

OLIVER WYMAN



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Automotive Manufacturing Transition

Ron Harbour
Managing Partner
Global Automotive Manufacturing

Oliver Wyman

Global Automotive Practice

- Based in Detroit, Munich, Paris, Sao Paulo, Seoul
- Acquired Harbour Consulting 2007
- Consulting Services
 - Factory Improvement
 - Manufacturing Due Diligence
 - Supplier Restructuring
 - Benchmarking
- Harbour Report™ continues globally:
 - North America (1989)
 - South America (2006)
 - Europe (1996)
 - Asia (new)



Automotive Manufacturing in North America

- Potential Topics

- New product technologies

- Future sourcing strategies

- New labor agreements

- Quality

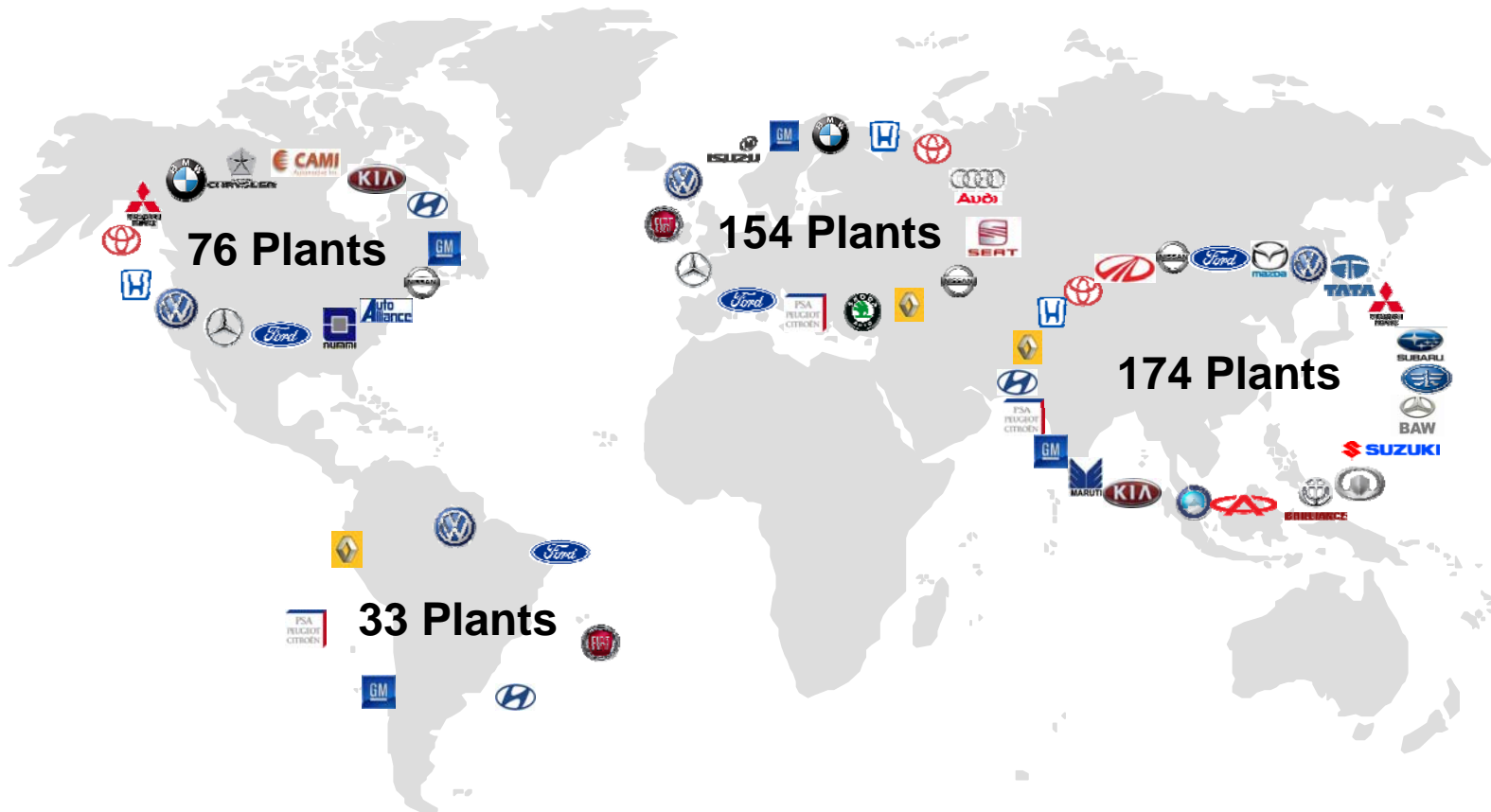
