

***KEY NONWOVEN TECHNOLOGIES AND CAPACITY  
DEVELOPMENTS FOR HYGIENE ABSORBENT PRODUCTS IN ASIA***

***ASIA-PACIFIC NONWOVENS SYMPOSIUM  
SHANGHAI 2015***

**PRICE HANNA**  
CONSULTANTS

***Presentation by David Price  
Price Hanna Consultants LLC***

## ABOUT PRICE HANNA CONSULTANTS

*Price Hanna is a management consulting firm specializing in the global nonwoven and hygiene businesses.*

- *The principals of Price Hanna have more 30 years of combined consulting experience and a deep background in all key functional business areas derived from senior and executive management roles and consulting with leading nonwoven and woven fabric, fibers and related raw materials businesses worldwide.*
- *Our practice spans all levels of the value chain for disposable and durable nonwovens and materials in proprietary, non-conflicting projects.*

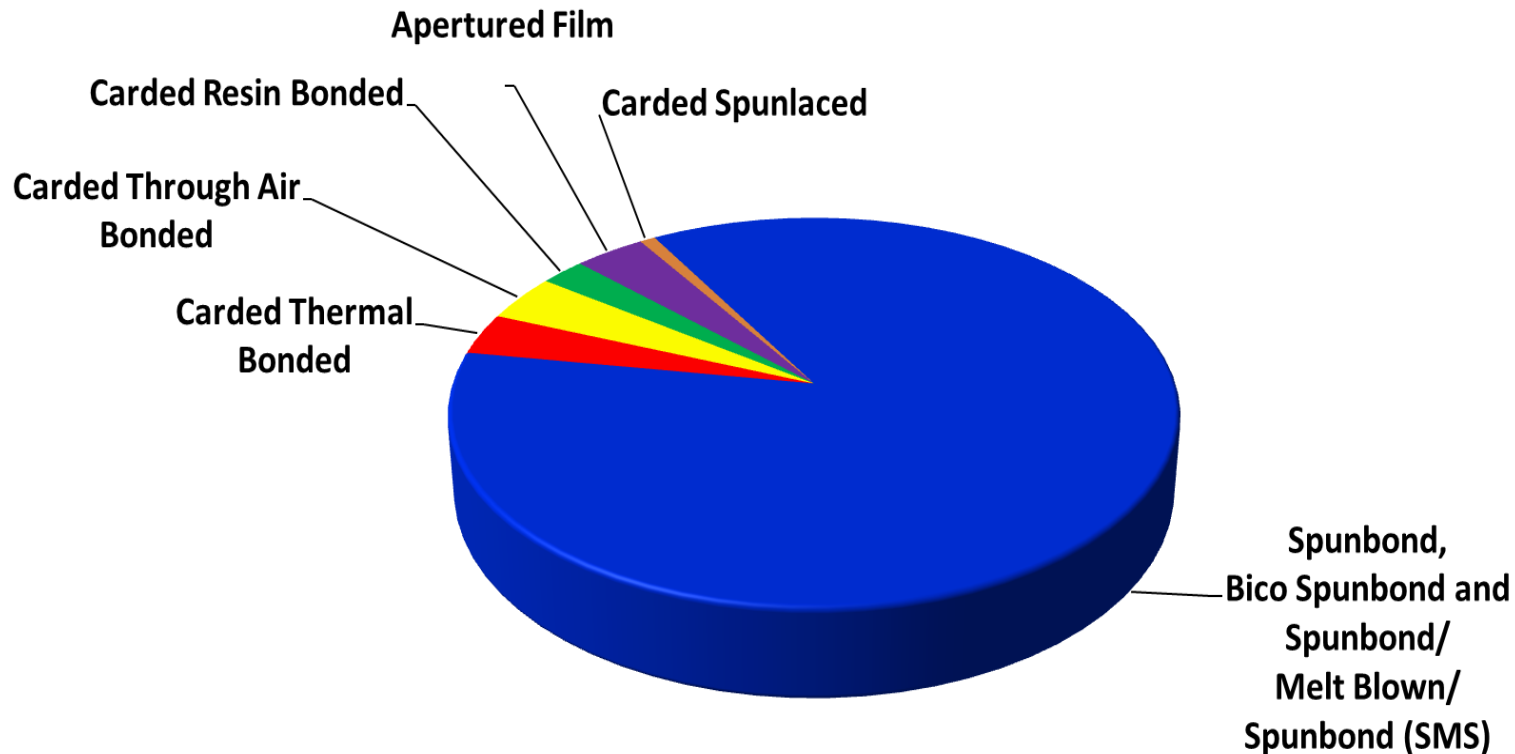
## RELEVANT SUBSCRIPTION REPORTS

- *Spunbonded and Spunmelt Nonwoven Polypropylene World Capacities, Supply/Demand and Manufacturing Economics 2009, 2014 – 2019*
- *Global Outlook for Hygiene Absorbent Products and Key Raw Materials in 2013, 2014 and 2019*
- *Outlook for Barrier Nonwovens and Film in Global Medical Markets 2014 – 2019*
- *Global Spunbonded Polyester Nonwoven Supply, Demand, Manufacturing Economics and Profitability 2008, 2013 and 2018*

