

ANFA Nonwovens Conference 2019

INDORAMA
VENTURES
AVGOL[®]
An Indorama Ventures Company

Fibers and Nonwovens in Automotive Applications

Current Trends and a Perspective on the Future

by Sanjay Bhayani & Shailesh Agrawal

ANFA Nonwovens Conference 2019, New Delhi

© IVL Nov-2019



Contents

Megatrends 2030

Automotive Trends & Production

Fibers & Nonwovens For Automotive Applications

Challenges, Opportunities & a Perspective on the Future

Megatrends 2030

Automotive Trends & Production

Fibers & Nonwovens For Automotive Applications

Challenges, Opportunities & a Perspective on the Future

Megatrends 2030



Demographics

8.5B People

+1B in just 15 years!

**Fastest growing
demographic
~1B Elderly (>65y)**

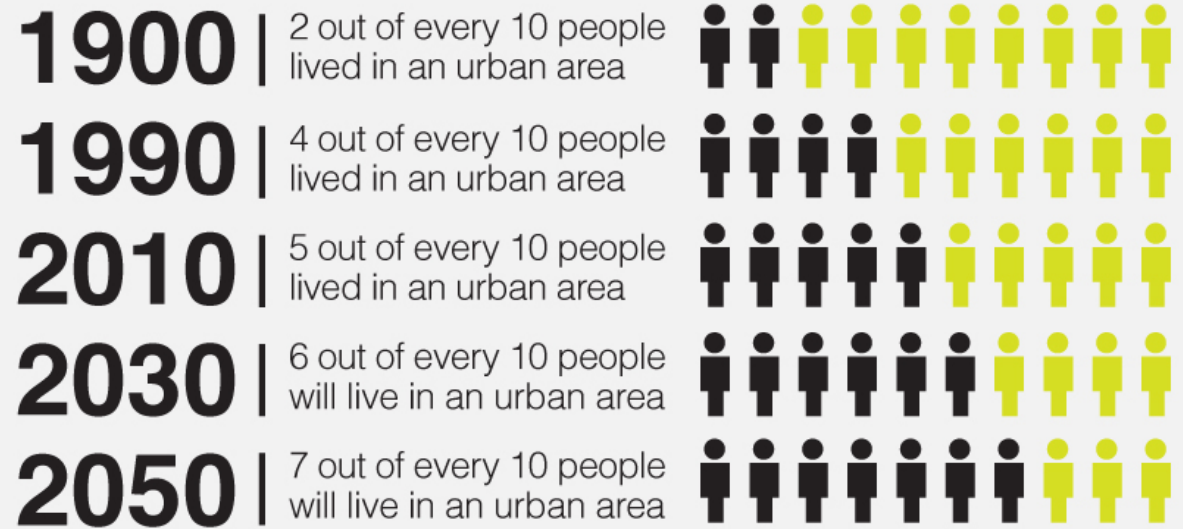
Source: The world in 2030: Nine Megatrends to Watch, Andrew J. Winston May 2019, MIT Sloan Management Review
ANFA Nonwovens Conference 2019, New Delhi

[This Photo](#) by Unknown Author is licensed under [CC BY-SA-NC](#)
© IVL Nov-2019

Megatrends 2030



Urbanization / Megacities



Defined by UN HABITAT as a city with a population of more than 10 million

6 of every 10 people will live in cities
41 megacities vs 28 in 2014
21 megacities will be in Asia

Sources: The world in 2030: Nine Megatrends to Watch, Andrew J. Winston May 2019, MIT Sloan Management Review
OECD Science, Technology and Innovation Outlook 2016

ANFA Nonwovens Conference 2019, New Delhi

Photos by Unknown Authors licensed under [CC BY-NC-ND](#) and [CC BY-SA](#)
© IVL Nov-2019

Megatrends 2030



More Transparency



The world will be more open, less private
Exponential growth in the information collected on each person, product and organization

Megatrends 2030



Rapid move towards zero-carbon tech.

- No power generation using fossil fuels.
- Electric vehicles (EVs): 125-220mn!
(only 3.1mn in 2017)

Increased infra-structure efficiency from the use of data-driven technologies.

Clean Technology



Megatrends 2030

Extreme Climates



Climate
change will
accelerate

Regularly
Extreme
Weather,
Everywhere!