- Productivity

- Plant footprint and Capacity**



Automotive Industry

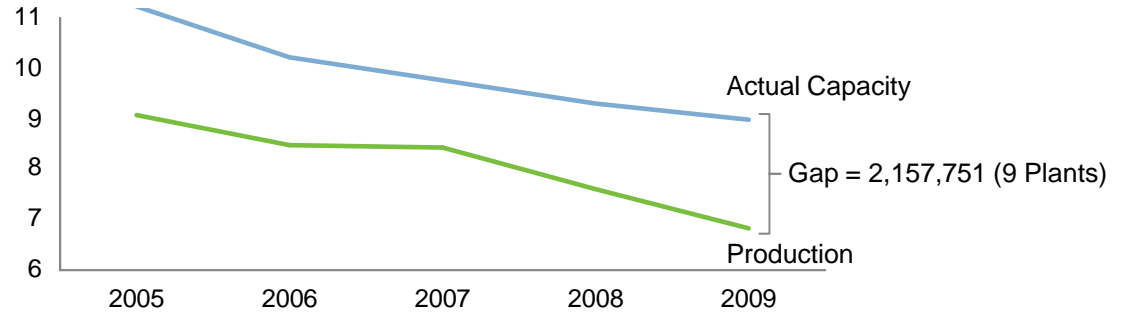
Vehicle Assembly Facility Visits / Assessments



Actual Capacity Trends – Beyond Plant Closures

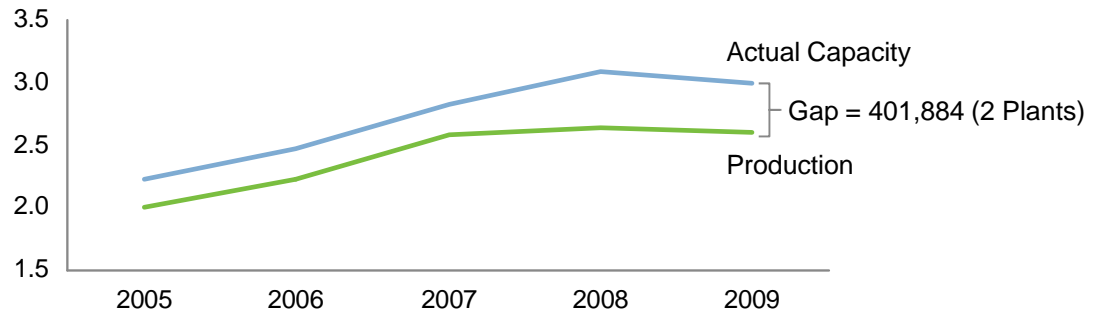
Europe: Eastern Migration

Western Europe¹



# of Plants	35	33	33	34	34
Util. %	81%	83%	86%	82%	76%
Avg. JPH	54	50	50	46	47
Avg. Shifts	2.4	2.3	2.3	2.2	2.1

Eastern Europe¹



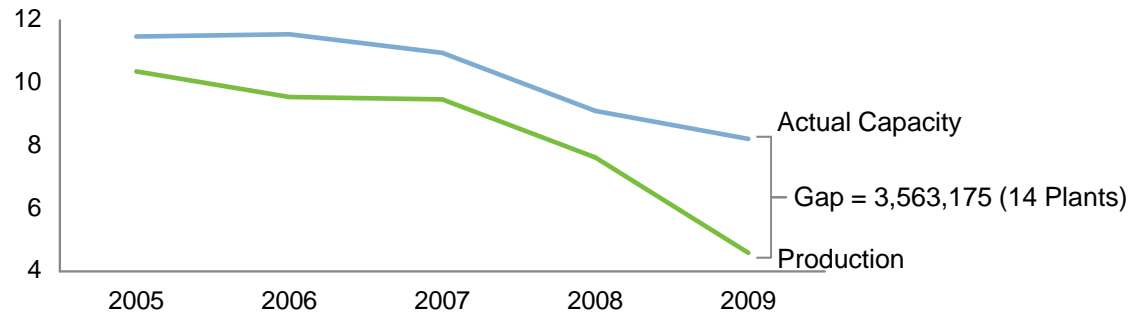
# of Plants	12	12	12	12	13
Util. %	90%	90%	91%	85%	87%
Avg. JPH	30	27	33	34	34
Avg. Shifts	2.4	2.6	2.9	2.8	2.5

¹ Includes Harbour Report Europe participating plants only. Excludes BMW, Honda, Nissan, Toyota, Daimler, VW Commercial Vehicle