# NONWOVEN TECHNOLOGIES IN ASIA FOR HYGIENE ABSORBENT PRODUCTS

- *In Asia and other global regions, spunbonded & spunmelt polypropylene technology supplies more nonwoven area volume for disposable absorbent hygiene products than any other cover stock material.*
- *Globally, spunbonded & spunmelt polypropylene nonwovens account for about 85% of all cover stock raw materials used in disposable diapers and pants.*
- *Other smaller, but no less important cover stock materials, are various carded thermal, resin and spunlaced bonded nonwovens, apertured film and airlaid pulp absorbent cores and sub layers.*

**GLOBAL NONWOVEN TECHNOLOGIES IN HYGIENE ABSORBENT PRODUCTS  
(EXCLUDES AIRLAID PULP ABSORBENT CORES AND SUBLAYERS)  
PERCENT OF TOTAL BILLIONS OF SQUARE METERS  
2014**



Source: Price Hanna Consultants LLC estimates

## SPUNBONDED & SPUNMELT POLYPROPYLENE NONWOVENS – ASIA HYGIENE

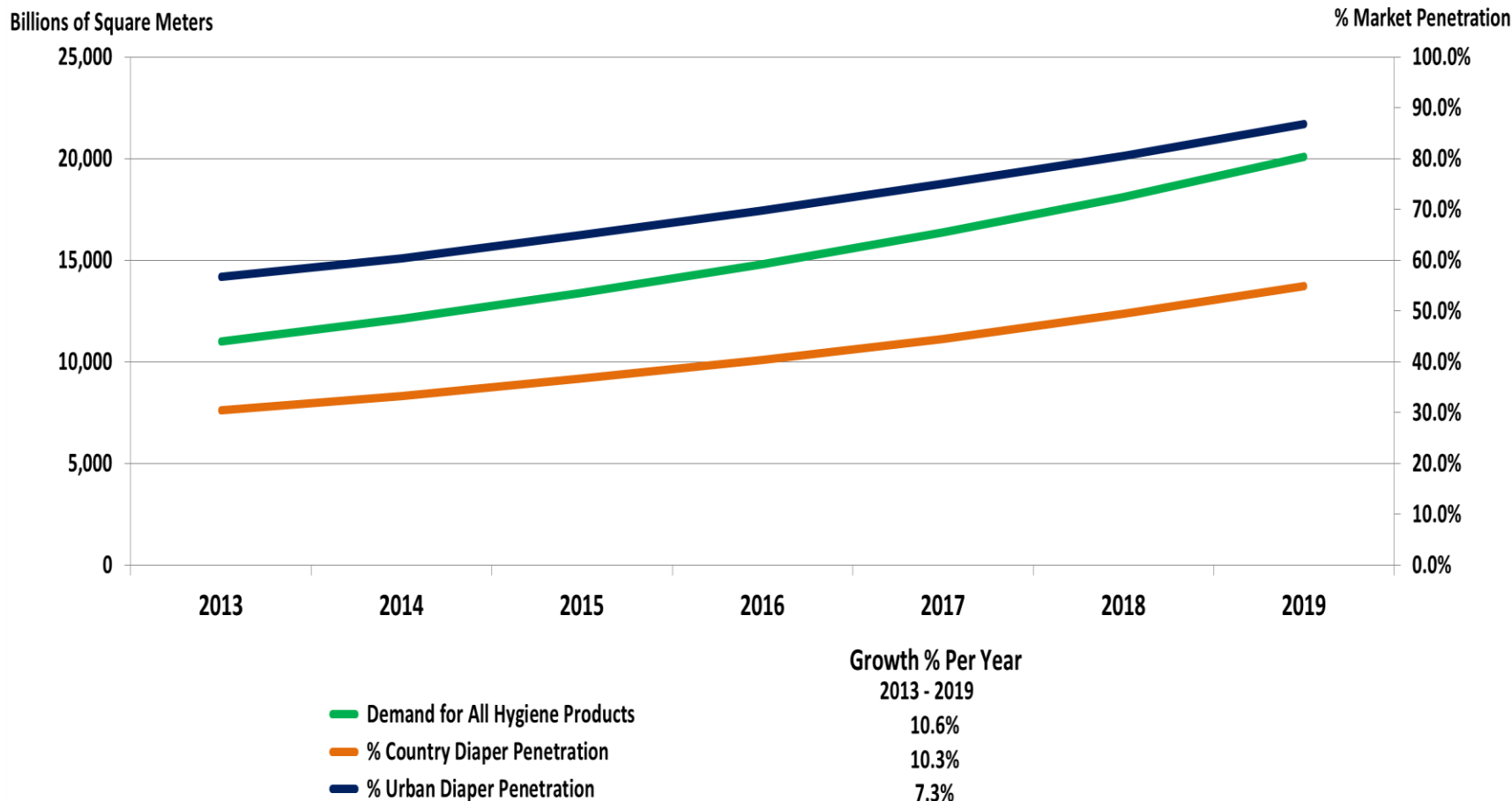
- *Spunbonded/spunmelt polypropylene nonwovens have played an important role in the demand growth of disposable hygiene materials.*
- *This largest and fastest growing of all nonwoven global technologies has continuously evolved to provide higher levels of comfort, softness and other performance benefits at ever lower costs.*
- *In Asia, demand and capacity for spunbonded and spunmelt polypropylene nonwovens used in hygiene absorbent products have grown rapidly and are expected to continue to do so.*