Source: The world in 2030: Nine Megatrends to Watch, Andrew J. Winston May 2019, MIT Sloan Management Review

Photos by Unknown Authors licensed under [CC BY-NC](#), [CC BY-NC-ND](#), [CC BY-SA-NC](#), [CC BY](#)

ANFA Nonwovens Conference 2019, New Delhi

© IVL Nov-2019

Megatrends 2030

Constrained Resources



**More aggressive
Resource
pressures &
constraints**

**The equivalent of
3 Earths' resources
needed by 2050??**

Source: The world in 2030: Nine Megatrends to Watch, Andrew J. Winston May 2019, MIT Sloan Management Review; KPMG

ANFA Nonwovens Conference 2019, New Delhi

© IVL Nov-2019



Megatrends 2030

Automotive Trends & Production

Fibers & Nonwovens For Automotive Applications

Challenges, Opportunities & a Perspective on the Future

Automotive Technology Trends



FLEETS

By 2030, 25% of global miles traveled will be shared^(a)



AUTONOMOUS

A \$7 trillion business by 2050^(b)



CONNECTED

The automobile is third fastest growing tech device after phones and tablets^(c)



ELECTRIC

1st million sold in 6 years, 2nd million sold in 2 years^(d)

(a) The Boston Consulting Group

(b) Intel & Strategy Analytics, Accelerating the Future: The Economic Impact of the Emerging Passenger Economy

(c) Forbes, Intel Moves To Make A Mark In The Automotive Industry, As Processing Grows In Cars

(d) Global milestone: The first million electric vehicles and International Council on Clean Transportation, The rise of electric vehicles: The second million

