US Field trip

Exton, Pennsylvania

September 4, 2014
Safe harbor statement

This presentation may contain forward-looking statements with respect to DSM’s future (financial) performance and position. Such statements are based on current expectations, estimates and projections of DSM and information currently available to the company. DSM cautions readers that such statements involve certain risks and uncertainties that are difficult to predict and therefore it should be understood that many factors can cause actual performance and position to differ materially from these statements. DSM has no obligation to update the statements contained in this presentation, unless required by law.

A more comprehensive discussion of the risk factors affecting DSM’s business can be found in the company’s latest Annual Report, which can be found on the company's corporate website, www.dsm.com
Performance Materials: differentiated growth strategy

- **Accelerate**
  - Functional materials
  - Solar
- **Strengthen**
  - PA6 compounds
  - High Performance Plastics
- **Restructure**
  - Powder Coating resins
  - Dyneema® Life Protection
  - Composite resins

- **DSM’s capabilities to extract value**
  - BG DRF
  - BG DEP
  - BG Dyneema
  - DSM Biomedical
What are Biomedical Materials?

<table>
<thead>
<tr>
<th>Biocompatible material is ...</th>
<th>For example...</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ ...a synthetic or natural material used to replace part of a living system or to function in intimate contact with living tissue</td>
<td>✓ ...artificial hips, vascular stents, artificial pacemakers, and catheters are all medical devices made from different biocompatible materials</td>
</tr>
</tbody>
</table>

| ✓ ...are classically not made by living organisms but have composition and properties similar to and compatible with those made by living organisms | ✓ ...calcium hydroxyapatite coating found on many artificial hips is used as a bone replacement that allows for easier attachment of the implant to the living bone |

“We propose to consider materials for medical applications within and outside of the human body, both of natural and synthetic origin”
Our vision

“To be the leading development partner, trusted by the medical industry to shape the future of biomaterials and regenerative medical devices that improve and brighten patients’ lives throughout the world”
# Biomedical materials history at DSM

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Start of DSM Dyneema’s medical R&amp;D efforts</td>
<td>Official launch of Dyneema Purity® orthopedic sutures</td>
</tr>
<tr>
<td>2002</td>
<td>Medical Coatings R&amp;D efforts started in DSM Desotech</td>
<td>First sales of Dyneema Purity® fiber for knee ligament fixation</td>
</tr>
<tr>
<td>2004</td>
<td>Biomedical EBA launched</td>
<td>First sales of Dyneema Purity® fiber in cardiovascular and spinal applications</td>
</tr>
<tr>
<td>2006</td>
<td>PTG Acquisition</td>
<td>First cardiovascular &amp; ophthalmic drug delivery development agreements</td>
</tr>
<tr>
<td>2008</td>
<td>DSM targets EBA sales in 2020 &gt; €1bn</td>
<td>Expanded portfolio for ophthalmic applications</td>
</tr>
<tr>
<td>2010</td>
<td>Medivas technology acquisition for Drug Delivery</td>
<td>Kensey Nash Acquisition</td>
</tr>
<tr>
<td>2012</td>
<td>Actamax DSM-DuPont JV</td>
<td>510(k) clearance from the FDA for PRP Device</td>
</tr>
<tr>
<td>2014</td>
<td>US Dyneema Purity® fiber plant</td>
<td>In-house medical coating service plant</td>
</tr>
<tr>
<td></td>
<td>UHMWPE membrane technology</td>
<td>Dyneema Purity® 10 dtex fiber launch</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Medivas technology acquisition for Drug Delivery</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Bionate® II PCU Antimicrobial Coatings</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Next generation UH product</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>VitroStealth® non-biofouling coatings</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>DSM targets EBA sales in 2020 &gt; €1bn</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Expanded portfolio for ophthalmic applications</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Kensey Nash Acquisition</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>510(k) clearance from the FDA for PRP Device</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>In-house medical coating service plant</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Dyneema Purity® 10 dtex fiber launch</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Medivas technology acquisition for Drug Delivery</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Bionate® II PCU Antimicrobial Coatings</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Next generation UH product</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>VitroStealth® non-biofouling coatings</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>DSM targets EBA sales in 2020 &gt; €1bn</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Expanded portfolio for ophthalmic applications</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>Kensey Nash Acquisition</td>
</tr>
<tr>
<td></td>
<td>510(k) clearance from the FDA for Meso Bilayer Surgical Mesh</td>
<td>510(k) clearance from the FDA for PRP Device</td>
</tr>
</tbody>
</table>
Responding to today’s trends and challenges

Global sustainability
  • Committed to finding effective, sustainable solutions to medical issues facing the world

Active lifestyle
  • Helping medical device manufacturers and clinicians meet the challenges in medicine - with biomedical materials that are the industry standard in strength and biostability

Healthcare costs
  • Designing innovative biomedical materials that enable medical device manufacturers to make more minimally invasive devices which speed recovery, shorten hospital stays and minimize reoperation

Aging population
  • Contributing to treatments that help people lead longer, healthier and more active lives
From repair to healing

- Supportive Care
- Mechanical Replacement
- Natural Materials
- Engineered Tissue
- Cell Based

Evolution in Medical Devices

Complexity - from repair to healing
2013 Medical Devices Market: ~ USD 180bn*

The material solutions market is estimated at USD 30-50bn with CAGR > 2 times GDP

* Source  HRI 2013
Our business model

We provide products and technologies to our customers and strategic partners (medical device and pharmaceutical companies) who utilize their expertise and well established distribution networks in a wide variety of market segments.