Actual Capacity Trends – Beyond Plant Closures

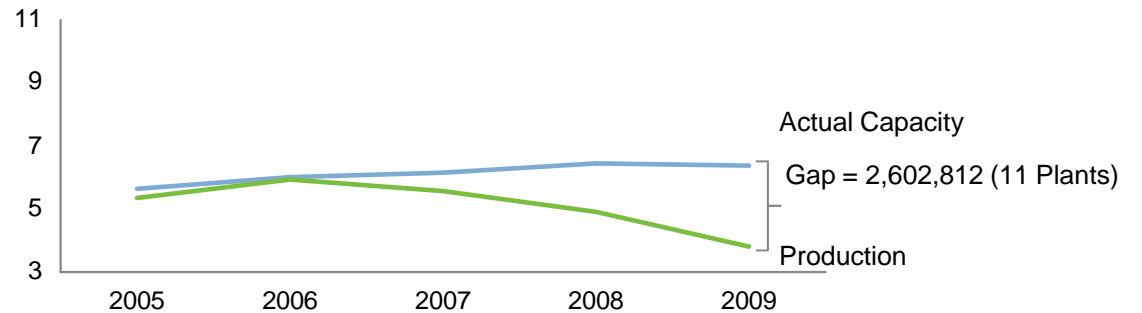
North America: Southern Migration

Northern US and Canada



# of Plants	58	56	53	51	46
Util. %	90%	83%	86%	84%	56%
Avg. JPH	55	56	56	56	56
Avg. Shifts	1.9	2.1	2.0	1.8	1.9

Southern US and Mexico









# of Plants	30	33	30	31	30
Util. %	94%	98%	90%	76%	59%
Avg. JPH	43	45	44	46	46
Avg. Shifts	1.9	2.0	2.1	2.1	1.9







Source: The Harbour Report

North American Vehicle Assembly Capacity Summary

Number of Vehicle Assembly Plants

	2000	2010
 Chrysler	14	10
 Ford	22	14
 GM	30	16
 Honda	5	8
 Nissan	5	6
 Toyota	5	9
Others	11	13
TOTAL	92	76

Vehicle Assembly Annual Capacity

	2000	2010	Current Market Share (6/10 YTD)
 Chrysler	3.0 million	2.2 million	9.9%
 Ford	4.5 million	2.8 million	16.9%
 GM	6.2 million	3.0 million	18.8%
 Honda	1.1 million	1.7 million	10.0%
 Nissan	0.8 million	1.5 million	8.4%
 Toyota	0.8 million	1.5 million	14.2%
Others	1.6 million	2.3 million	21.7%
TOTAL	18.3 million	15.0 million	

Source: Harbour Report data and Wards Auto World

Volkswagen Chattanooga, TN



Toyota Tupelo, MS










Honda Greensburg, IN










North American Stamping Capacity Summary

Number of Stamping Plants

		2000	2010
	Chrysler	8	7
	Ford	9	9
	GM	17	15
	Honda	3	5
	Hyundai	0	2
	Nissan	2	3
	Toyota	2	4
	TOTAL	41	45

Number of Major Press Lines

		2000	2010
	Chrysler	71	66
	Ford	139	85
	GM	297	117
	Honda	7	8
	Hyundai	0	3
	Nissan	11	14 ¹
	Toyota	24	26 ²
	TOTAL	549	319