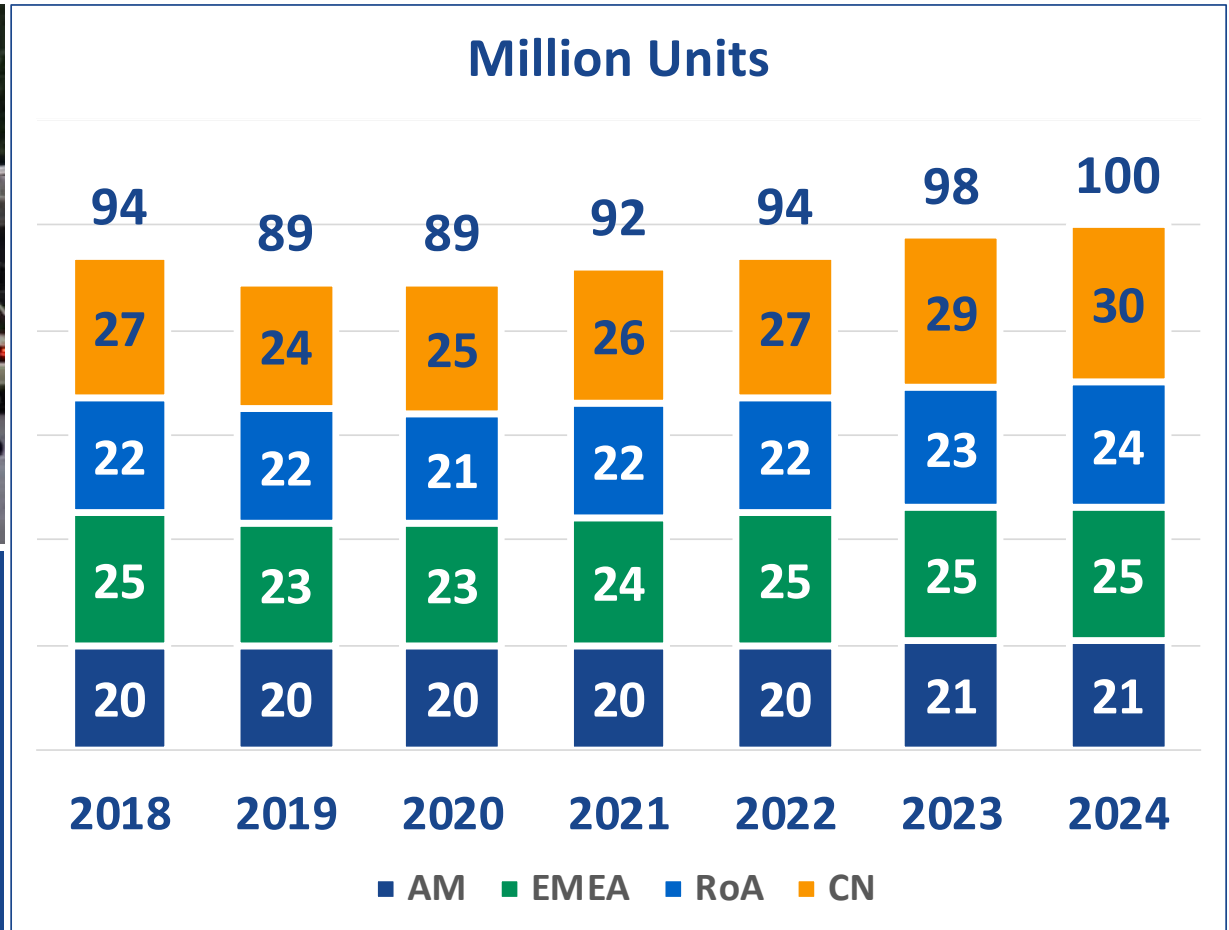
Global Light Vehicle Production



Global 2018-24: +1.0% p.a.

- China +1.8%
- Rest of Asia +1.5%
- EMEA +0.0%
- AM +0.8%

Source: Smithers Rapra / IVL Analysis



This Photo by Unknown Author is licensed under [CC BY-NC-ND](https://creativecommons.org/licenses/by-nc-nd/4.0/)