Our business growth initiatives are guided by four basic strategies:

1. Invest in our core technologies
2. Develop new proprietary biomedical material products
3. Establish new partnerships and customers
4. Manufacture biomedical materials and products for our customers
Value chain strategy

**Strategy:** Capitalize on material technology & capabilities to create/extract more value further down in the Value Chain without selling & distributing.
The clinical segments we serve

- Cardiovascular
- Dental
- Diabetes management
- Diagnostic
- General surgery
- Neurologic
- Ophthalmic
- Orthopedic
- Pain management
- Plastic & Reconstructive surgery
- Sports medicine
- Urinary
- Vascular
- Women’s health
Broader portfolio of biomedical materials

Biomedical Polyurethanes
Coatings
Drug delivery
ECMs
Mechanical Devices

Polyethylene
Silicone hydrogels
Extracellular Matrices
Innovative devices and tooling

Natural Materials
Polymers & Metals
Silicone hydrogels
Biomedical Polyethylene

Ceramics, Minerals & Collagen
PLA, PEEK, Polyurethane & Metal Implants

Making medical products longer-lasting, more effective, less invasive and more productive
Our technologies, materials and capabilities

Core Technologies

Specialty Materials

Capabilities

Committed to the long-term improvement of people’s lives through innovation

Work together providing the most advanced and trusted solutions to the medical industry
Core technologies

Technology Platforms

Part of a comprehensive established DSM organization committed to the long-term improvement of people’s lives through innovation.
Synthetic Resorbable Materials

- **Variety of Resorbable Materials**
  - PLA, PGA, Polycarbonates (e.g. TMC), ...
  - Polycaprolactones

- **Multiple Configurations**
  - Proprietary High Strength technology
  - Solid, Porous

- **Composites**
  - Ceramics Combinations
    - B-TCP
    - HA
    - Bioactive Glass
Applications for Synthetic Resorbable Materials

**Markets**
- CMF
- Trauma
- Sports Medicine
- Dental
- Spine
- Extremities
- Cardiovascular

**Applications**
- Dental Membranes
- Trauma plates
- Micro Fixation devices: e.g. anchors, pins, screws etc.
- Spinal Fusion devices
- Stents and Shunts
- Meniscus repair device
- Joint applications
- CMF devices for reconstructive surgery
- Vascular Closure Devices
Specialty Materials

Part of a comprehensive established DSM organization committed to the long-term improvement of people’s lives through innovation.

- Collagen
  Fibrous, Fibrillar & Soluble
  Ceramic Compounding

- Silicone Hydrogels

- Biostable Polyurethanes
  Thermoplastic Pellets, Sheets, Rods & Tubes

- Stabilizers for UHMWPE (HALS)

- Polyesteramide (PEA) Polymers
  Particles, Rods, Films, Coatings
  Biologics / Drug Compounding

- UHMWPE Fiber
  Spools & Non-Woven Matts
  Dyneema Purity®

- Ceramics
  Powders, Granules, 3D Shapes, Settable Cements

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.
Our Specialty Materials: from repair to healing

- Mechanical Replacement
- Supportive Care
- Natural Materials
- Biomedical Polyurethanes
- Biomedical Polyethylenes
- Coatings
- Drug Delivery

- Engineered Tissue
- Mechanical Devices
- ECM's
- Bio Commercialization
- Silicon Hydrogels
- Polymers & Metals

Evolution in Medical Devices

Complexity - from repair to healing

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.
Biostable polyurethanes

Bionate® and Bionate® II
Thermoplastic Polycarbonate-urethane

BioSpan®
Segmented Polyurethane

CarboSil®
Thermoplastic Silicone-Polycarbonate-urethane

Elasthane™
Thermoplastic Polyether-urethane

PurSil®
Thermoplastic Silicone-Polyether-urethane

All polymer families have extensive FDA Master Files
Applications for polyurethanes

Markets
- Cardiovascular
- Diabetes management
- Diagnostic
- Neurologic
- Orthopedic
- Vascular
- Women’s Health

Applications
- Articulating joint implants
- Artificial hearts
- Balloons
- Cardiac rhythm management
- Cardiovascular electrostimulation
- Continuous glucose monitoring
- Drug eluting stents
- Gynecological surgery (C-section, hysterectomy)
- Neurostimulation
- Orthopedic implants
- Pacemaker leads
- Reproductive health devices
- Spinal implants
- Total disc replacement devices
- Ventricular assist devices
Capabilities & expertise

Manufacture & Assembly
Clean rooms: 15 class 100,000 suites
25,000 sq-ft
cGMP & ISO 13485 certified

Regulatory & Clinical
510k, PMA, CE Mark, IDE, Biocompatibility
US & OUS Clinical Trials

Packaging & Sterilization
Tray, Pouch, Box, Layout, IFU’s, Labels
Gamma, E-Beam, ETO

Device Testing
Mechanical, Chemical, Microbiological & Invivo/Invitro

Research & Development
Fully Equipped Pilot Manufacturing, Cell Culture & Analytical Materials Characterization Laboratories

Tool Shop
EDM, CNC, Milling, Grinding, Mold design & Fabrication
14 Full Time Toolmakers

Part of a comprehensive established DSM organization committed to the long-term improvement of people’s lives through innovation.

