



中原様 提出資料

DSM in Sustainability and Climate Actions

*DSM - The global science-based company active in health,
nutrition and materials*

2017年10月

DSM 株式会社

代表取締役社長 中原雄司

中原 雄司

職歴： **日揮株式会社**

エンジニアリング部門、ナイジェリア駐在を経て、プロジェクトマネージャー

マッキンゼー・アンド・カンパニー 2003~

2009年末よりパートナー、グローバル素材（化学）・エネルギー担当

Royal DSM グループ 2013~

本社Corporate Strategy & Acquisition（オランダ）戦略担当SVP

DSM Nutritional Products（スイス）戦略プロジェクト担当 SVP

DSM 株式会社 代表取締役社長

学歴： 東京大学 工学部 化学工学科 学士・修士

米国コーネル大学 経営大学院（MBA）修士



The DSM Challenge:

Sustainability
of the
Triple P:

People - Planet - Profit

DSM's vision:

Bright Science, Brighter Living

2050年に人口
は90億人超に:

科学技術の英
知により、地
球と人類社会
の
Sustainability
を確保するこ
とが最大課題

DSMは百十数年の歴史を通して事業を大きく 変遷させてきた



炭 鉱

基礎化学
石油化学

スペシャルティ
機能化学

ライフ・サイエンス
マテリアル・
サイエンス

1902~

1950~

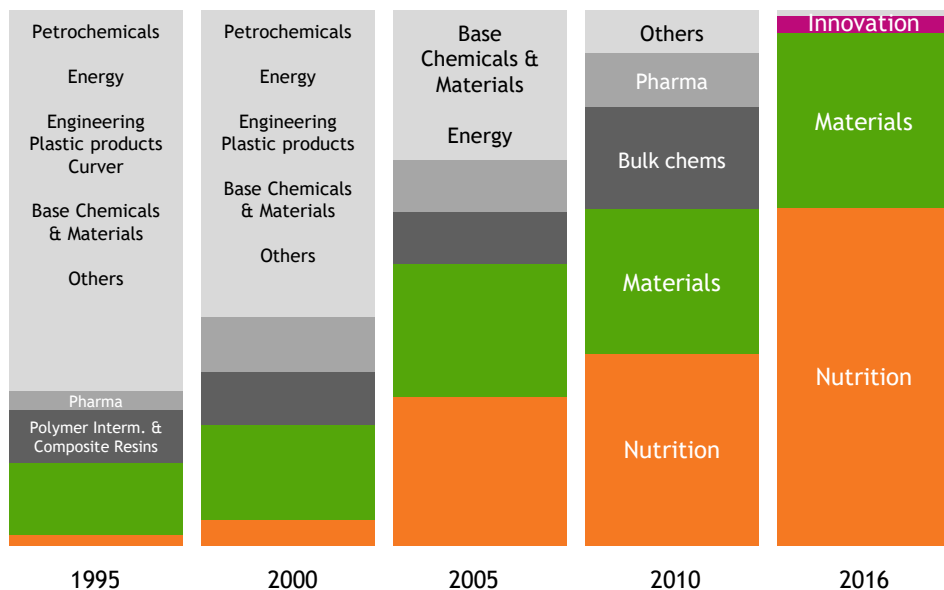
1970~

2000~

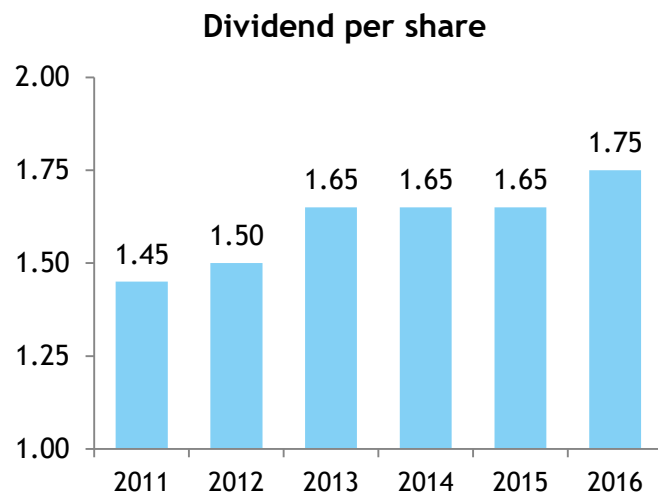


ここ20年においても事業ポートフォリオを成長領域にシフトしつつ、業績を上げてきた

DSM事業ポートフォリオ 売上げ比率 (%)