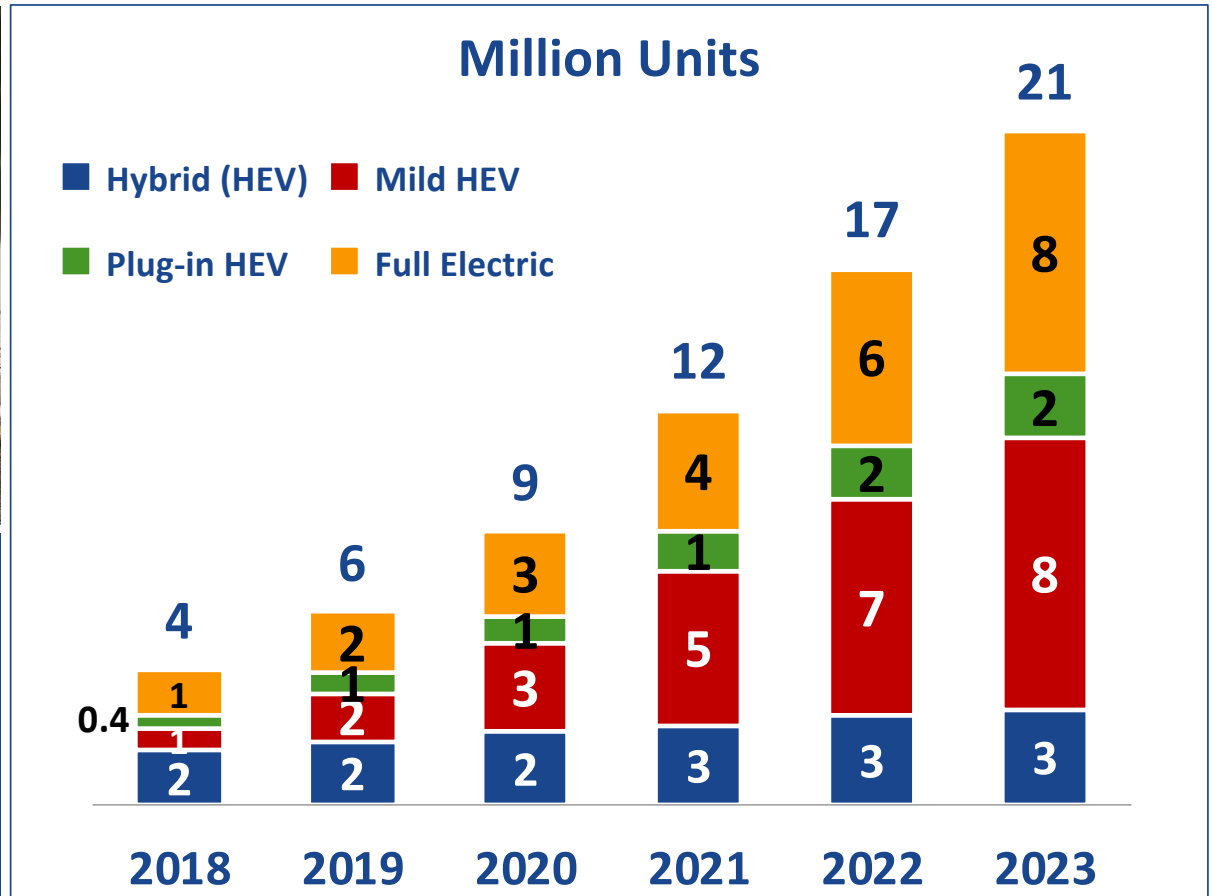
Electric Vehicles – New Registration



EV growing at 32% CAGR

Full EVs 41% CAGR

China Leads on EVs: 1M in 2018!



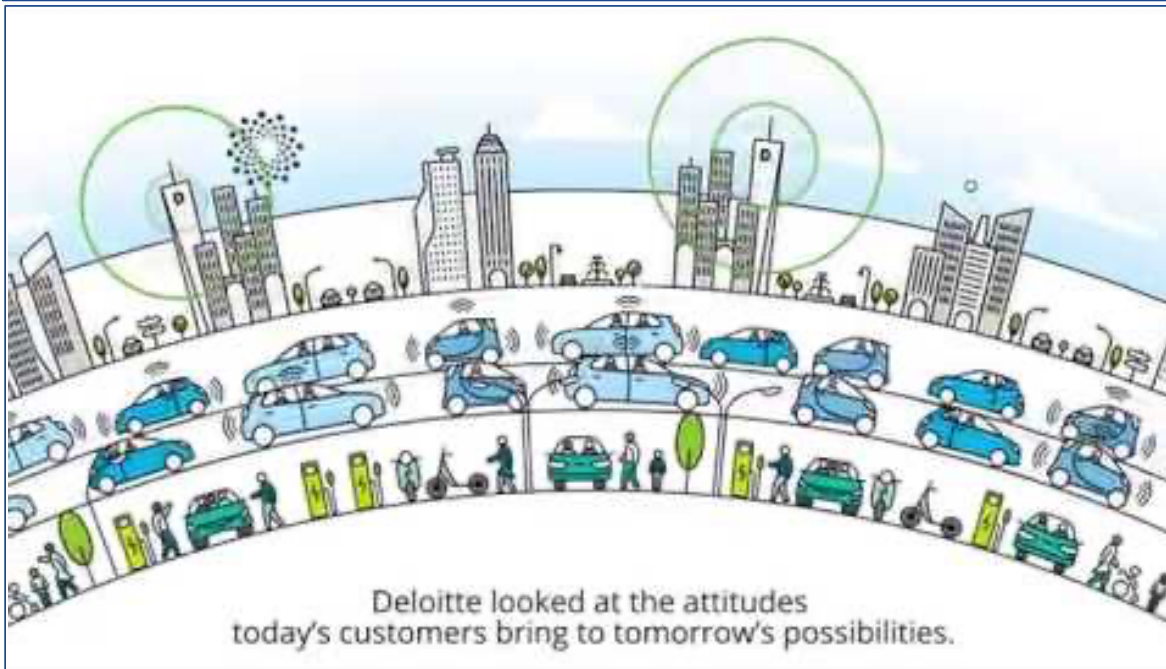
Sources: Smithers Rapra; IEA: Global EV Outlook 2019

ANFA Nonwovens Conference 2019, New Delhi

This Photo by Unknown Author is licensed under [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/)
© IVL Nov-2019

Deloitte Global Consumer Study

Insights & Perspectives from automotive consumers around the world



**Stalling trust in
Autonomous vehicles**

More choices for mobility

**Looking to Governments
for increased regulation**

Affordability is imperative

Other interesting references:

KPMG - Mobility 2030: Beyond Transportation: <https://www.youtube.com/watch?v=4B7mZFU2sB4>

McKinsey & Co. - The Future of Commercial Mobility: <https://www.youtube.com/watch?v=KllwSSz05Xw>

Volvo: Smart Cities - Infrastructure and Transport of the Future: <https://www.youtube.com/watch?v=d1DndVz9dAs>