# SPUNBONDED/SPUNMELT NONWOVEN DEMAND FOR HYGIENE PRODUCTS IN ASIA

## *Key Demand Drivers*

- *RAPID PENETRATION OF HYGIENE DISPOSABLE PRODUCTS - FIRST IN URBAN AREAS AND NOW IN RURAL MARKETS*
- *ADOPTION OF MODERN DIAPER AND PANT DESIGNS*
- *EARLY AND PROMISING PENETRATION OF ADULT INCONTINENCE PRODUCTS*
- *SUBSTITUTION OF SPUNBONDED/SPUNMELT POLYPROPYLENE NONWOVENS FOR CARDED NONWOVENS*

## CHINA HYGIENE MARKET DEMAND FOR SPUNBONDED/SPUNMELT POLYPROPYLENE NONWOVENS 2013 - 2019



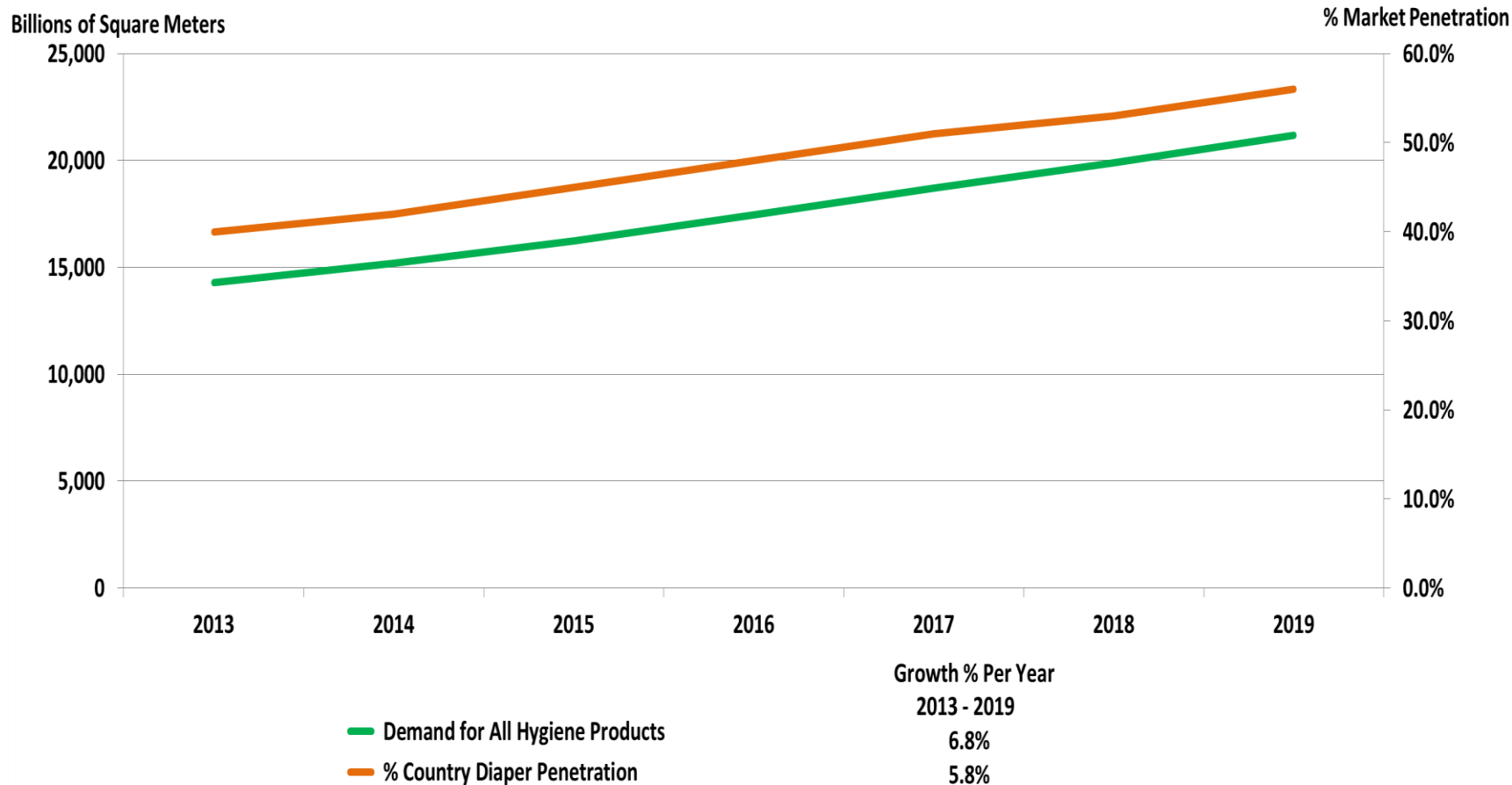
Source: Price Hanna Consultants LLC estimates



