The next generation of tape makers and users

UPDATE ON THE PSA INDUSTRY
Source: Freedonia Study, issued October 2016

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(tesa SE)
1. Introduction/ Summary
2. Demand by
   - region
   - type of tape
3. Supply / Production
   - details per Region
4. Markets
• China/Asia is and will be THE dominant/most relevant player for:
  – Supply
  – Demand
  – Raw materials
• Biggest influence on Chinese market is future (local) regulations, e.g. environmental restrictions, labor laws, salary levels, etc.
Macro trends

2. PSA TAPE DEMAND
### WORLD PRESSURE SENSITIVE TAPE DEMAND

(million square meters)

<table>
<thead>
<tr>
<th>Item</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>15/10</th>
<th>20/15</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Population (mil persons)</td>
<td>6896</td>
<td>7314</td>
<td>7725</td>
<td>8115</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>World Gross Domestic Product (bil 2014$)</td>
<td>95300</td>
<td>112460</td>
<td>133700</td>
<td>158900</td>
<td>3.4</td>
<td>3.5</td>
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<tr>
<td>World Mfg Value Added (bil 2014$)</td>
<td>15590</td>
<td>18820</td>
<td>22750</td>
<td>27050</td>
<td>3.8</td>
<td>3.9</td>
</tr>
<tr>
<td>$/mil $ GDP</td>
<td>364</td>
<td>385</td>
<td>399</td>
<td>407</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>$/000$ MVA</td>
<td>2.2</td>
<td>2.3</td>
<td>2.3</td>
<td>2.4</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>m²/capita</td>
<td>5.0</td>
<td>5.9</td>
<td>7.1</td>
<td>8.0</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>World Pressure Sensitive Tape Demand</td>
<td>34725</td>
<td>43325</td>
<td>53400</td>
<td>64750</td>
<td>4.5</td>
<td>4.3</td>
</tr>
<tr>
<td>North America</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>7679</td>
<td>9090</td>
<td>10520</td>
<td>11965</td>
<td>3.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Canada &amp; Mexico</td>
<td>1254</td>
<td>1470</td>
<td>1745</td>
<td>2075</td>
<td>3.2</td>
<td>3.5</td>
</tr>
<tr>
<td>Western Europe</td>
<td>5706</td>
<td>6090</td>
<td>6805</td>
<td>7540</td>
<td>1.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Asia/Pacific</td>
<td>16300</td>
<td>21850</td>
<td>28285</td>
<td>35295</td>
<td>6.0</td>
<td>5.3</td>
</tr>
<tr>
<td>China</td>
<td>9605</td>
<td>13495</td>
<td>17540</td>
<td>21590</td>
<td>7.0</td>
<td>5.4</td>
</tr>
<tr>
<td>Japan</td>
<td>1870</td>
<td>2040</td>
<td>2185</td>
<td>2360</td>
<td>1.8</td>
<td>1.4</td>
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<tr>
<td>Other Asia/Pacific</td>
<td>4825</td>
<td>6315</td>
<td>8560</td>
<td>11345</td>
<td>5.5</td>
<td>6.3</td>
</tr>
<tr>
<td>Central &amp; South America</td>
<td>1881</td>
<td>2180</td>
<td>2555</td>
<td>3145</td>
<td>3.0</td>
<td>3.2</td>
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<tr>
<td>Eastern Europe</td>
<td>1800</td>
<td>2252</td>
<td>2760</td>
<td>3430</td>
<td>4.6</td>
<td>4.2</td>
</tr>
<tr>
<td>Africa/Mideast</td>
<td>1359</td>
<td>1863</td>
<td>2475</td>
<td>3375</td>
<td>6.5</td>
<td>5.8</td>
</tr>
<tr>
<td>$/m²</td>
<td>0.84</td>
<td>0.92</td>
<td>1.02</td>
<td>1.12</td>
<td>1.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Pressure Sensitive Tape Demand (bil $)</td>
<td>29.2</td>
<td>40.0</td>
<td>54.4</td>
<td>72.5</td>
<td>6.5</td>
<td>6.3</td>
</tr>
</tbody>
</table>
• In **volume** terms:
  – 53.4 bn m² - growth of 4.3% p.a.
  – 43.3 bn m² in 2015

• In **value** terms:
  – $54.4 bn – growth of 6.3% p.a
  – $40 bn in 2015

• **Average tape prices**
  – From ~ $0.92 per m² in 2015
  – To $1.02 per m² in 2020 - projected to **increase ~ 2%** per year

  (oil and natural gas prices are expected to remain comparatively low by historical standards)
DEMAND BY REGION

PSA tape demand
PSA TAPE – REGIONAL DEMAND (VOLUME)

WORLD PRESSURE SENSITIVE TAPE DEMAND BY REGION, 2015

- China 31.1%
- Japan 4.7%

GLOBAL PSA TAPES INDUSTRY STUDY, SOURCE: FREEDONIA, published October 2016
### PSA TAPE – REGIONAL DEMAND (VOLUME)