Megatrends 2030

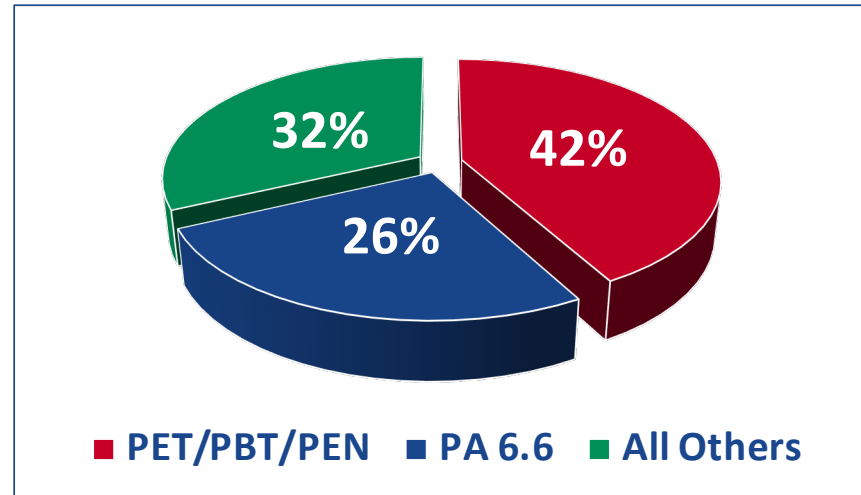
Automotive Trends & Production

Fibers & Nonwovens For Automotive Applications

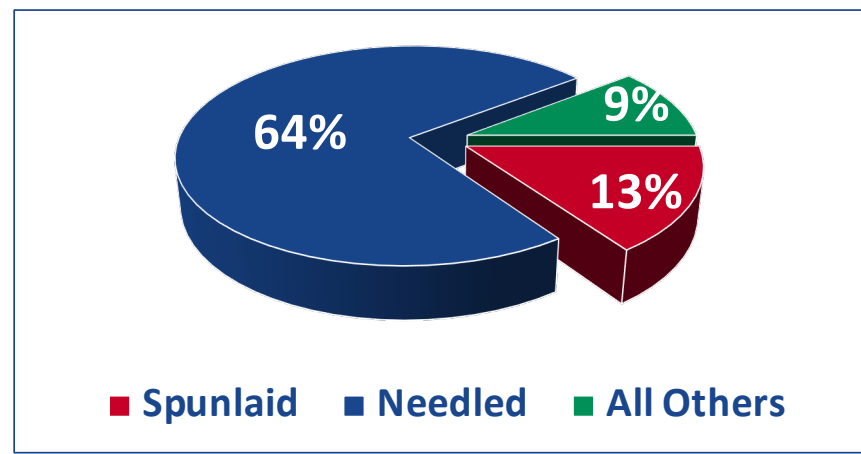
Challenges, Opportunities & a Perspective on the Future

Fibers & Substrates in Automotive Applications

Fibers				
rPET / PET / PBT / PEN, Hollow PET				
PA 6.6	PP	Viscose	Aramids	FR
Low Melt / Bico			Carbon	
Cotton / Flax / Jute / Hemp				



Nonwoven Substrates	
Thermo-bonded	Spunlaid
Hydro-entangled	Stitch-bonded
Meltblown	Drylaid
Needlepunched	Airlaid/Wetlaid



Source: International Nonwovens Journal: Nonwovens in Automotives – More than just a pretty face by William C. Smith

ANFA Nonwovens Conference 2019, New Delhi

© IVL Nov-2019

Nonwovens/Textiles in Automotive Applications



- Fuel, Oil, Cabin Air Filters
- Battery Separators
- Moulded Seat Covering
- Carpet, backing, reinforcement
- Car mats
- Decorative fabric, interior trims
- Headliners
- Trunk liners, Wheel arch liners
- Engine hood liners
- Acoustic & Heat Insulation
- Airbags & Seat belts
- Vehicle underbody insulation