## SPUNBONDED/SPUNMELT NONWOVEN DEMAND FOR HYGIENE PRODUCTS IN CHINA

- *Demand in 2019 is expected to be more than 20 billion square meters.*
- *Demand growth from 2013 to 2019 has slowed due to already high penetration of disposable hygiene products in urban areas. Penetration of hygiene disposable products in rural areas will continue to drive growth.*
- *Promising growth in disposable adult incontinence product usage could boost future demand.*
- *Exports to Central and Southern Asia and the Americas assists with capacity utilization.*

## ASIA-PACIFIC HYGIENE MARKET DEMAND FOR SPUNBONDED/SPUNMELT POLYPROPYLENE NONWOVENS 2013 - 2019



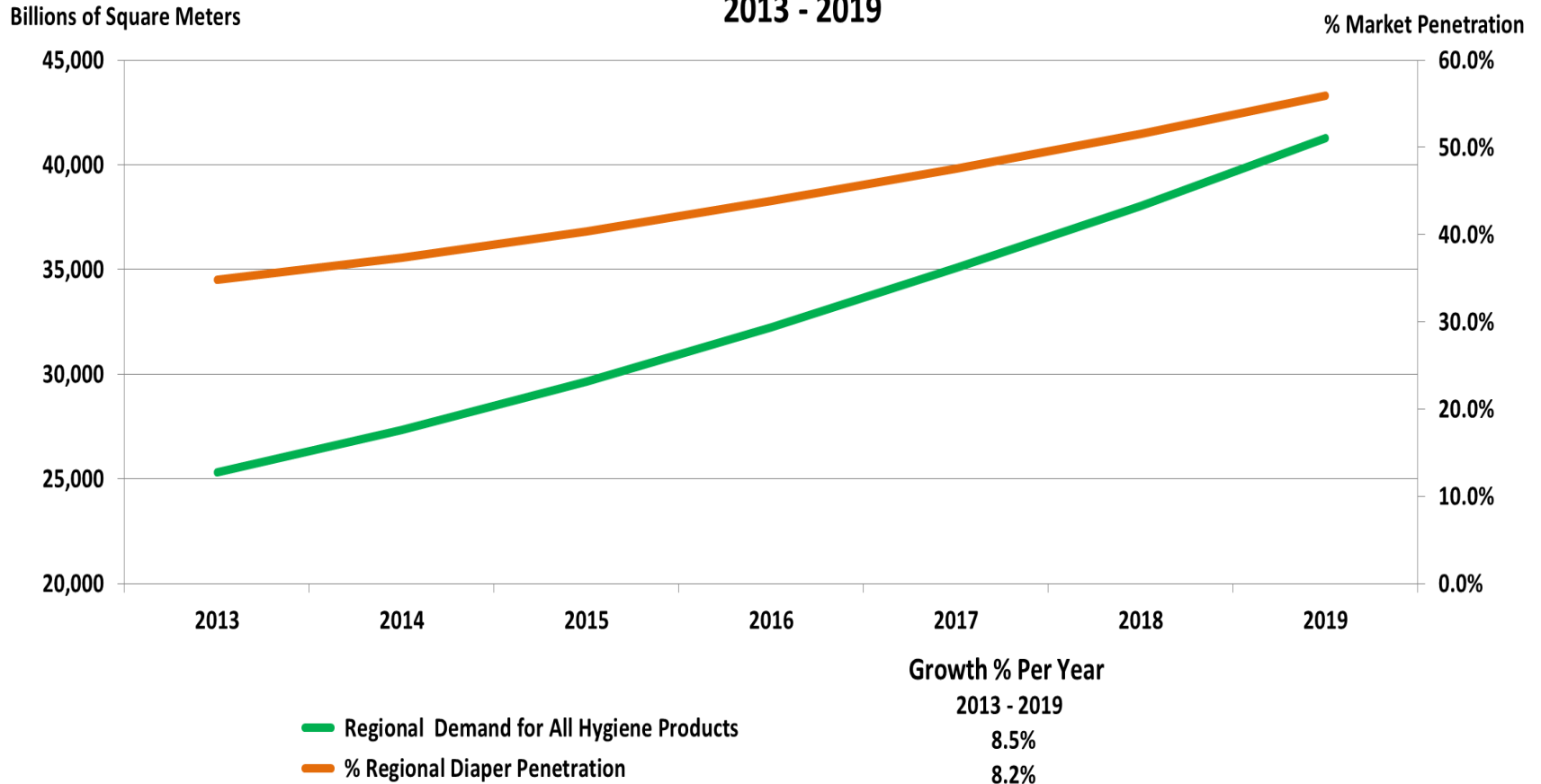
Source: Price Hanna Consultants LLC estimates

## **SPUNBONDED/SPUNMELT NONWOVEN DEMAND FOR HYGIENE PRODUCTS IN ASIA PACIFIC**

- *Demand in 2019 is expected to be more than 21 billion square meters.*
- *Demand growth is driven by growing penetration of developing markets in Southeast Asia and generic growth in developed countries.*
- *Japan market penetration is high and demand growth in line with birth rates.*
- *Exports to Central and Southern Asia have played a meaningful role in capacity utilization and production demand development.*