Capabilities
Regulatory filing and support

- Regulatory strategy consultation
  - Experienced clinical and regulatory affairs staff

- US and international regulatory filing
  - Proven track record of obtaining US and foreign regulatory approvals

- Clinical evaluation reports per ISO 14155

- Clinical investigation plan development and trial management
  - Large and small-scale clinical trials with leading medical institutions throughout the world
Who are we Trusted by?
DSM cell therapy development services

- Design, develop, and manufacture systems to isolate and concentrate autologous cells at the point of care
- Manage the regulatory filings and/or approvals (e.g. PMA, IDE, 510K)
- Partner with leaders in industry

<table>
<thead>
<tr>
<th>DSM</th>
<th>Competition</th>
<th>Benefit for physician</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>Consistent high platelet recovery and concentration</td>
<td>Variable results in PRP concentration</td>
</tr>
<tr>
<td>Processing time</td>
<td>2.5 minutes</td>
<td>15 - 30 minutes</td>
</tr>
<tr>
<td>Size</td>
<td>Small and portable @ only 4 lbs.</td>
<td>24 - 68 lbs.</td>
</tr>
<tr>
<td>Procedure</td>
<td>3-step automated process</td>
<td>Multiple steps; cumbersome process</td>
</tr>
</tbody>
</table>

“This products give us more non-operative tools to personalize the approach for the individual patient based on their level of activity, degree of injury and treatment preference,” Peter Vitanzo, MD, Sports Medicine Specialist at the Rothman Institute in Philadelphia

DSM offers a repeatable model to be used in other cell therapies
DSM as Business Partner

Strong Reputation
• Large player with 100+ years of history, committed to further grow its position in the medical material field
• Supplier of materials & technologies, partnering with most large medical device companies today
• Science-based company with highest quality standards and OEM capability for medical device companies

One Stop Shop
• Broad portfolio of biocompatible materials with strong track record and FDA master files in place
• Wide range of capabilities ranging from design to manufacturing and from testing to packaging

Global Reach
• Worldwide, millions of patients have material from DSM in their body in all kind of medical devices
• DSM has teams to support you in US, EU and Asia

“DSM is helping medical device manufacturers provide better, safer and cost effective products to improve patient care”
Safe harbor statement

This presentation may contain forward-looking statements with respect to DSM’s future (financial) performance and position. Such statements are based on current expectations, estimates and projections of DSM and information currently available to the company. DSM cautions readers that such statements involve certain risks and uncertainties that are difficult to predict and therefore it should be understood that many factors can cause actual performance and position to differ materially from these statements. DSM has no obligation to update the statements contained in this presentation, unless required by law.

A more comprehensive discussion of the risk factors affecting DSM’s business can be found in the company’s latest Annual Report, which can be found on the company's corporate website, www.dsm.com
Agenda

- DSM Strategy
- Who are we?
- Growth
- Automotive
- Electronics
- Polymers for Flexible Packaging
- Investments
Performance Materials: differentiated growth strategy

- **Strengthen**
  - >2x GDP
  - PA6 compounds
  - PA6 film & extrusion

- **Restructure**
  - <2x GDP
  - Composite resins

- **Accelerate**
  - ~2x GDP
  - High Performance Plastics
  - Solar
  - Functional materials

- DSM Engineering Plastics

- DSM’s capabilities to extract value
  - LB DRF
  - BG DEP
  - BG Dyneema
  - EBAs

- BG DEP
  - PA6 film & extrusion
  - Specialty Coating resins

- BG Dyneema
  - Powder Coating resins

- EBAs
  - Dyneema® Fiber Solutions

- DSM Engineering Plastics

- DSM Bright Science. Brighter Living.
Who are we?

- **DSM Engineering Plastics (DEP) Americas** has 350 employees with 3 manufacturing operations and 1 HQ / Commercial Operations / R&T Centre in the Detroit Area.

- Part of **Global Engineering Thermoplastics Business Group** with footprints in Europe, Asia and the Americas, strong focus on Semi Crystalline products.

- *Value creator over supply chains* starting at OEMs and extending till molders. Add value at every step of the chain.

- Proud supplier to serve *worlds most prestigious companies* on the globe.

- Ambitious; expanding in new markets with *new (bio) polymers* and *compounds* determined to be the *supplier of choice*.

- Totally committed to *sustainability & innovation* with new products, in-depth application know-how and R&D investments.

Leading supplier of Engineering Thermoplastics.
Growth DEP Americas

- Innovation pull new applications in all segments
- Growth: beyond typical 2 times GDP growth
- Automotive - DEP outpaced market by penetrating applications
- Electronics sales in Asia (excluded in numbers) - specification done in North America
- The investment in a new Polyamide 6 polymer plant in the US will support strong position in Food packaging and balanced portfolio

Significant organic growth accelerated by investments
Business Dimensions & Growth

Markets
1. Automotive
2. Electronic
3. Film and Extrusion
4. Electrical
5. General Industries

Products
1. Akulon/Novamid PA6 (co) polymers
2. Akulon/Novamid PA6 Compounds
3. Stanyl, Stanyl ForTii PA4.6
4. Arnitel, Arnite PET/PBT/TPC
5. EcoPaXX PA4.10

Regions
1. DEPEU
2. DEPAP
3. DEPAM

Understand Industry and Segment drivers

Translate drivers to opportunities for our products

Business is executed in the regions
Automotive - Global trends support DSM

Growing demand of vehicles especially in high growth economies; upgrade of fleets