一株あたりの配当 (€)



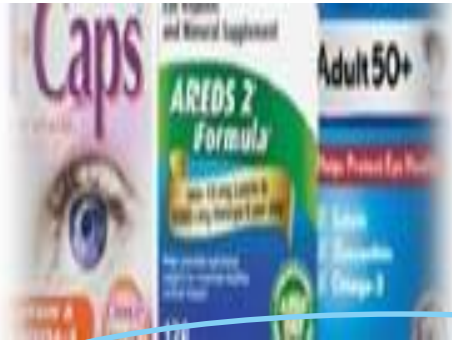
Stable preferably rising dividend for DSM's shareholders

「Planet 及び People の健康」を素材面からサポート

ニュートリション

健康

先端材料



主要
製品群

Vitamins
Carotenoids
DHA/EPA

Enzymes
Probiotics
Cultures

Super engineering plastics
Environmental resins
Biomedical materials

売上

約1.1兆円

50カ国

2万人

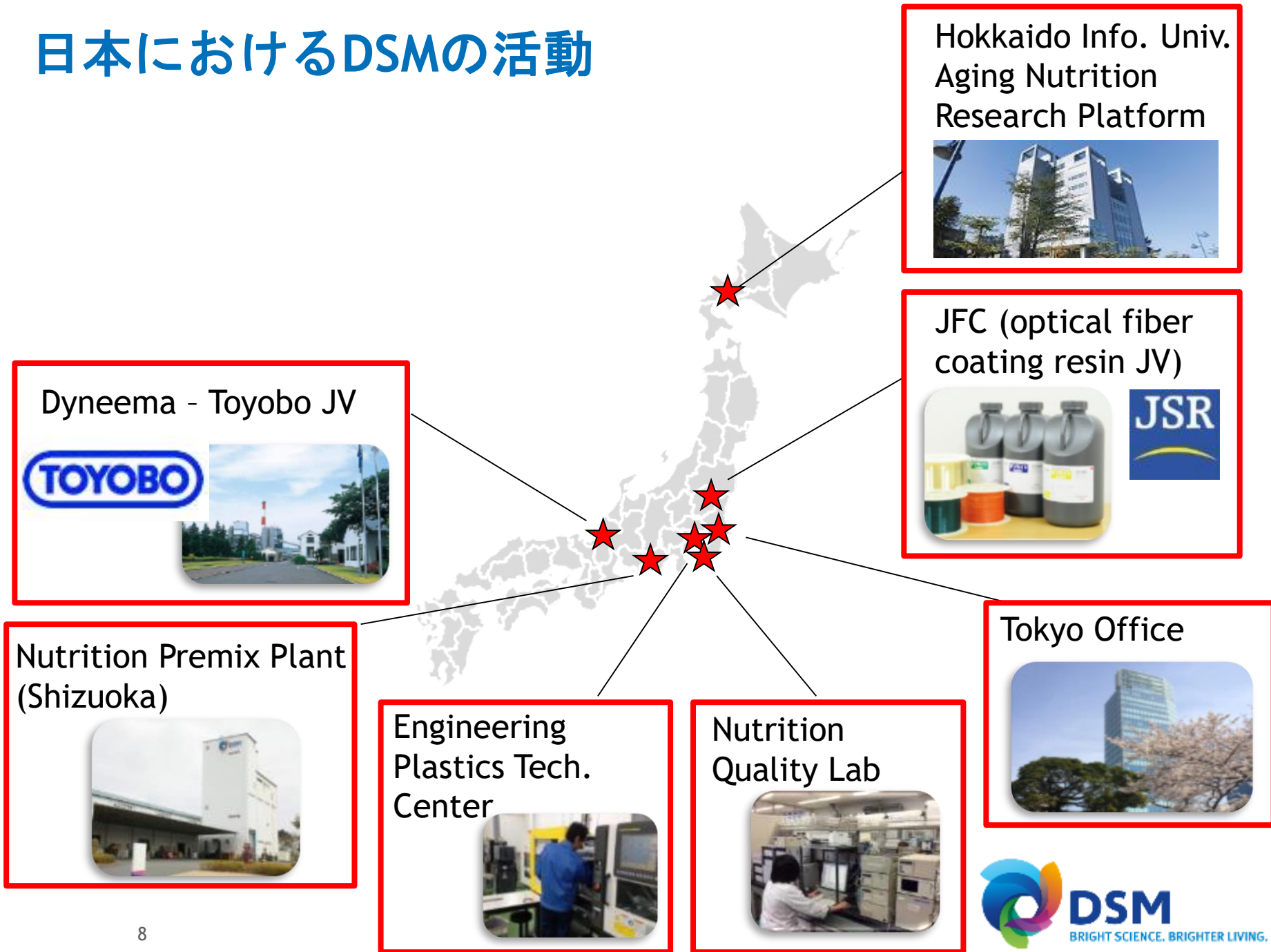