## ASIA-PACIFIC AND CHINA HYGIENE MARKET DEMAND FOR SPUNBONDED/SPUNMELT POLYPROPYLENE NONWOVENS

2013 - 2019



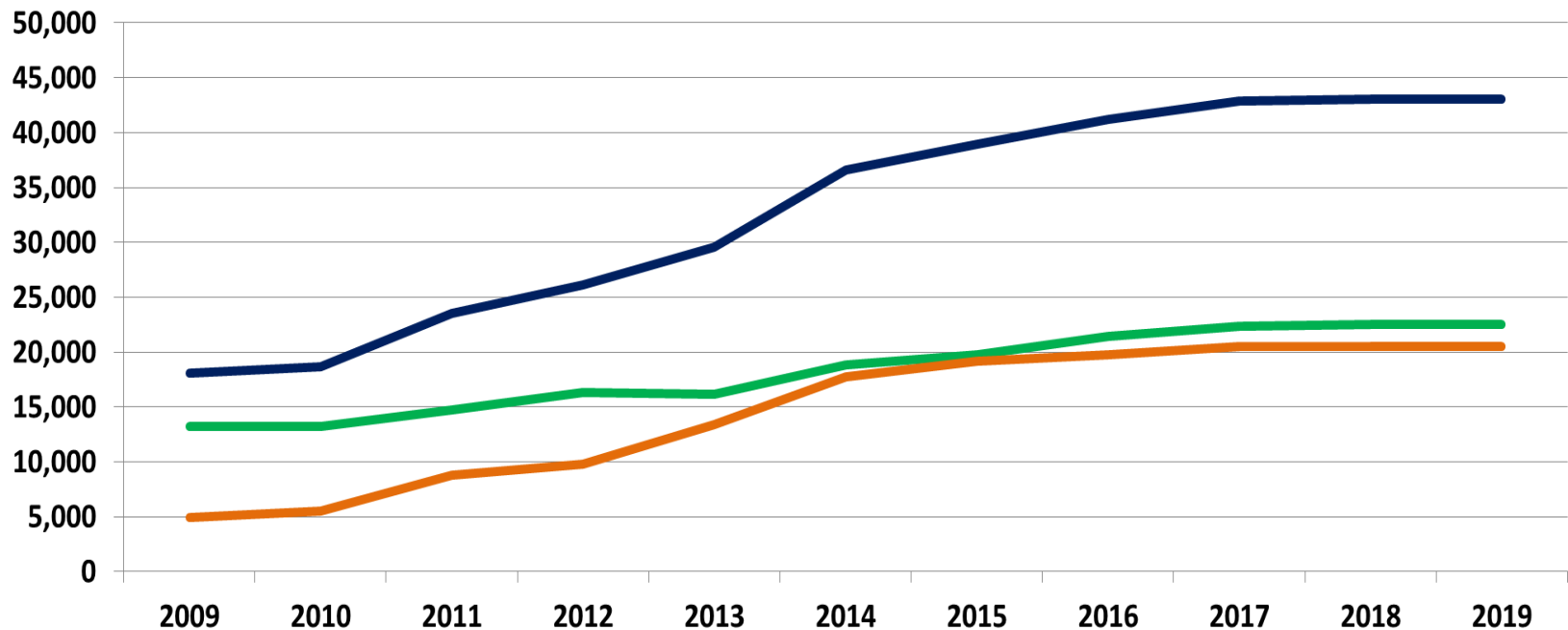
Source: Price Hanna Consultants LLC estimates

## **SPUNBONDED/SPUNMELT NONWOVEN DEMAND - HYGIENE PRODUCTS - ASIA PACIFIC & CHINA**

- *Demand in 2019 is expected to be more than 41 billion square meters.*
- *There remains significant opportunity for demand growth in much of the region as many developing markets still have low penetration rates.*
- *Demand growth in the region as a whole will remain higher than other global regions. Export opportunities to South and Central Asia will continue.*

## ASIA SPUNBONDED/SPUNMELT POLYPROPYLENE CAPACITY FOR HYGIENE

### Billions of Square Meters



	Growth % Per Year	
	2009 - 2014	2014 - 2019
Asia-Pacific	7%	4%
China	29%	3%
Total Asia	15%	3%

Source: Price Hanna Consultants LLC estimates

## SPUNBONDED/SPUNMELT NONWOVEN CAPACITY FOR HYGIENE PRODUCTS IN ASIA

- *Nearly all fine denier spunbonded & spunmelt capacity installed in Asia since 2003 has been for hygiene.*
- *Prior to 2003, hygiene capacity in China was used for manufacture of basic diaper designs and diaper insert pads. As disposable fastening diaper designs changed to add more features, more nonwovens were used.*
- *Over time, spunbonded & spunmelt nonwovens replaced carded nonwovens to become the primary material used for topsheet, backsheet and leg cuffs in fastening diapers and diaper pants used in China and globally.*

## SPUNBONDED/SPUNMELT NONWOVEN CAPACITY FOR HYGIENE PRODUCTS IN ASIA PACIFIC

*Since 2003, new generations of spunbonded & spunmelt technology have been installed in anticipation of serving growing hygiene demand and for production of medical barrier nonwovens.*

- This new generation of spunbonded and spunmelt technology replaced single beam and stand-alone melt blown lines whose capabilities were limited in capacity and product capability.*