Climate change, emission reduction and efficient use of energy is key to OEMs

Demand for more functionalities and safety features increase the electrification and weight of cars
Overview of key drivers

Market definition:
Powertrain & Air/Turbo Management, Interior, Exterior, Auto E&E, Chassis & Brake System

Key drivers for market growth

Key drivers for market growth
- Light Vehicle Growth

Specific growth drivers for DEP
- Emission Reduction and Fuel Consumption Legislation
- Safety Legislation
- Consumer quest for more Comfort
- Improved Eco Footprints

Substitution trends
- Metal-to-plastic conversion
- Interpolymer conversion (downsizing: PA6 to HPM; LCA: biobased plastics)

Strong growth opportunity for DEP
Main differentiators in automotive

- Long historical relationships at engineering, purchasing and managerial levels at many locations of the top-5 Tier-1s
- Proven track record over 15 years, approved in 350 commercial parts worldwide
- Global grades, global specs, local supply and agile global network
Cars*: lighter, more powerful and safer

**Weight development (kg)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Weight (kg)</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>805</td>
<td>+22%</td>
</tr>
<tr>
<td>1983</td>
<td>985</td>
<td>+40%</td>
</tr>
<tr>
<td>1991</td>
<td>1,380</td>
<td>+7%</td>
</tr>
<tr>
<td>1997</td>
<td>1,477</td>
<td>+8%</td>
</tr>
<tr>
<td>2003</td>
<td>1,590</td>
<td>-12%</td>
</tr>
<tr>
<td>2008</td>
<td>1,399</td>
<td>-21%</td>
</tr>
<tr>
<td>2013</td>
<td>1,105</td>
<td></td>
</tr>
</tbody>
</table>

Cars became fatter due to additional features and increase of safety standards.

Cars became smaller due to lightweighting driven by fuel economy.

Cars became more powerful due to increase of use of turbo’s.

**Engine power development (kg)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Engine Power (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golf I</td>
<td>37</td>
</tr>
<tr>
<td>Golf II</td>
<td>40</td>
</tr>
<tr>
<td>Golf III</td>
<td>40</td>
</tr>
<tr>
<td>Golf IV</td>
<td>55</td>
</tr>
<tr>
<td>Golf V</td>
<td>55</td>
</tr>
<tr>
<td>Golf VI</td>
<td>59</td>
</tr>
<tr>
<td>Golf VII</td>
<td>63</td>
</tr>
</tbody>
</table>

1 Maximum curb weight
2 Engine power of the smallest model

* Medium Compact Example

SOURCE: VW
Tightening of CO₂ regulation

CO₂ requirement in different regions

More stringent in future:

2020: CO₂ to 95 g/km in Europe

2025: New WLTP test standard

Will boost metal-to-plastic conversion further

Major driver for weight reduction, leading to technology shifts and inter-material substitution

Source: Argon National Lab
Differentiation driven by application know-how

*With OEMs and Tier 1-system suppliers*

**Industry Definition**
Automotive Industry includes Passenger Car and Light Trucks, produced globally.

**Development time and cycle time**
Developments typically done with OEM or Tier 1 and require 2-4 years, after which ongoing sales to Tiers 1, 2, 3 for 3-8 years, with next generation specification likely for incumbent suppliers.

<table>
<thead>
<tr>
<th>Value chain</th>
<th>DSM Engineering Plastics</th>
<th>Part producer / molder</th>
<th>System supplier</th>
<th>OEM</th>
</tr>
</thead>
</table>

**Key success factors**
- **DSM Engineering Plastics**
  - Leadership position, global footprint, design expertise, differentiated products
- **Part producer / molder**
  - Low cost operation, quality consistency, areas of specialization
- **System supplier**
  - Leadership position, cost efficiency, innovative system design, global footprint
- **OEM**
  - Economy of scale, cost/efficiency, local legislation requirements, capture emerging market growth

**Key trends**
- **Foot print globalization, metal replacement (high strength/ stiffness and high T)**
- **New processing technologies (ATC, multi material, thin wall, high precision, etc.)**
- **Consolidation, increasing design authority, driving system innovation to OEM**
- **Weight reduction, powertrain efficiency, driver comfort & safety improvements**
Example Safety Systems: 10% CAGR growth

Market definition:
Housing of the airbag for frontal airbags (driver side, passenger side and knee airbags)

Key drivers for market growth (x% CAGR)

- Growth car production (4%)
- Increased use of airbags (1%)
- Additional airbags (knee airbag, side curtain airbag)

Specific growth drivers for DEP

- Metal replacement (5%)
- Material supplier consolidation (favoring strong established global players)

Substitution trends

- Metal to plastic
- Higher Heat resistant plastics
- Higher Impact/Stiffness mat
- Lighter Materials

Driven by increase of safety standards and metal to plastic substitution
Established leadership: Akulon PA6 Airbag housing

Airbag in Akulon PA6, reducing weight with 20-50% (metal replacement)

Safety systems need to be predictable, reliable and 100% dependable

Extreme proven track record, used in over 120 million vehicles
Reduces weight, cost and CO$_2$ emission
Electronics - Global trends

- Connectivity with faster data transfer and cloud computing
- Quest for greater functionality and performance - miniaturization
- Reduction of the environmental impact on e-waste - less hazardous circumstances
New developments providing growth opportunities