Dow Jones
Sustainability
Index

Top Ranking

DSMにとっての主要市場



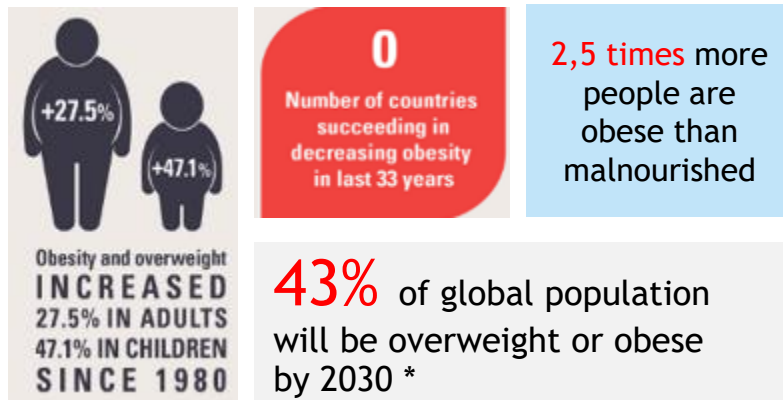
日本におけるDSMの活動



Malnutrition (低栄養状態)

The single largest contributor to disease in the world

Obesity (肥満)

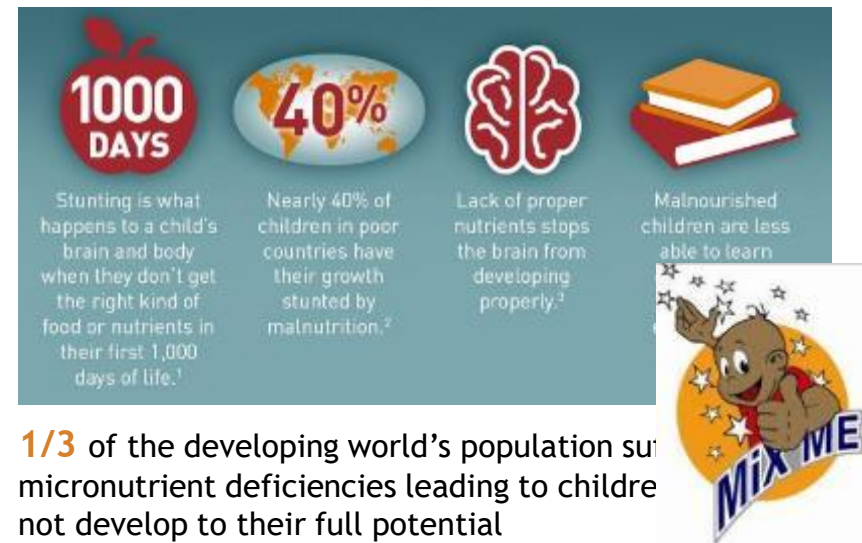


50% The percentage of deaths caused by cardiovascular disease in the European Region