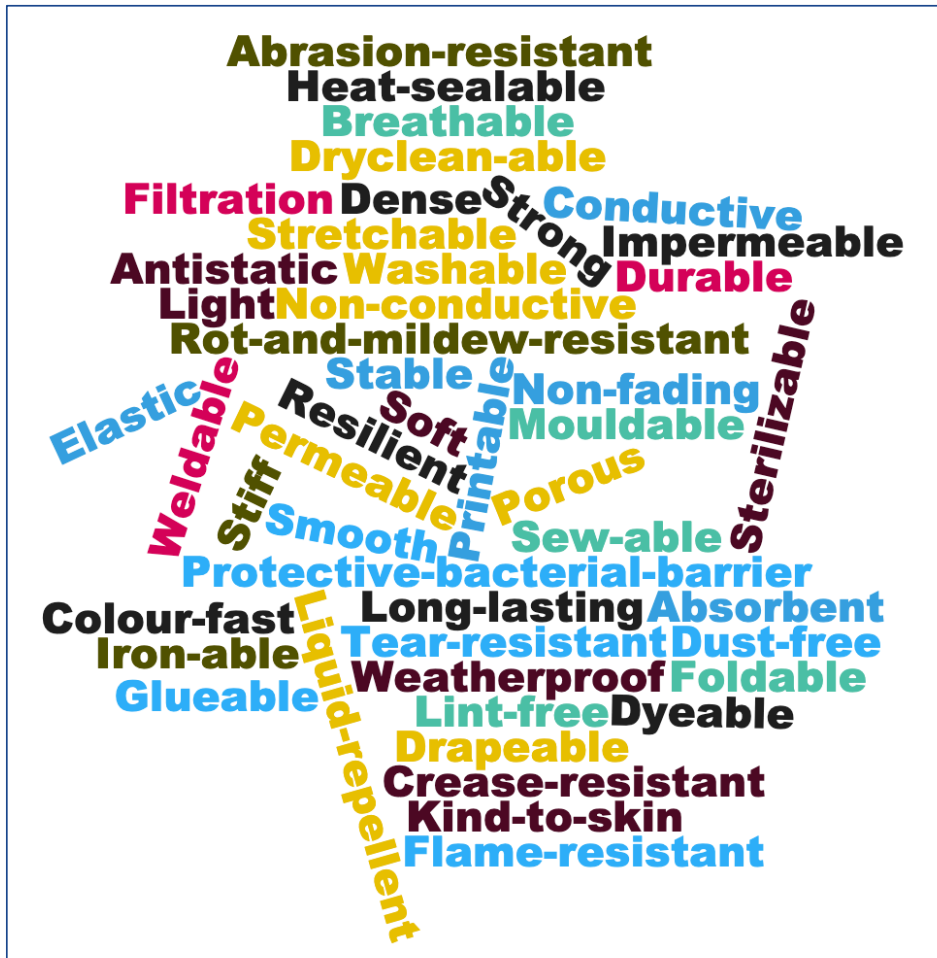
>40 Car Parts Made of Nonwovens

Source: EDANA

ANFA Nonwovens Conference 2019, New Delhi

© IVL Nov-2019

Advantages of Nonwovens



AUTOMOTIVE

LIGHTWEIGHT FABRICS FOR VEHICLES



NONWOVENS ARE
15% TO 30% LIGHTER
THAN THE TRADITIONAL
MATERIALS THEY REPLACE,
MAKING YOUR CAR
MORE THAN  **2KG LIGHTER.**



LESS POLLUTION = BETTER HEALTH :
IF NONWOVENS WERE USED
IN ALL NEW CARS IN THE EU,
THIS WOULD RESULT IN
MORE THAN 2,000
DISABILITY ADJUSTED
LIFE YEARS.