## SPUNBONDED/SPUNMELT NONWOVEN CAPACITY FOR HYGIENE PRODUCTS IN ASIA PACIFIC

*Spunbonded & spunmelt technology for hygiene end uses in China and Asia have changed radically since 2003.*

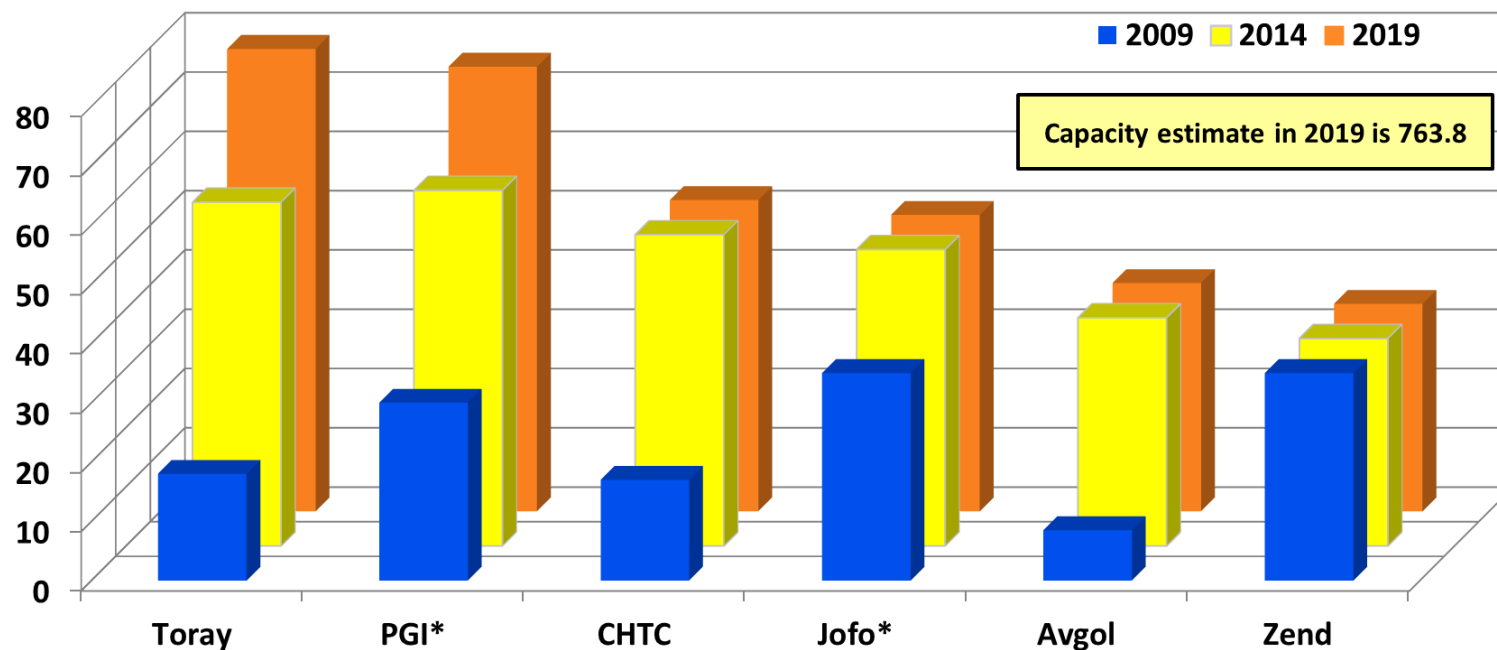
- *First generation hygiene lines were installed in 1995 to 2000, were narrow in width and had nameplate capacity of about 2,500 tonnes or less.*
- *The next generation of technology began to be installed around 2003. Lines with nameplate capacity of about 15,000 tonnes, multiple spin beams, 4.2 meters wide were installed.*
- *The newest generation lines are 4.2 meters wide, have up to 7 spin beams, 24 k tonnes of capacity, line speeds up to 1000 mm, high throughput, often include bicomponent extrusion beams and can produce high quality fabrics at 8 gsm.*

## SPUNBONDED/SPUNMELT NONWOVEN CAPACITY FOR HYGIENE PRODUCTS IN ASIA PACIFIC & CHINA

*The market introduction of advanced spunbonded and spunmelt nonwoven technology in 2004 combined with attractive demand growth in China and other parts of Asia sparked a race to install the latest generation of technology in the region.*

- *New generation technology provided the ability to produce strong very light weight fabrics with higher elongation and increased softness.*

**CHINA FINE DENIER  
SPUNBONDED/SPUNMELT POLYPROPYLENE NONWOVEN  
SELECTED PRODUCER NAMEPLATE CAPACITY DEVELOPMENT  
2009 - 2019  
(Thousands of Tonnes)**



\*Multiple locations combined.