Heart disease is the leading cause of death for women in the United States that is $\frac{1}{4}$ out of every women

Globally diabetes kills **4.6 million** people a year, it is among the top causes of disability

Stunting (成長阻害)





Essentiality
of nutrition

The first 1000 days echo for the
rest of life





“You are what your mother ate”

人間のサステナビリティ（長寿健康社会）を、 栄養面からもサポート



1. Japan

Elderly Nutrition Platform

産学官連携による、今後最も人口増加する日本の高齢化に対応する
栄養科学的エビデンスを顧客・パートナーとともに実施する体制

2. Personalized Nutrition (個の栄養提案)

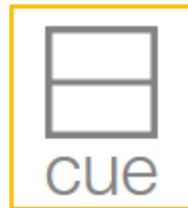
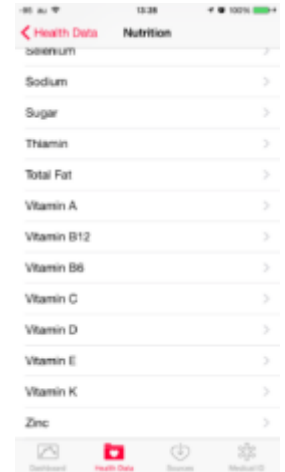
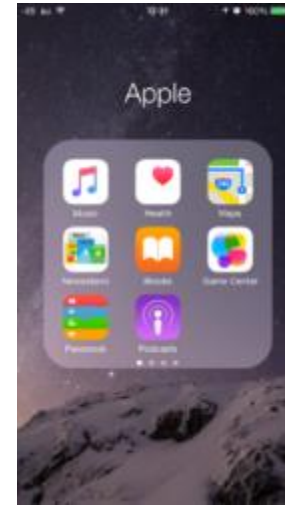
非（最小）侵襲型診断機器およびビッグデータを組み合わせ、個々の健康状況に合わせた栄養処方（ソリューション）の提供



“Personalized Nutrition”の時代がスタート...

簡単な測定→日々の健康管理→食事・運動・栄養補完

NOVARTIS & Google



Click!





Suture Anchors
(Sport medicine)



Ligament with Dyneema
(Sport medicine)



Spinal Disc with
TPU (Ortho)



Screw (Ortho,
Sport medicine)



Dyneema Suture
(Ortho, Sport
medicine)



BCG
(Ortho)



ECM
(sport medicine)

440万人が毎年DSM
Biomedicalの素材を
使用、長寿健康社会
を身体機能面から
サポート

ECM : External Cellular Matrix
BCG: Borne Graft Substitute
TPU: Thermoplastic polyurethane