<table>
<thead>
<tr>
<th>CAGR (%)</th>
<th>10-15</th>
<th>15-20</th>
<th>20-25</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4,5</td>
<td>4,3</td>
<td>3,9</td>
<td></td>
</tr>
<tr>
<td>Africa &amp; Mideast</td>
<td>6,5</td>
<td>5,8</td>
<td>6,4</td>
<td></td>
</tr>
<tr>
<td>Central &amp; South America</td>
<td>3,0</td>
<td>3,2</td>
<td>4,2</td>
<td></td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>4,6</td>
<td>4,2</td>
<td>4,4</td>
<td></td>
</tr>
<tr>
<td>Western Europe</td>
<td>1,3</td>
<td>2,2</td>
<td>2,1</td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td>3,4</td>
<td>3,0</td>
<td>2,6</td>
<td></td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>6,0</td>
<td>5,3</td>
<td>4,5</td>
<td></td>
</tr>
</tbody>
</table>
The **Asia/Pacific** region, will continue to grow above average by increased manufacturing output, especially in the food and beverage market.

The **Chinese** market equals combined size of USA and Western Europe; it will remain the largest market by a wide margin despite some ongoing economic slowdown.

The **Africa/Mideast** region will register the fastest growth through the forecast period, but will still account for less than 5% of global demand by 2020. *Not the next generation yet!*

The more mature markets of **NAM, WEU, and JPA** will continue to account for more than one-third of total demand in 2020. However, growth opportunities in these markets will be more restrained.

- In the **US**, modest gains in manufacturing output will support sales of carton sealing tapes, as will increases in motor vehicle production and construction activity.
- In **Western Europe**, rebounding construction activity following a long period of decline will boost the use of masking and other tapes.
- **Japan’s** economic growth will remain slow, but the country will remain a significant producer and consumer of specialty tapes, such as those used in motor vehicle and electronics assembly.
PSA tape demand

DEMAND BY PRODUCT TYPE
PSA TAPE – DEMAND BY TYPE (VOLUME)

WORLD PRESSURE SENSITIVE TAPE DEMAND BY TYPE, 2015

- Carton Sealing: 67%
- Masking: 8%
- Electrical & Electronic: 4%
- Double-Sided: 4%
- Medical: 2%
- Other: 13%
- 43.3 billion m²
• **Carton sealing tapes** (CST) demand is forecast to grow 4.1% p.a. to nearly 36bn m²

• **Masking tapes**, including both commodity and high performance types, is expected to increase 4.7% p.a. to nearly 4.6bn m²

• While carton sealing tape (CST) will continue to account for the majority of demand, a number of **specialty tape types** - including medical and double-sided tapes - are expected to register faster growth:
  
  – **Electrical and electronic** tapes (excluding double-sided types, which are covered separately) are projected to grow 3.8% p.a. to 2.3bn m²
  
  – **Double-sided tapes** are projected to grow 5.7% p.a. to nearly 2.5bn m², faster than the overall average for the global tape market.
  
  – **Medical tapes** demand, including surgical, medical equipment, and sports medicine and athletic tapes, is projected to rise 4.9% p.a. to 1.4bn m²
3. SUPPLY / PRODUCTION
SUPPLY/ PRODUCTION OVERVIEW – YESTERDAY

• **Asia/Pacific**
  – In 2003 accounted for 40% of world PSA production
  – In 2013 this stood at ~ 50%

• Tape production in more advanced economies declined between 2008 – 2013:
  – Western Europe slowed; growth in the US at less than 1%.

• Tape manufacturing:
  – China is now world’s largest manufacturer, supplying to APAC, Eastern Europe, and North America.
  – Taiwan and Indonesia also produce tapes mainly destined for export markets.
  – Italy is Europe’s leading manufacturer, supplying much of the market in both Western and Eastern Europe.

GLOBAL PSA TAPES INDUSTRY STUDY, SOURCE: FREEDONIA, published October 2014
The Asia/Pacific region will expand its share of global output from 56% in 2015 to nearly 60% in 2020.

China and the US will remain the two leading global producers of tape, with China now the largest by a wide margin.

Italy has seen much of its traditional market stagnate or decline in recent years, as demand in WEU has stalled for the most part, and EEU remains a still-underdeveloped market for PSA tape.

Taiwan has seen one of its traditional export markets, China, boost domestic production. Some Taiwanese suppliers to the Chinese market have shifted production to mainland China, retaining their share of the market.

China, India, and Indonesia will continue to see strong growth in tape production, although India’s production remains low relative to the size and growth of the domestic tape market.

Japan’s tape industry will remain important despite seeing little growth through 2020, due to a sluggish domestic market and increased production in neighboring countries that were once more import-reliant.
SUPPLY / PRODUCTION

THE PLAYERS
Thousands of firms are active in the global pressure sensitive tape industry, including converters. Still, the global market is led by a few dozen firms, the largest of which are active in most of the world’s major geographic markets.