Key drivers for market growth

- Cloud computing
- Increased focus on sustainability
- Increased mobility
- Broader penetration of solid state lighting
- Design, Ease of use, Thinnovation
- Massive increase of Smartphone
- High data rates, content explosion
- Decrease of desktop demand

Specific growth drivers for DEP

- Miniaturization
- Thinnovation
- More data transfer
- More sustainability
- Higher data rates
- Smaller and less connectors/application

Substitution trends

- Interpolymer conversion (more data transfer: PA66/PBT to HPM; halogen-free)
- PA replacement by Polyesters due to higher speed

Overall plastic demand is increasing due to mobile and server applications; Desktop market is shrinking.
Main differentiators for DSM in electronics

- Strong application and CAE design support to speed up time to market for our customers
- Proven track record over 20 years at all connector manufacturers, ODMs as system providers and OEMs across the world
- Demonstrated capability to solve failure issues in the validation phase via design, tooling or material advice in every region of interest
- Strong reputation as innovation leader, enabling improved designs for our customers
Electronics is an industry with fast cycle times

**Development time and cycle time**
Driven by OEM, ODMs and Tier 1s, cycles are 6-12 months, product live times differ by segment, less than a year for a smartphone, up to 10 years and above for a server or washing machine.

<table>
<thead>
<tr>
<th>Value chain</th>
<th>Engineering Plastics Suppliers</th>
<th>Part Producers (Molders, Connector or Cable Assembly)</th>
<th>System Supplier</th>
<th>OEM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key success factors</strong></td>
<td>Customer intimacy &amp; relation, speed, application expertise, product innovation and performance, sustainability</td>
<td>Total cost, quality, reliability, flexibility, innovation</td>
<td>Total cost, innovation, flexibility, quality, reliability</td>
<td>Design, performance, reliability, brand, innovation</td>
</tr>
<tr>
<td><strong>Key trends</strong></td>
<td>Flow, performance, eco footprint, halogen free, electrical parameters relevant for high speed and product safety</td>
<td>New processing technologies (e.g. ceramic painting, thin wall molding, Silver printing,..)</td>
<td>Own branding, innovation leadership, consolidation</td>
<td>Appearance and design, high speed, wireless, miniaturization, power reduction, recycling, footprint</td>
</tr>
</tbody>
</table>
Fast upcoming technology: Cloud Computing
Servers driven by cloud computing

Global - Electronics - PMC Servers

Key drivers for market growth (x% CAGR)

- Growth of Cloud computing (20%)
- Strong growth of data content by facebook, google, Amazon, SAP, Microsoft, Youtube,..(>100%/y)
- Growth server production (4.3%)

Specific growth drivers for DEP

- Explosive growth of server memory
- Worldwide server farms consumer 30b watts energy
- 88-92% of this energy is lost in standby
- Power reduction drives advanced designs with high flow, low warpage & reflow

Substitution trends

- Interpolymer (LCP to HTPA), halogen containing to halogen free, low flow to high flow
Server farms consume more power than most cities

- Worldwide, server farms use about 30 billion watts of electricity per year.
- Yearly electricity demand equals the output of 30 nuclear plants.
- Data centers in the United States account for one-quarter to one-third of that load.
- Only 6-12% of this electricity is used for computation, the rest is used to keep servers idling.
- In Silicon Valley, many data centers appear on the state government’s Toxic Air Contaminant Inventory.
- Reducing power consumption is a clear need in developing the next generation servers.

Proven solutions for next generation DDR4 housing

Stanyl®ForTii™ and Stanyl®

Stanyl®ForTii™ and Stanyl® are the only halogen free, high temperature polyamides that supports customers in meeting stringent requirements of reflow soldering.
Trends support business opportunities DEP

Overall trends in electronics

- Market trends
  - Cloud Computing
  - Increased mobility
  - Connected Home and Cars
  - High data rates, content explosion
  - Digital Health
  - Green Design

- Technological trends
  - Further Integration and Miniaturization
  - Further roll out of lead free
  - Low temp soldering
  - Optical vs Cu interconnects
  - Vapor phase soldering
  - Power/Energy reduction
  - Wireless
  - 3D ICs

Impact on Existing Segments

Connectors
- Low warpage, high flow & mechanics
- Less plastics, halogen free, $\varepsilon_r$, $\tan \delta$
- Less desktops, more servers & mobile
- Reflow soldering, standardization

Wires and Cables
- PVC alternatives halogen free
- Wireless & integration replaces cables
- Power reduction reduces cable weight

Lighting
- Growth of (O)LEDs
- Ongoing cost pressure
- Big changes in supply chain landscape

Impact on Potential New Segments

- Growth of Antennas
- Replacement of PC/ABS in Enclosures
- Material solutions for wearables
- Plastics substrates for flexible displays
Global trends in flexible food packaging

Global population growth and lifestyle change lead to increased consumption of processed and prepared food.

Industry looks for smart packaging which contribute to reduced food waste by extending the shelf life.