スーパーエンブラの性能向上により、多くの領域で金属代替、軽量化、電気化、高効率化に貢献している

Powertrain

Chain Tensioner
PA46 (TW341/441)
0.03Kg/veh

Auto Tensioner
PA46 (TS271/272)
0.03Kg/veh

Grille Shutter
PA6 (K224)
1.0Kg/veh

Engine Cooling Fan
PA6 (K224)
1.0Kg/veh

High Speed Cooling Fan
PA6 Ultraflow
1.2Kg/veh

ETC Gear
PA46 (TW241/271)
0.01Kg/veh

EGR Gear
PA46 (TW241/271)
0.01Kg/veh

Engine Mount
PA4T Ace
0.3Kg/veh

Head Cover
PA4T Ace
1.5Kg/veh

Auto E&E

HVAC Compressor Valve
PA46 (TW241)
0.05Kg/veh

HVAC Compressor Housing
PA4T Ace
0.5Kg/veh

Wire Harness Protector
PA66 (Novamid 3021)
0.1Kg/veh

Wire Harness Corrugate Tube
PA6 (Novamid 1015)
0.2Kg/veh

Battery Part
TPE (Arnitel PL460S)
0.2Kg/veh

Air/Fuel

Air Intake Manifold
PA6 (K227XHG6)
1.2Kg/veh

Intercooler End Cap
PA46 (TW241F10)
0.4Kg/veh

Engine Cover
K-FHM24
0.5Kg/veh

Clean Air Duct
K240-HPG3
0.3Kg/veh

Turbo Compressor Housing
PA46 Diablo (OCD2100)
0.5Kg/veh

Brake, Chassis & Body

Sun Roof Extension
PA6 (K224)
0.3Kg/veh

Air Bag Canister
PA6 (K224PG6/PG8)
0.2Kg/veh

EPS Gear
PA46 (TW241/271)
0.01Kg/veh

Bearing Cages
PA46 (TS271/272)
0.6Kg/veh

E-Brake Booster Housing
PET (Arnite A)
0.2Kg/veh

Shifter Base
PA6 (K224)
0.1Kg/veh

Shifter Fork
PA46 (TW271)
0.05Kg/veh

CVJ Boots
TPE (Arnitel EB464)
0.04Kg/veh

CO2 emission reduction

Metal Replacement.

Powertrain Efficiency.

Blue is New Proposal

Stanyl® : Timing chain tensioner

Mercedes SLS AMG :



Brighter Living

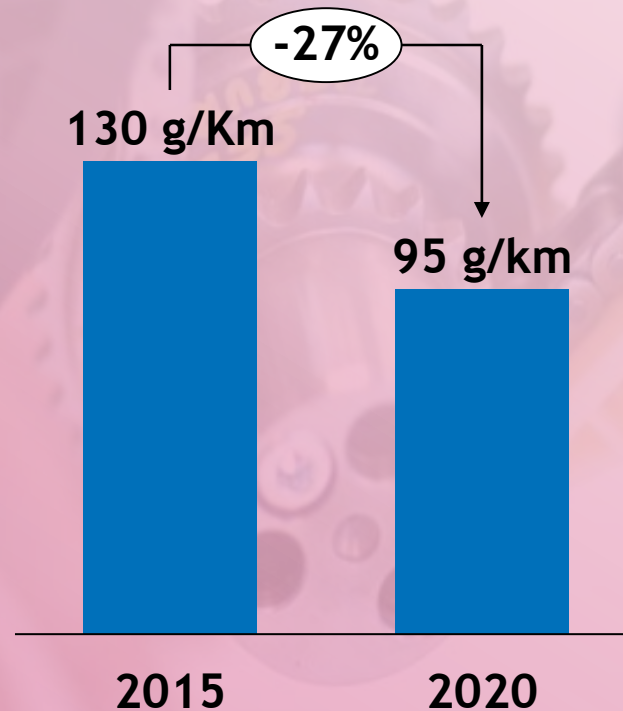
2g/km CO₂ lower emissions

1% less fuel consumption

Saving huge on CO₂ penalty costs

Aligning with Regulation Roadmaps - for triple P

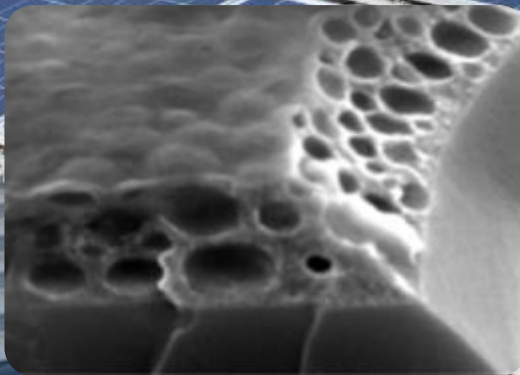
EU 2015 ~ 2020
CO2 Emission Targets



DSM Anti-Reflective coating

DSM AR coating has best in class transmission gain and outstanding outdoor durability.