Source: Price Hanna Consultants LLC estimates

## SPUNBONDED/SPUNMELT NONWOVEN CAPACITY FOR HYGIENE PRODUCTS IN ASIA PACIFIC

*Toray Polytech Nantong is a leading supplier of spunbonded & spunmelt nonwovens in China and Asia Pacific.*

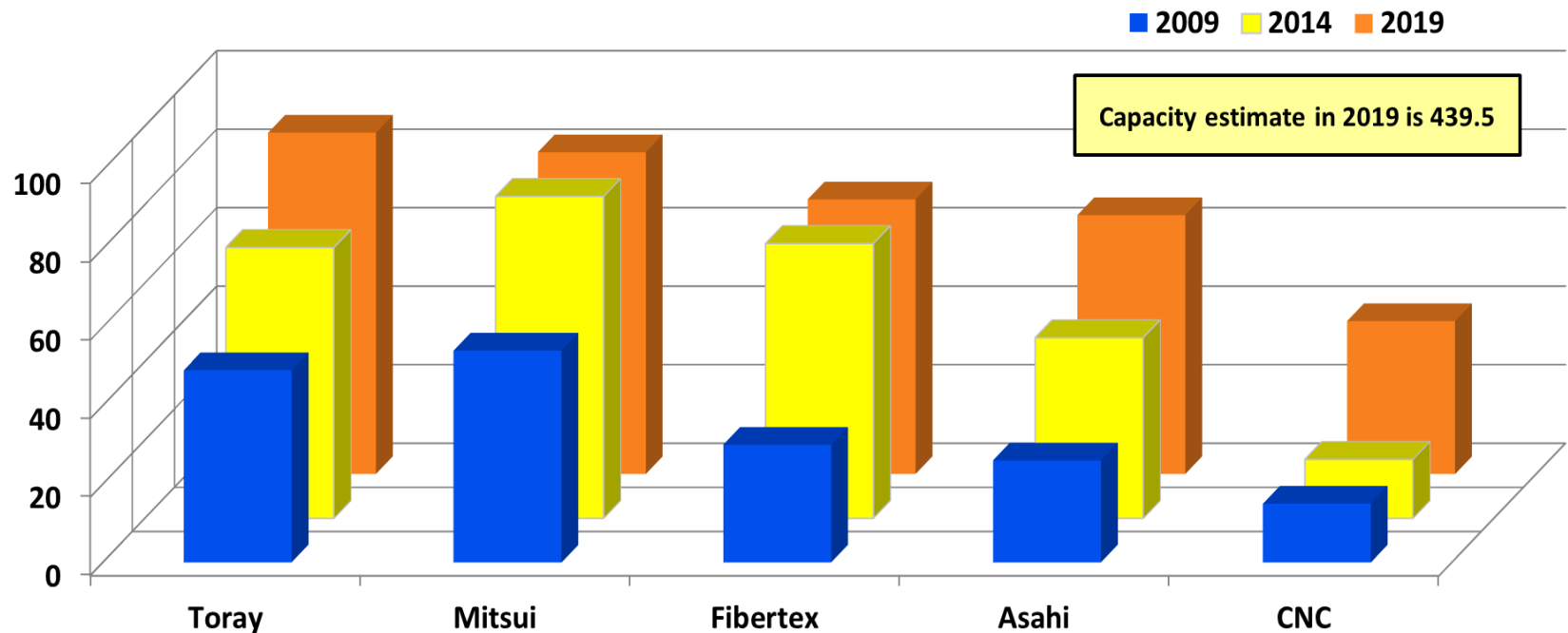
- *Toray's first line was commissioned in 2008. Since then, Toray installed three additional lines and now has the largest capacity of fine denier spunbonded and spunmelt capacity in China with 78,000 tonnes. Toray's capacity is capable of producing nonwovens for medical barrier, but has sufficient demand to sell all of its output for hygiene end uses.*

## SB/SMS NONWOVEN SELECTED PRODUCER CAPACITY DEVELOPMENT FOR HYGIENE IN CHINA

*In China, capacity growth from 2009 -2014 was torrid.*

- **Toray Nantong** – Four new lines since 2008. Total modern capacity 78Kt.
- **CHTC Jiahua** – Three new lines since 2012. Total modern capacity for hygiene 35.5Kt
- **Jofo Weifang** – One new line in 2014. Total modern capacity for hygiene 31Kt
- **PGI Suzhou/Nanhai** – Two new lines in Suzhou since 2011; new plant/line in Nanhai in 2016. Total modern capacity for medical and hygiene 63Kt
- **Mitsui Tianjin** – First line in China with 18Kt capacity in 2013
- **First Quality Wuxi** – First line outside the U.S. 24Kt for hygiene and medical 2013

**ASIA-PACIFIC FINE DENIER  
SPUNBONDED/SPUNMELT POLYPROPYLENE NONWOVEN  
SELECTED PRODUCER NAMEPLATE CAPACITY DEVELOPMENT  
2009 - 2019  
(Thousands of Tonnes)**