Need to reduce environmental impact of packaging via recycling and bio-based solutions.
Better barrier & breathable properties and multi-layer

**Market trends**
- **Reduce food waste**
  - From land to retail
  - Shelf life improvement
  - Consumer awareness
- **Demographic changes**
  - Convenience food
  - Smaller household size
  - Lifestyle on the go
- **Sustainability & Regulations**
  - Recycle/Green material
  - Tax Brand owner’s waste

**Technology trends**
- **Shelf life extension**
  - Smart packaging solutions for shelf life extension;
  - Shelf life sensors
- **Pouch Packaging & Fresh produce protection**
  - Packaging for ready to cook/eat concepts\(^1\);
  - Replacement of cans and bottles\(^2\)
- **Better Barrier & breathable**
  - Oxygen barrier, breathable solution; better puncture resistance, moist/fog control
- **Multi-layer structures**
  - Multi layer/functional concepts for e.g. reclosable, retorting, ready-to-cook

**Increasing regulations**
- On packaging waste reductions, recycling, and lower CO\(_2\) foot print

**Recyclability**
- New performance materials driven by monolayer film concept; Alu. replacement

**In favor of PA growth**
1. these are mainly the fresh concepts
2. is in favor of PA, the pouch growth

**Challenging PA growth**

---

\(^1\) these are mainly the fresh concepts
\(^2\) is in favor of PA, the pouch growth
The oxygen barrier film for food packaging slows down the oxidation process and helps to prevent microbial infection.
Cut foot waste with multi-layer film (Akulon®/Novamid™)

The barrier film is puncture resistant which prevents the package from damage
“Thanks to environmentally friendly Arnitel Eco our panliners not only help to improve food quality and yield, they also prevent food from baking or burning to the pot or pan, thus saving cooking and clean-up time, and leaving no food residue or waste.”

Michael Schmal
President M&Q Packaging Corporation

Higher value & lower eco-impact with Arnitel® Eco

A bio-based material with up to 50% reduction in carbon footprint
A bio-based material with excellent performance from -40°C to +205°C, therefore equally ideal for shock freezing and for the oven.
**Buying power large retailers forces value chain cost-innovation**

**Industry Definition**
Flexible food packaging includes films and pouches for consumer food packaging. 80% is used for food packaging and 20% for industrial/medical packaging.

**Development time and cycle time**
Developments are mainly initiated by retailers & brand owners. Converters/film producers are their main innovation/development partners. All raw material suppliers initiated programs to understand the packaging needs across the whole value chain.

<table>
<thead>
<tr>
<th>Value chain</th>
<th>DEP</th>
<th>Converter/film producer</th>
<th>Brand owners</th>
<th>Retailers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key success factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership position in food packaging, strong R&amp;D capabilities. High service level. Understanding value chain needs</td>
<td>Low cost operation, quality consistency, constant drive for innovation to protect margins; strong partnerships with BO and retailers</td>
<td>Drive for innovation, cost efficiency, in depth consumer &amp; retailer understanding, strong brand names supported by A&amp;P</td>
<td>Cost, efficiency, volume driven sales, high turnover speed/shelf, strong retailer brand name, loyalty, promotions</td>
<td></td>
</tr>
<tr>
<td><strong>Key trends</strong></td>
<td>Demand for innovative high performance food packaging, cost down, more sustainable</td>
<td>New processing technologies Consolidation, direct innovation partnerships with BO and retailers</td>
<td>More need for faster innovation, sustainability, unpredictable legal implications for food packaging (waste reduction, food &amp; plastic)</td>
<td>Strong growth of Private label, growing demand for convenience/fresh food, complex handling, strong growth of online retailing</td>
</tr>
</tbody>
</table>

**Move towards newer generation products needed to protect margins**
Market trends and innovation opportunities

Trends in flexible food packaging

Current Trends
• Easy Open
• Fresh Taste with less Food Waste
• Reduce Packaging

Innovation Now & For the Future
• Single Serve
• Microwaveable
• Cook-In
• Longer Shelf Life
• Reduce Food Waste
• Reduce Packaging

Sadia BR Cook-in Pouch
Mom’s Cereals Resealable Stand-up Pouch
Bemis NA Microwaveable Pouch
Bemis SA Retort Pouch
Sealed Air NA Grip & Tear
Customer collaborative innovations within DSM

DSM Nutritional Products, DSM Resins & Functional Materials and DSM Engineering Plastics work with Bemis on “next generation” Food Packaging, like the BR retort soup pouch

- Bemis brings total film manufacturing capability
- DSM brings food knowledge, film additives and film knowledge including printing inks, breathable or barrier polymers, oxygen scavenger technology

DSM Nutritional Products and DSM Engineering Plastics work with Viskase on “next generation” hot dog casing packages

- Viskase wants to replace cellulosic casings due to cost & availability
- DSM brings fermented food knowledge & favor additives, film additives and film knowledge with breathable &/or barrier polymers
Akulon PA6 High Viscous are critical building blocks for packaging
Worldscale plant - shortlist locations
Global products for extrusion; capability to supply regionally;
Complimentary with Novamid Acquisition 2010 / Arnitel
Start Q4 2014 - shipments Q3 2016
Wrap-up

- DSM Engineering Plastics is a high growth company in diverse and attractive markets
- Strong presence in industries with good growth potential due to megatrends
- Global footprint and capabilities established and growing
- Expansion in polymers for flexible packaging will drive growth in Americas
- Investments supported by DSM in recent years enable growth far beyond GDP with differentiated products in several industries
- Innovation in all end markets will support further growth
BRIGHT SCIENCE. BRIGHTER LIVING.™
DSM Resins & Functional Materials

Rob Crowell, President Functional Materials

US Field Trip
September 4, 2014
Safe harbor statement

This presentation may contain forward-looking statements with respect to DSM’s future (financial) performance and position. Such statements are based on current expectations, estimates and projections of DSM and information currently available to the company. DSM cautions readers that such statements involve certain risks and uncertainties that are difficult to predict and therefore it should be understood that many factors can cause actual performance and position to differ materially from these statements. DSM has no obligation to update the statements contained in this presentation, unless required by law.