DSM is a committed partner, offering development support and a filled pipeline of future offerings



Enabling Advanced Biofuels

- POET & DSM: two innovative leaders - one shared vision**
- Making cellulosic ethanol competitive to grain ethanol
 - Building Project LIBERTY (\$250 Mln investment) in Emmetsburg, Iowa
 - Grand Opening 3 September 2014

Cellulosic Ethanol Plants in the U.S

Company	Location	Feedstock	Capacity (million gal/year)	
Abengoa Bioenergy	Hugoton, KS	Wheat straw	25 - 30	est. late 2013
DuPont	Nevada, IA	Corn stover	30	est. 2014
POET-DSM	Emmetsburg, IA	Corn stover	20 - 25	Sept. 2014

POET |  DSM
Advanced Biofuels



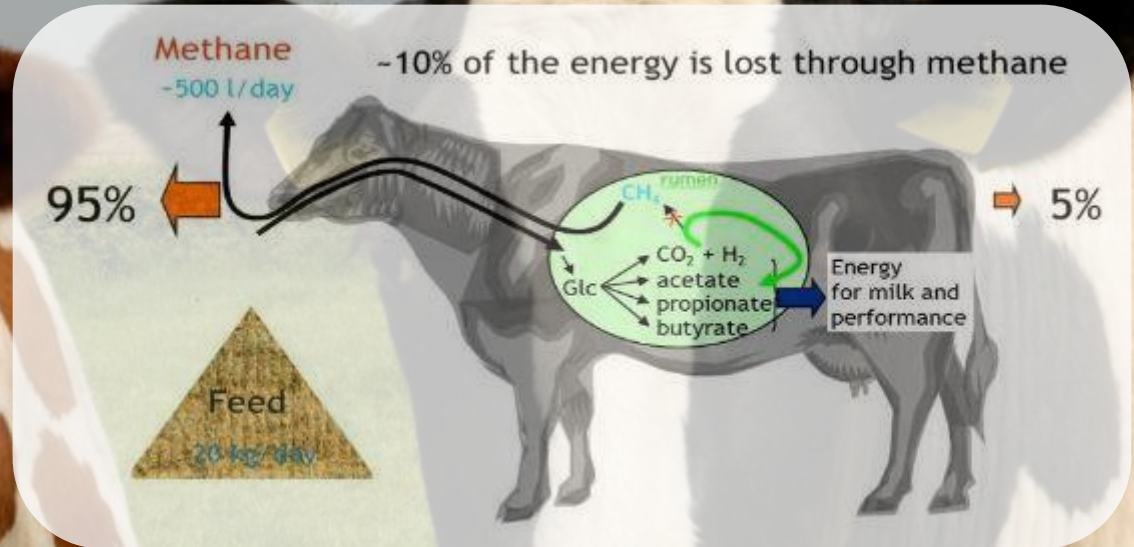
 Project LIBERTY
GRAND OPENING
September 3, 2014

POET |  DSM
Advanced Biofuels



Clean Cow

Reducing Methane Emission from Cattle



Identification and development of a feed additive(s) solution to reduce methane by 25-30% *in vivo* and with the potential for better performance



niage®

alive. again and again.



リサイクル素材の革新へ：

（カーペット廃棄量は米国年間180万トン！）



グローバル・メガトレンドによる諸課題に呼応する事業運営を目指している

Health & Wellness



Aging population

Healthcare issues

Food composition

Health

Global Shifts



Population growth

Urbanization drive

Wealth increase

Nutrition

Climate & Energy



Sustainability concerns

Resources constraints

Energy concerns

Materials

Sustainability as a growth driver for DSM

DSMでは、3つのSustainability領域をターゲットとしている



NUTRITION



CLIMATE CHANGE & ENERGY



CIRCULAR & BIO-BASED ECONOMY



SUSTAINABLE DEVELOPMENT GOALS



Why are we involved in Climate Actions?

RESPONSIBILITY

to act →



“Yes, the planet got destroyed, but for a beautiful moment in time we created a lot of value for shareholders.”