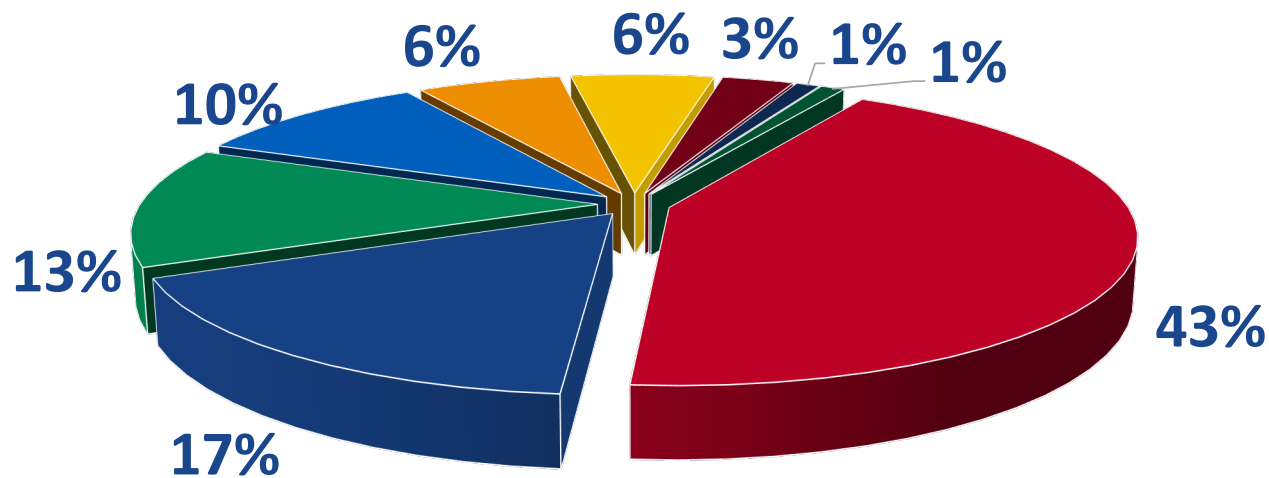
TWO THIRDS OF THIS
BENEFIT COMES FROM
THE USE OF THE CAR.
THAT IS FROM THE DAY
THAT YOU BEGIN DRIVING IT.

FOR AN AVERAGE
PASSENGER CAR, USING
NONWOVENS SAVES
55 KG CO₂
EQUIVALENTS
OVER ITS LIFETIME.



CARS USING NONWOVENS
IN ALL POSSIBLE
APPLICATIONS, FROM
INSULATION, TO LININGS
HAVE A BENEFIT OF
MORE THAN 30%
LESS IMPACT
ON THE ENVIRONMENT.

Nonwoven Applications in Automotive



■ Carpet **■ Insulation** **■ Trunk** **■ Hoodliner** **■ Headliner**
■ Seating **■ Package Trays** **■ Door Panels** **■ Miscellaneous**

- Carpets & insulation make up ~73% of the nonwovens used in a vehicle
- Recycled materials are therefore widely used

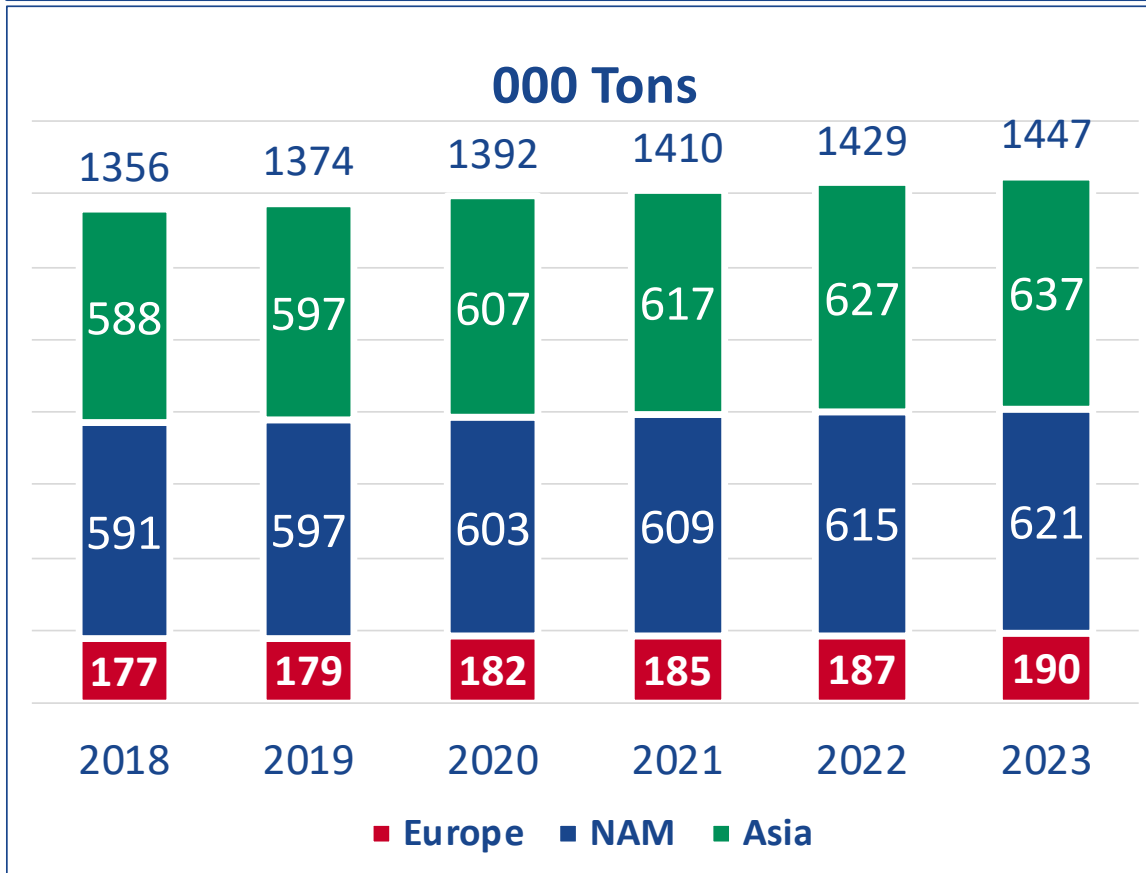
Source: International Nonwovens Journal: Nonwovens in Automotives – More than just a pretty face by William C. Smith