A more comprehensive discussion of the risk factors affecting DSM’s business can be found in the company’s latest Annual Report, which can be found on the company's corporate website, www.dsm.com
Performance Materials: differentiated growth strategy

- High Performance Plastics
- Functional materials
- Solar
- Biomedical
- Composite resins
- Dyneema® Life Protection
- Powder Coating resins
- Specialty Coating resins
- PA6 compounds
- PA6 film & extrusion

DSM’s capabilities to extract value

Restructure

Strengthen

Accelerate

>2x GDP

~2x GDP

<2x GDP

DSM Resins & Functional Materials

DSM Biomedical

BG DRF

BG DEP

BG Dyneema

DSM Bright Science. Brighter Living.
DSM Resins & Functional Materials (DRF)

- A global player in the development, manufacturing, marketing and sales of high-quality resins solutions for paints, coatings, composites, 3D printing resins and optical fiber coatings.

- Our mission: We generate value for our customers by working with them to provide more sustainable materials to meet regulatory needs and better respond to end-user demands through continuous innovation.

Our businesses:
- UV curable resins
- Powder Coating Resins
- Specialty Coating Resins
- Functional Materials
  - Fiber optical coatings
  - Somos / Stereolithography
Overview of our markets, regions and products

2013 Sales by End Market

- Building & Construction
- Automotive & transport
- Electrics & Electronics
- Packaging & graphic arts
- Telecom
- Other

2013 Sales by Region

- Europe
- North America
- China
- Rest of Asia
- Rest of World

2013 Sales by Product

- Waterborne
- UV curable
- Powder
- Optical fiber
- Stereolithography
- Other

Market Position Coating Resins & Functional Materials

<table>
<thead>
<tr>
<th>Market Position</th>
<th>Top position</th>
<th>Top 2-3 position</th>
<th>Niche player</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-based Coating Resins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powder Coating Resins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UV-Curing Coating Resins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical Fiber Coating Resins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stereolithography</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Strategic Progress in DSM Resins & Functional Materials

- **Cost reductions & efficiency improvements**
  - By restructuring and margin management activities significantly improved financial performance in Powder and Specialty Coating resins

- **Growth through sustainable innovations**
  - By introducing “Supercoating” for Fiber Optic Materials to ensure continued market leadership in segment
  - Moved away from solvent borne coatings to waterborne systems in portfolio: from 50% of portfolio in 2000 to less than 20% expected in 2015

- **Strong sales growth and presence in High Growth Economies**
  - Established “Waterbased China platform” to develop sustainability awareness in industrial coating market in China
  - Acquisition of AGI in UV curable resins (Taiwan-China)
Megatrends drive our key end-markets

DSM global trend

Global shifts

Health and wellness

Climate and energy

Building and Construction (45% of 2013 sales)
- Legislation to decrease environmental impact
- Shift to bio-based preference (sustainability)
- Shift away from solvent borne materials

Telecom and E&E (16% of 2013 sales)
- Rapid growth in mobile devices, servers & infrastructure
- More comfort and customization
- Emergence of 3D printing for additive manufacturing
- Safer materials, recycling

Food Packaging / Graphic Arts (14% of 2013 sales)
- Increasing consumption of processed and packed food
- Strong, safe and smart packaging (reduction of food waste)
- Recycling and recyclable materials

Automotive (5% of 2013 sales)
- Lower emissions during manufacturing
- Light weight to safe fuels

General Industries (20% of 2013 sales)
- Lower emissions
- Safety and protection in industrial applications

Shift to sustainable coatings systems & materials
- Solvent free
- Waterborne
- Bio-based
- Renewable
- New applications
Global shift to sustainable coatings

Shift to more sustainable coatings

Resin Technology | Global annual growth rate (%)
--- | ---
Solvent-borne | ~ -1%
Waterborne | ~5%
Powder | ~3.5%
UV curing | ~6%

Driven by legislation and growing consumer awareness

DSM focus on sustainable coatings

% of supply sustainable coating systems

- Global Supply
- DSM Supply

UV curing, Powder & Waterborne

2010 2015 2020
Well distributed in regulated markets

North America:
- California regulated
- LEED
- BioBased preference program

Latin America:
- No legislation

Europe:
- Legislation most advanced
- NGO labeling

Russia:
- No Regulation

China:
- WB platform: base for lobbying

India:
- No Regulation

To drive a sustainable economy, legislation is needed
Legislation is intensifying in the world and driving markets to sustainable coatings systems

Significant growth opportunity for DSM in non-regulated, high growth economies
Our market positions

- DSM only active in small, higher value-add part of the coating industry, based on current technological competences
- DSM is a niche player in most attractive areas (green). Commodities (grey) requiring backward integration into monomers
- Although being a niche player, DSM is sizeable enough and well positioned to leverage its competences

Focus on sustainable technologies in attractive growth market segments
Our businesses: UV Curable Resins (AGI)

- DSM-AGI (51% DSM controlled JV acquired in 2011)
- Offers a broad range of environmentally-friendly UV (ultraviolet) curable resins used in coatings and inks for wood, flooring, plastic and graphic arts applications
- Top customers: DIC, ECI, Xtreme, Renner, Heyo
- Main competition: Allnex, Sartomer
- Strategic Direction:
  - Growth in specialty UV curable coating technologies
  - Backward integration for Functional Materials