OPPORTUNITY

for growth →

*International Energy Agency (IEA): climate deal unlocks **\$13.5 trillion** of investments in energy efficiency and low carbon technologies by 2030 - \$8.3 trillion of which in the transport, buildings and industry sectors.*

DSMのSustainability戦略の骨格



Key Agenda for Climate Change & Energy

自社プロセスの変革

REDUCE our own footprint

realize 40-45% GHG efficiency improvement 2008-2025 (via energy efficiency, 50% renewable purchased electricity, internal carbon price)

技術・製品を通じた事業成長

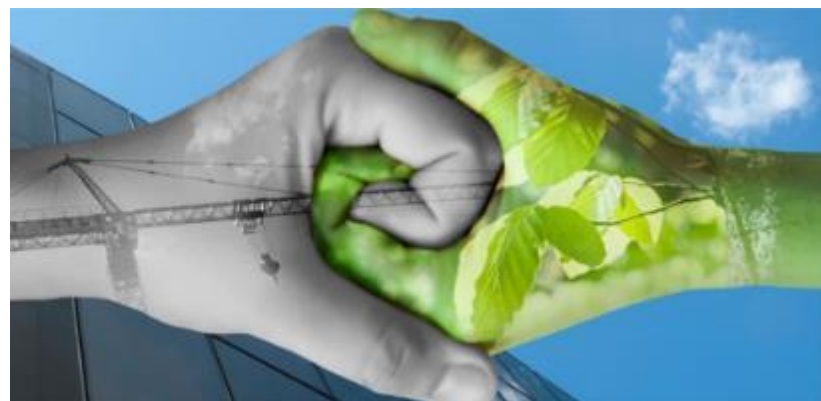
ENABLE a low carbon economy

identify (and seize!) business & innovation opportunities for our low-carbon *Brighter Living Solutions*

市場の変革のリード

ADVOCATE climate action

creating markets in which our low-carbon products can *thrive*, with a focus on renewable energy and carbon pricing



DSM Sustainability Targets

Sustainability performance

Sustainability KPIs	2010 Realisation	2015 Realisation	2016 Realisation	2020 Targets
Dow Jones Sustainability Index	Gold Class	Gold Class	Number 1	Gold Class
Brighter Living Solutions Eco+ Eco+ / People+	39% ---	57% ---	63% ---	--- 65%
GHG efficiency improvements ¹	---	---	---	40-45% (2025)
Employee engagement ²	70%	69%	71%	75%
Safety (Frequency Index Recordables)	0.57	0.41	0.33	0.25

¹ Compared to 2008; supported by Energy Efficiencies (> 1% annually) and Renewable Electricity (50% of purchased electricity in 2025)

² Striving to reach High Performance Norm; in addition we strive to improve our (executives) Diversity Mix in (underrepresented) Nationalities (from 39% in 2010, to 50% in 2015 to 60% in 2020) and Gender (female executives from 9% in 2010, to 15% in 2015 to 25% in 2020)

Brighter Living Solutions

Innovations and products that are better for the planet (Eco+) and people (People+) based on a product life cycle approach



ECO+

Profitable solutions with measurably better environmental impact than the mainstream reference solution



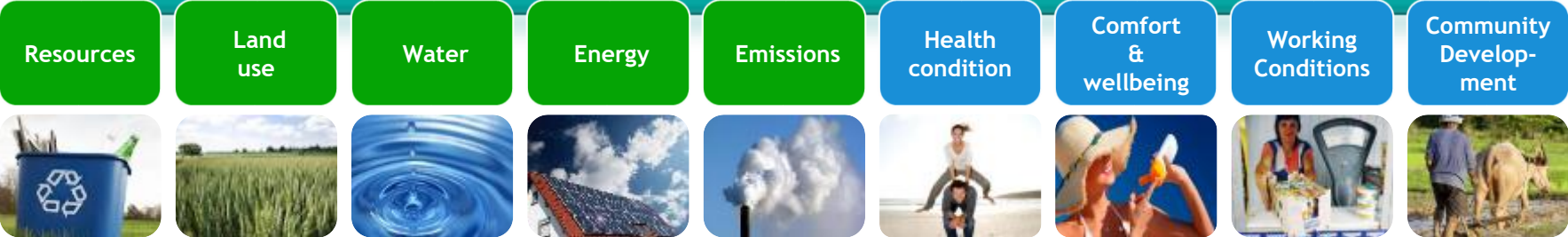
PEOPLE+

Profitable solutions with a measurably better impact on lives of people than the mainstream reference solution.