3M, Nitto Denko, tesa, and Lintec -- controlled nearly 20 percent of the global pressure sensitive tape market in value terms in 2015 (>1bn sales each)
Most players are diversified conglomerates, PSA Tapes just one of several streams of income.

<table>
<thead>
<tr>
<th>Company</th>
<th>PSA Tape Sales</th>
<th>Non-PSA Tape Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>3M</td>
<td>4.0 (13%)</td>
<td>30.3</td>
</tr>
<tr>
<td>Nitto Denko</td>
<td>1.4 (21%)</td>
<td>6.6</td>
</tr>
<tr>
<td>Beiersdorf (tesa)</td>
<td>1.2 (16%)</td>
<td>7.4</td>
</tr>
<tr>
<td>Lintec</td>
<td>1.0 (57%)</td>
<td>1.8</td>
</tr>
<tr>
<td>IPG</td>
<td>0.4 (54%)</td>
<td>0.8</td>
</tr>
<tr>
<td>Yem Chio (Achem)</td>
<td>0.4 (71%)</td>
<td>0.6</td>
</tr>
<tr>
<td>Avery</td>
<td>0.4 (6%)</td>
<td>6.0</td>
</tr>
<tr>
<td>Sekisui</td>
<td>0.3 (4%)</td>
<td>9.1</td>
</tr>
<tr>
<td>Shurtape</td>
<td>0.3 (93%)</td>
<td>0.4</td>
</tr>
<tr>
<td>Berry Plastics</td>
<td>0.3 (6%)</td>
<td>4.9</td>
</tr>
<tr>
<td>Henkel</td>
<td>0.3 (1%)</td>
<td>20.1</td>
</tr>
<tr>
<td>Illinois Tool Works (Stokvis)</td>
<td>0.3 (2%)</td>
<td>13.4</td>
</tr>
<tr>
<td>Scapa</td>
<td>0.3 (66%)</td>
<td>0.4</td>
</tr>
<tr>
<td>Oji Holdings</td>
<td>0.2 (2%)</td>
<td>11.9</td>
</tr>
<tr>
<td>MACtac</td>
<td>0.2 (38%)</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Supply/ Production

DETAILS PER REGION
Details per region

ASIA PACIFIC
Demand is expected to increase 5.3% p.a. to 28.3bn m² in 2020, i.e. > 50% of global market

- While this represents a deceleration from previous periods (largely due to slowing economic growth in China), gains will remain robust by global standards
- CST > 70%
Details per region

WESTERN EUROPE
Regional tape production will rise a modest 1.2% annually to 6.3bn m² in 2018.

Italy will remain the largest regional producer.

**Market Trends**

- Western Europe will have the market edge with specialty tapes.
- Solvent – based adhesives will continue to be replaced by environmentally, waterborne and hot melt types.
Demand is expected to increase 2.2% p.a. to 6.8bn m² in 2020; ~ 13% of market

- While anticipated growth is well below global average, it will present a significant improvement over previous periods in which growth barely exceeded 1%
- CST ~ 60%
4. PSA TAPE MARKETS
Global **motor vehicle production** is expected to grow 3.5% p.a. reaching > 100m units by 2020. While vehicle output fell in some major countries like Brazil & Japan, this was more than offset by gains in markets such as North America and the Asia/Pacific region.

- World expenditures on **building & construction** are projected to expand 3.6 % p.a. through 2020; More than 55% of global expenditures in AP (China = 36%); Expenditures almost evenly distributed between residential and non-residential building sectors.

- Global demand for **electrical and electronic tapes** (excl. d/s tapes) is expected to grow 3.8% p.a. reaching a total volume of 2.3bn m² in 2020; For electronic types, gains will be fueled by markets such as computer and personal digital equipment and by the fast pace of new product development.

- World demand for **medical tapes** is expected to **grow 4.9% p.a.** reaching a total volume of 1.4bn m² in 2020; Medical Tapes include: Surgical tapes, Medical equipment tapes, sports medicine tapes, Athletic tapes.

- World demand for **double-sided tapes** is expected to **grow 5.7% p.a.** reaching a total volume of nearly 2.5bn m² in 2020; While these tapes account for a small share of market volume only, they occupy a **much larger share of the market in value terms**; their higher performance, more complex construction and a greater variation in adhesives used make them significantly more costly than most single-sided tapes.
In an effort to provide further value and support new opportunities for our members, the PSTC Board of Directors allocated funds from the strategic reserve to commission a market research study by partnering with TRC Advisory and Brakethrough Research.

**Key objective:** identify top opportunity areas for "growing the pie" for pressure-sensitive tape.

The end goal of this research initiative is to identify the largest pockets of "headroom" for conversion to pressure-sensitive tape from competing solutions...

The objectives included:

- **UNDERSTAND** the decision drivers that are influencing current specification and usage of different bonding solutions
- **ASSESS** the key barriers to converting usage of other bonding solutions to PSA Tape
- **IDENTIFY** the industries and applications that are most likely to convert
How about:

- **NETWORKING** – with key suppliers

Make good use of the Afera!
THANK YOU