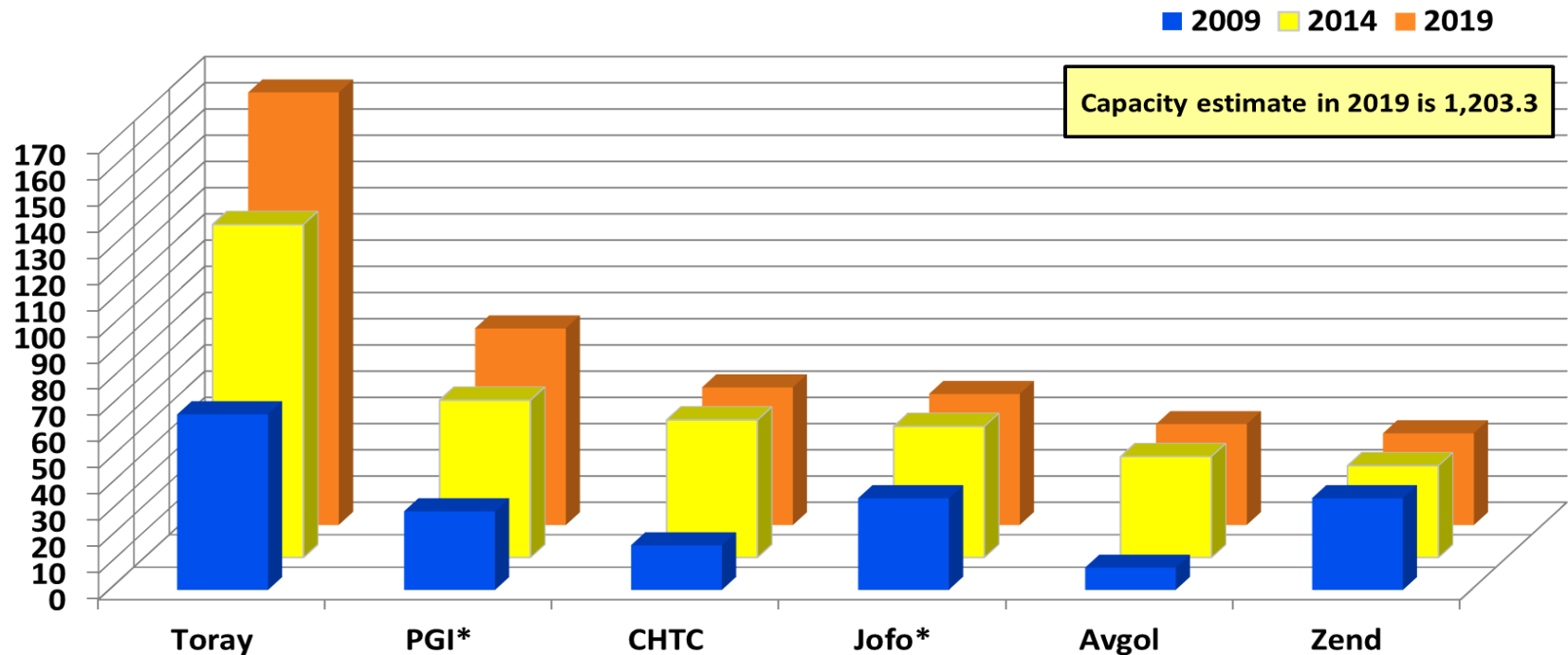
Source: Price Hanna Consultants LLC estimates

## SPUNBONDED/SPUNMELT NONWOVEN CAPACITY FOR HYGIENE PRODUCTS IN ASIA PACIFIC

*In Asia Pacific, most capacity growth since 2003 has been installed in Southeast Asia.*

- *More than 200,000 tonnes installed or planned since 2003 (**Fibertex Malaysia**- 70Kt), **Mitsui Thailand** (30Kt), **Asahi Thailand** (40Kt), **CNC Thailand** (24Kt), **Toray Indonesia** (38Kt)*
- *Only one new line in Japan since 2001- **Mitsui** 18Kt (2014)*
- *More capacity will be added before 2019 to serve developing markets in Southeast Asia and possibly replace older technology in other parts of the Asia Pacific region.*

**ASIA FINE DENIER  
SPUNBONDED/SPUNMELT POLYPROPYLENE NONWOVEN  
SELECTED PRODUCER NAMEPLATE CAPACITY DEVELOPMENT  
2009 - 2019  
(Thousands of Tonnes)**



\*Multiple locations combined.

Source: Price Hanna Consultants LLC estimates



## FORECAST FOR SPUNBONDED/SPUNMELT NONWOVENS IN ASIA PACIFIC & CHINA

- Continued technology advancements for softness and stretch
- Higher utilization of low weight capability
- Supply concentrated among a few major producers with the most modern technology and operational expertise
- New wave of capacity installation could occur to replace early generation technology still in operation
- Demand will slow with increasing market penetration. Adult incontinence market development in China and other developing markets in Asia holds promise for driving new growth.

## ASIA SPUNBONDED/SPUNMELT MARKET DEVELOPMENT

*There is ample opportunity for growth over the next several years in Asia from market expansion, but acquisition and consolidation could also play a role in achieving greater growth and profitability as the regional market matures.*

*We can envision a number of attractive mergers for what are now regional producers enabling these companies to become global players.*

## SUMMARY

*Spunbonded/spunmelt polypropylene nonwovens will continue to be the dominate cover stock material for disposable diapers and pants,*

- *Technology has made great strides to address softness and bulk. Research and advancements continue.*
- *The technology gives the market what it seeks - low cost, high performance, softness, cloth-like aesthetics, high elongation and stretch, use of sustainable fibers.*
- *Carded through air bonded nonwovens continue to be used for topsheet in premium diapers due to softness and cloth-like appearance. Carded through air bonded and spunlaced nonwovens will grow in use, but developments for softer and higher loft spunbonded nonwovens are in the pipeline.*

# CONTACT INFORMATION

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