveon				x				Mfr	Opened plant in 2005
Poly One	x		x	x				Mfr	Mixed capacity multi product plant
RTP	x	x	x	x				Mfr	Shared capacity multi product plant (2005), TPEs limited due to pelletization capabilities
Schulman	x	x	x	x				Mfr	
SK	x		x	x				Mfr/ Import	Chinese plant only SEBS compounds/shared capacity plant with PP compounds
Solvay Eng Polymers		x	x					Import	Recently introduced to the Chinese market
SPC (Teknor Apex)	x		x					Import	Plant in Singapore
Zylog	x							Import	Indian plant location

SOURCE: ROBERT ELLER ASSOCIATES,INC. TPE CHINA MULTICLIENT, 2005

PARALLEL SUPPLY CHAIN

- **ORIGINAL MODEL FOLLOWED NATIONALITIES**
- **WESTERN TPE COMPOUNDERS:**
  - ONLY NOW RESPONDING TO CHINA/INDIA TPE POT'L
  - WOFEs VS. JV'S (IP PROTECTION)
  - TARGETING TRANSPLANTS
  - LIMITED ACCESS TO DOMESTIC MARKETS
  - CULTURAL BARRIERS
  - FORCED TO USE LOCAL CHANNEL PARTNERS
  - BONDED WAREHOUSES WILL MAKE IMPORTING EASIER
- **ASIAN DOMESTIC COMPOUNDERS:**
  - TECHNOLOGY TRANSFER BARRIERS NOT SIGNIFICANT
  - GOVERNMENT SUPPORT
  - BETTER (FAMILY/CULTURAL) CONNECTIONS
  - LIMITED ACCESS TO TRANSPLANT CUSTOMERS THUS FAR
  - PRICES LOWER BUT GAP CLOSING
- **WESTERN COMPANIES REALIZE THE "REAL" POT'L. OF CHINA IS THE CHINESE DOM. MKT. AND ARE SHIFTING TARGETS**
- **NEW MODEL WILL DEVELOP BASED ON QUALITY**

CHINA vs. INDIA

	CHINA	INDIA
POT'L DOMESTIC MARKETS	• 1.3 BILLION PEOPLE	• 1.0 BILLION PEOPLE
INFRASTRUCTURE	• AGGRESSIVELY BUILDING INFRASTRUCTURE AROUND ECONOMIC DEV'MENT ZONES, FACILITIES OFTEN IN PLACE WAITING FOR NEW PLANTS	• ROADS/PORTS/LOGISTICS POOR • GOLDEN QUADRANGLE A HELP, BUT ONLY A START
GOVERNMENT	• CONTINUITY TO A PLAN, A SENSE OF CONSTANCY • EXCELLENT CENTRAL PLANNING = STRENGTH • BECOMING VERY BUSINESS FRIENDLY – CONTINUALLY OPENING UP FOR MORE FOREIGN INVESTMT – FLOATING OF THE YUAN – BONDED WAREHOUSING • CORRUPTION EXISTS, BUT FOCUSED ON A FEW PEOPLE	• DEMOCRATIC GOV'T CHANGED FREQ. (ELECTIONS EVERY 4 YEARS) • NEW GOV'TS MEANS A STOP-START • BUREAUCRACY THAT IS NOT HIGHLY BUSINESS FRIENDLY • CORRUPTION EXISTS BROADLY
BUSINESS	• WILL DOMINATE GLOBAL MANUF. PARTICULARLY MANUF. FOR EXPORT FOR THE NEXT 10 YRS.	• WILL DOMINATE SERVICE CENTER AND SOFTWARE COMPANIES THAT CAN TAKE ADVANTAGE OF QUICKLY BUILT ELECTRONIC HWYS

INDIA TPE MARKET

COMPANY	TPE-S	o-TPV	TPU	TPO	SPEC	METALLOCENE	AGENT
Compounders							
Synoprene Polymers Pvt. Ltd	x	x	x	x			
Zylog		x					
Technovinyl (KK)	x	x	x	x			
Hydro S &S		x (p-TPV)					
Synergy Multibase	x						
Machine Basell India (MBI)				x			
Tipco				x			
TPE Compound Importers							
GLS	x	x	x				
Kraiburg	x						Sarin Trade
ExxonMobil (Santoprene)		x					Hydro S&S
RTP	x	x	x				Specialty Polymers
Teknor Apex/SPC	x	x	x				Micromers
Raw Materials							
Domestic Raw Material Producers							
Reliance				PP			
Basell				PP			
Bayer			x				
Importers of Raw Materials							
DSM					COPE		
Dupont					COPE		Bhimrajka Implex (BIG)
Noveon			x				
Merquinsa			x				Bhimrajka Implex (BIG)
Dow			x			Engage, Nordel, Versify	Bhimrajka Implex (BIG)
ExxonMobil						Vistamaxx	

SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006

THE ECONOMIC WAR IS OVER?

- **MANUFACTURING FOR MANY TPE END PRODUCT SECTORS HAS ALREADY SHIFTED FROM WEST TO EAST**
- **YUAN REVALUATION:**

  - TOKEN GESTURE?

  - AGAINST A MARKET BASKET (U.S. DOLLAR EQUALLY WEIGHTED WITH OTHER CHINESE TRADING PARTNER CURRENCIES)

  - U.S. DOLLAR POWER WEAKENED

  - SUBSTANTIAL ASIAN COST ADVANTAGE WILL CONTINUE
- **CHINESE U.S. BOND INVESTMENT SLOWS U.S. RETALIATION POTENTIAL**
- **ASIAN TPE MARKET SIZES DWARF U.S. AND EUROPE MARKETS**

  - MARKET POWER OF 3 BILLION NEW CONSUMERS

  - 1.5 BILLION NEW WORKERS
- **ASIA PULLING AHEAD IN TECH. EDUCATION LEVEL AND NUMBERS**

CONCLUSIONS

This has been a brief review of the issues being addressed in the REA TPE China Multiclient Study

- **CHINA IS A LARGE, GROWING TARGET FOR TPEs**
- **OPPORTUNITIES BOTH DOMESTIC AND EXPORT**
- **MAJOR INDUSTRY STRUCTURE CHANGES IN CHINA**
- **PARALLEL SUPPLY CHAINS**

HOW TO TAKE ADVANTAGE OF THESE OPPORTUNITIES?

SUBSCRIBE TO THE REA MULTICLIENT STUDY:

"SPECIALTY THERMOPLASTIC ELASTOMERS . . . MARKETS, ECONOMICS, INTERMATERIALS COMPETITION, AND INDUSTRY STRUCTURE IN CHINA"

Thank You!

ANALYSIS TECHNICAL ECONOMIC MARKET Management DECISIONS

Robert Eller Associates, Inc.

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