Photo: UV curable floor coating
Our businesses: Powder Coating Compounds

- Powder coating products for metal with development focused on sustainable differentiated technologies that cure at lower temperatures, efficiency improvements, reduction of energy consumption and, most importantly, new substrates (wood)
- Manufacturing in the US at Augusta, Georgia
- Large customers: Valspar, Jotun, Axalta, Akzo, PPG
- Main competition: Allnex, Arkema
- Strategic Direction:
  - Growth in specialties such as Ultra for wood substrates
Sustainable innovation: Powder coated wood

**Trends**
Increased sustainability awareness, faster and cost effective production of end product

**Application**
Paint for industrial wood coatings (MDF) for furniture (bathroom, office) and kitchen cabinets etc. NO compromises on performance (same or even better)

**Main Features**
Solvent free coating, highly efficient use of paint, low application energy, efficient and cost effective production of end product

- Health benefits (safe ingredients, zero VOC)
- Improved comfort and well-being (no odor, no hazardous compounds upon application)
- Better working conditions

- GHG emission reduction: up to 400% versus standard solvent borne technology
- Safe ingredients
- Efficient use of raw materials (little to no waste)

Developing most sustainable technology for coating wood
Our businesses: Specialty Resins (SR)

- SR (Specialty Resins) offers the widest portfolio of water-based coating resin technologies for application in Coatings, Adhesives & Graphic Arts
- Global footprint including manufacturing in the US
  - Wilmington, Massachusetts (incl R&D)
  - Frankfort, Indiana
  - East Providence, Rhode Island
- Large customers: Akzo, PPG, Teknos, Baker Hughes
- Main competition: BASF, Arkema, Allnex, Nuplex, Dow, Bayer
- Strategic Direction:
  - Global growth in waterborne specialties/replacement of less sustainable technologies
Bio-based waterborne coatings: DECOVERY®

Trends
Increased sustainability awareness: from general interest to preference for buying ‘green’. From fossil-based to bio-based

Application
Paint for professionals and DIY (suitable for high gloss to flat) for interior and exterior

Main Features
Natural biobased materials (DECOVERY® paint resins) opening a new era of high performance sustainable paint production without impacting the environment at any stage of its use

- Health benefits (safe ingredients, zero VOC)
- Improved comfort and well-being (low odor)
- Better working conditions

- GHG emission reduction: up to 50% versus standard technology
- Safe ingredients
- Renewable resources: based on novel biobased building blocks (50% renewable resources)

Setting up a Bio-based value chain
Setting up a new value chain

- First success secured with positive feedback of leading carpet Producers based on trial results on first prototype carpet production machines

1. Niaga’s carpet fiber binding technology, combined with DSM’s engineered polyester lamination adhesives technology enable the carpet industry to manufacture fully recyclable carpet systems

2. Mission is to make carpet waste obsolete (addressing major land-fill issue in the US)

Entering new innovative business model with carpet recycling
Our businesses: Functional Materials (optical fiber)

- DSM sets the standard for optical fiber protection and performance worldwide helping to ensure greater signal reliability and field performance within optical fiber networks.
- Global market share >70% with extensive intellectual property portfolio.
- Headquarters and R&D in Illinois with manufacturing in North Carolina, the Netherlands and Japan.
- Main competition: Momentive and Phichem (locally in China).
- Strategic Direction:
  - Growth in attractive and important Chinese growth market.
  - Continuing development of wide effective area optical fiber coatings in the West driven by higher and growing bandwidth requirements.

Elgin, Illinois, US

Server farms
Our businesses: Functional Materials (Somos)

- DSM also uses its strong technology base in UV curable thermosets to develop and market stereolithography materials used in 3D printing
- Large customers: Materialise, Formula 1 (multiple), Epoch Angel
- Main competition: 3D Systems
- Strategic Direction:
  - Growth globally with continuing development in new 3D printing technologies
Sustainable innovation: Additive Manufacturing

What is additive manufacturing/3D printing?

- “Process of computer-controlled joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies, such as traditional machining”
- Additive manufacturing (AM) enables an unprecedented level of design freedom

Speeding up development and moving down the value chain

- Total markets for 3D printers, printable materials, and printed parts expected to reach US$12 billion in 2025
- Positive government climate as 3D initiative creates new local jobs
- Opportunity to speed up adoption rate and expand the market with right partnerships and new business models
- Goal is to expand our materials offering to enable new printer technologies and capture value down the chain in end part applications

Exploring new business model with 3D Printing
Wrap-up

- DSM Resins & Functional Materials (DRF) has shifted its portfolio successfully toward specialty, value-added technologies.
- We see further opportunity with the clear shift from solvent-borne technologies to sustainable solvent-free products and low emission resins.
- Innovation in DRF is focused on more sustainable, high quality resins technologies and solutions in response to global challenges such as climate change, energy efficiency and the need to address health and improve well-being:
  - ✓ This approach has led to a strong increase in ECO+ products, with higher growth rates, high value creation / margins and lower environmental impact.
- The demand is highest in Europe and the US where awareness continues to rise about the negative effects of solvent-borne systems.
- We will capitalize on our innovation pipeline with ability to move the needle for DSM Resins & Functional Materials in the short term with low temperature curing powder coatings, biobased paint resins and carpet recycling.