ANFA Nonwovens Conference 2019, New Delhi

© IVL Nov-2019

Automotive Nonwoven Consumption

Regions with Major Consumption



- Automotive nonwovens are ~12% of all nonwovens
- 0~2% cagr (different regions)
- Light-weighting continues
From average ~115gsm in 2012 going to 100gsm by 2022
- Nonwoven Composites growing faster than any single nonwoven

Source: INDA, EDANA, IVL Estimates, Smithers Pira: The future of nonwovens to 2022

ANFA Nonwovens Conference 2019, New Delhi

© IVL Nov-2019



Megatrends 2030

Automotive Trends & Production

Fibers & Nonwovens For Automotive Applications

Challenges, Opportunities, & a Perspective on the Future

Challenges & Opportunities



Balance between a fast growing urban population and resource constraints



More frequently extreme climates will influence lifestyle choices and growth of microcosms



Multi-Modal Mobility
Personal vehicles
MRT systems
Ride sharing
Vehicle Subscription



Autonomous vehicles – very much visible now!
Improving quality of life or more dangerous roads?!

A Perspective on Future – Fibers & Automotive NW



Sustainability demands will continue to drive the usage of recycled and bio-degradable materials, and light-weighting



Despite higher safety levels, heat insulation/flame retardance could take priority over acoustic insulation



Smart (& beautiful) nonwovens enable application of IOT



Asia will be more involved in technology development, while continuing to remain the leading producer



Ride-sharing, subscription services, public transportation will demand even higher levels of durability/resilience.

This Photo by Unknown Author is licensed under [CC BY-SA](#), [CC BY](#), [CC BY-ND](#), [CC BY-NC-ND](#)



INDORAMA VENTURES AVGOL®

An Indorama Ventures Company

*We save lives!**

www.indoramaventures.com

www.avgol.com

www.dejamade.com

www.fibervisions.com

www.es-fibervisions.com

www.trevira.com

www.php-fibers.com

www.glanzstoff.com

www.kordarna.cz

Thank you for your Attention!

(*) IVL Mobility Group, 80.000 people per year with Airbags!

Fiber@Indorama.net

Credits

- The world in 2030: Nine Megatrends to Watch, Andrew J. Winston May 2019, MIT Sloan Management Review
- OECD Science, Technology and Innovation Outlook
- KPMG Future Stress 2030
- Smithers Rapra
- IEA: Global EV Outlook 2019
- Goodyear Tires
- INDA / EDANA
- The future of nonwovens, Smithers Pira
- Nonwovens Industry Magazine – Various articles
- Deloitte Consulting: Insights & Perspectives from automotive consumers around the world
- KPMG: Mobility 2030: Beyond Transportation
- McKinsey & Co.: The Future of Commercial Mobility
- Volvo: Smart Cities: Infrastructure & Transport of the Future
- Polyester Usage for Automotive Applications, By Canan Saricam and Nazan Okur
- International Nonwovens Journal: Nonwovens in Automotives – more than just a pretty face by William C. Smith
- Bloomberg: Toyota working on a car that can run 'forever' without charging
- IVL Analysis