¹Data for Nissan based on number of active presses reported in 2006

²Data for Toyota based on number of active presses reported in 2007

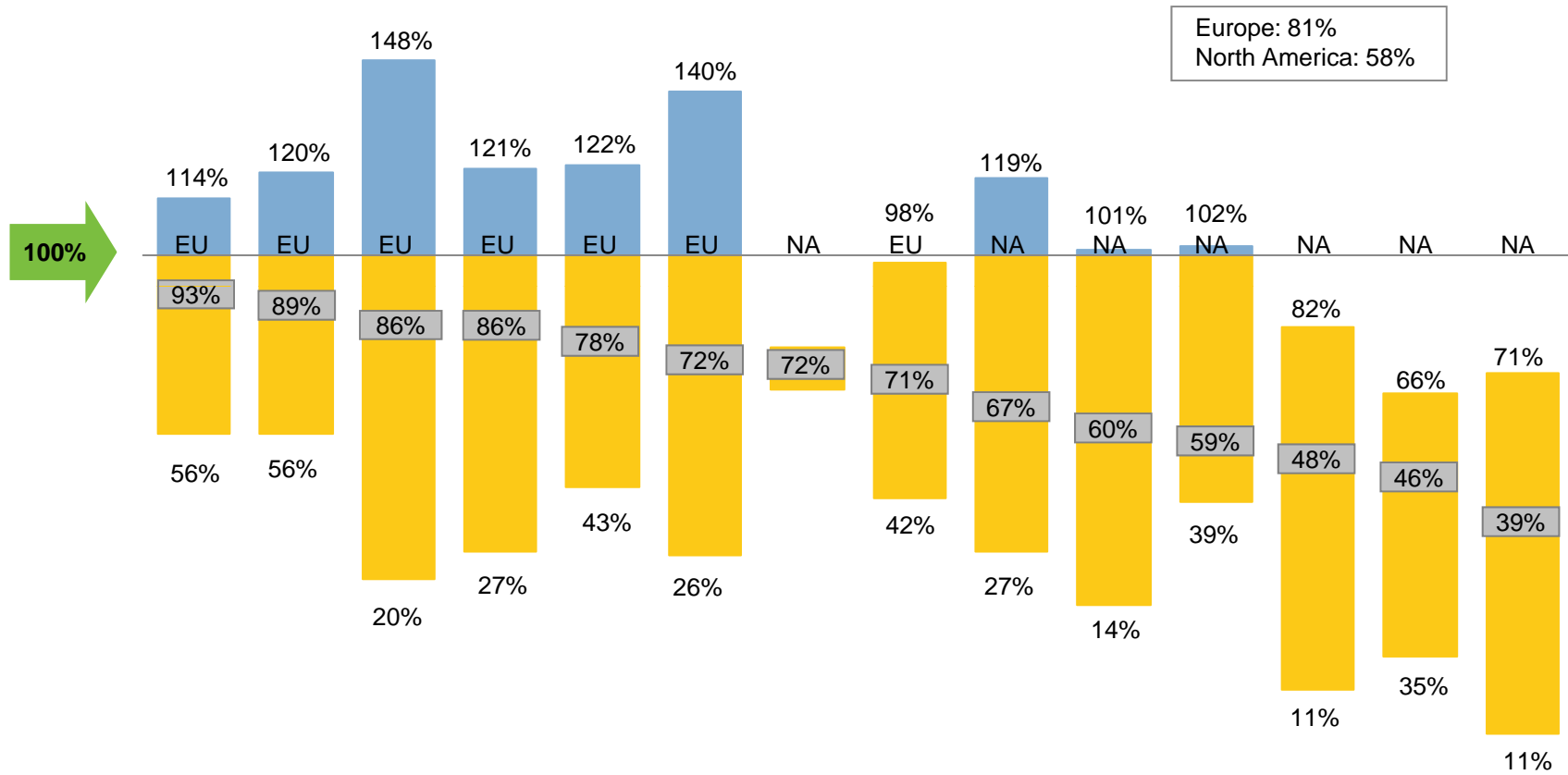


Impact of Flexibility on Capacity Utilization

Europe & North America

Normalized

Regional Averages



Normalized capacity is based on the bottleneck operation at each plant in terms of units per hour, multiplied by 16 hours and 235 days.
 Utilization % = annual production divided by normalized capacity

Automotive Manufacturing – Vehicle Assembly

The Traditional Footprint

- Large facilities (3 ml sq. ft. plus)
- Body, Paint, General Assembly focus
- Metal Stamping centralized (off location)
- 1,000 units/day capacity, dedicated lines
- Single platform, one/two body styles, one/two brands
- 2-8 hours shifts, overtime if necessary
- 3,000 people plus; organized, high cost labor, inflexible classifications and work rules
- Midwest locations
- Vertically integrated, but increasing outsourcing
- Conflict of people and technology



Automotive Manufacturing – Vehicle Assembly

Future Trends

Facilities

- Smaller, leaner
- Less workstations
- Metal stamping on site
- 800-1500 units/day
- “Optimum region”



Process

- 3 shifts at 8 hours or 3 crews, 2 shifts
- Vertical integration redefined
- Flex process for HEV, BEV
- Common flexible mainline, subs



Product

- Numerous body styles/brands
- Fewer platforms
- Lean Design (DFM)



Material & Logistics

- Part/module sequencing
- Part kitting
- Export Complexity
- Supplier Parks



People

- 2500 people or less
- Union and non-union
- Balance of people/automation
- Entry wages
- Few classifications, work rules



Quality

- Stronger problem solving
- First time quality





Automotive Manufacturing – Vehicle Assembly Summary

- Fewer Plants
- Fewer, high speed, flexible production lines
- “Generic” capacity
- Lower capital investment
- Balance of people and technology
- Strong people systems

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