Brighter Living Solutions:

Brighter Living Drivers: Eco+ and People+










Brighter Living Drivers



Brighter Living Solutions:

Examples of Brighter Living Drivers for Eco+ and People+

Brighter Living Drivers

Resources	Land use	Water	Energy	Emissions	Health condition	Comfort & wellbeing	Working Conditions	Community Development
								
Renewable sources	Yield improvement	Reduced water consumption	Renewable energy	Reduced GHG emissions	Maintaining good health	Reduced noise	Improved workers safety	Local employment / Jobs creation
Light weight	2nd gen feedstock	Prevention of water pollution	Reduced fuel use	Reduced particles to air	Risk reduction of diseases	Reduced bad smell	Ensured fair wages	Improved Infrastructure
Life time extension	...		Energy efficiency	Reduced emissions to soil	Mitigating nutrition deficiencies	Better touch	Elimination of child labor	Improved education levels
Replacement critical / scarce materials		...		Reduced emissions to water	Ensure sufficient intake nutrients for good health	Better taste	Elimination discrimination	
Recycled content	...				Mitigating health effects of pollution	Experienced higher comfort	Safer ingredients	...
Recovery valuable materials			...		Regeneration / restoring health condition		...	
Waste reduction	...				Safer ingredients			

More details of our “Planet” indicators

	Targets	Realization 2016
GHG efficiency improvement	40-45% (2008-2025)	23%
Energy efficiency improvement	>1% annually (>10% in 2025, reference 2015)	2%
Electricity purchased from renewable sources	50% in 2025	8%
Reduction of emissions to air per unit of product (VOC, NO _x , SO ₂)	40% in 2020 (reference 2015)	25%
Waste	80-90% recycled by 2020	83%
Water	Water risk assessments completed on 90% of selected sites by 2020	67%

弊社会長のFeike Sijbesma は、2016年に 国連気候変動カーボンプライシング部会の共同議長に任命



Year 2060: The search for a breakthrough technology to solve climate change continues.

IT'S A TIME MACHINE WE HOPE WILL TAKE US BACK 50 YEARS WHEN WE SHOULD HAVE PUT A PRICE ON CARBON.

WE BETTER HURRY!

NO! THAT'S THE GREAT THING ABOUT THIS TECHNOLOGY!

Carbon Pricing Leadership Coalition (CPLC)

- DSM advocates **carbon pricing** as a key instrument for an **orderly transition to a low (fossil) carbon economy**. Feike Sijbesma (CEO, DSM) is co-chair of World Bank Carbon Pricing Coalition, together with Canada's Environment & Climate Change Minister, Catherine McKenna.
- CPLC brings together 200 leaders from governments, businesses and civil society. Together, they accelerate and facilitate effective policy implementation, knowledge exchange and **corporate readiness**.
- Feike Sijbesma: “By putting an effective price on carbon, we can **anchor incentives** to reduce GHG emissions **in our economic system**.”



€50 internal carbon price

Helps us to:

- ✓ spot energy/cost saving opportunities at an early stage
- ✓ redirect and/or scale up investments towards low-carbon technologies and low(er) carbon energy sources
- ✓ understand future costs/risks and build confidence to all stakeholders (incl. investors) that we are preparing DSM for a future in which carbon will increasingly have a price
- ✓ raise environmental awareness

How:

- €50 per ton CO₂e (investment proposals must submit two business cases: one with, and one without the internal carbon price)
- Official corporate policy; required when reviewing large investment decisions, requiring significant capital expenditure

Has enabled decision-making on:

- Energy savings projects, renewable energy projects, and generally to improve our “integrated reporting & decision-making”



2017年3月には、DSMで初めての「環境経営フォーラム」を日本で開催



DSM環境フォーラムVol.1.5

Tell me CLIMATE CHANGE

企業と社会を豊かにする

増上寺ソーシャル映画上映会

上映作品：ナショナル ジオグラフィック
『地球が壊れる前に』

製作総指揮マーティン・スコセッシ
アカデミー賞受賞俳優レオナルド・ディカプリオが伝える環境破壊の現実



大本山増上寺

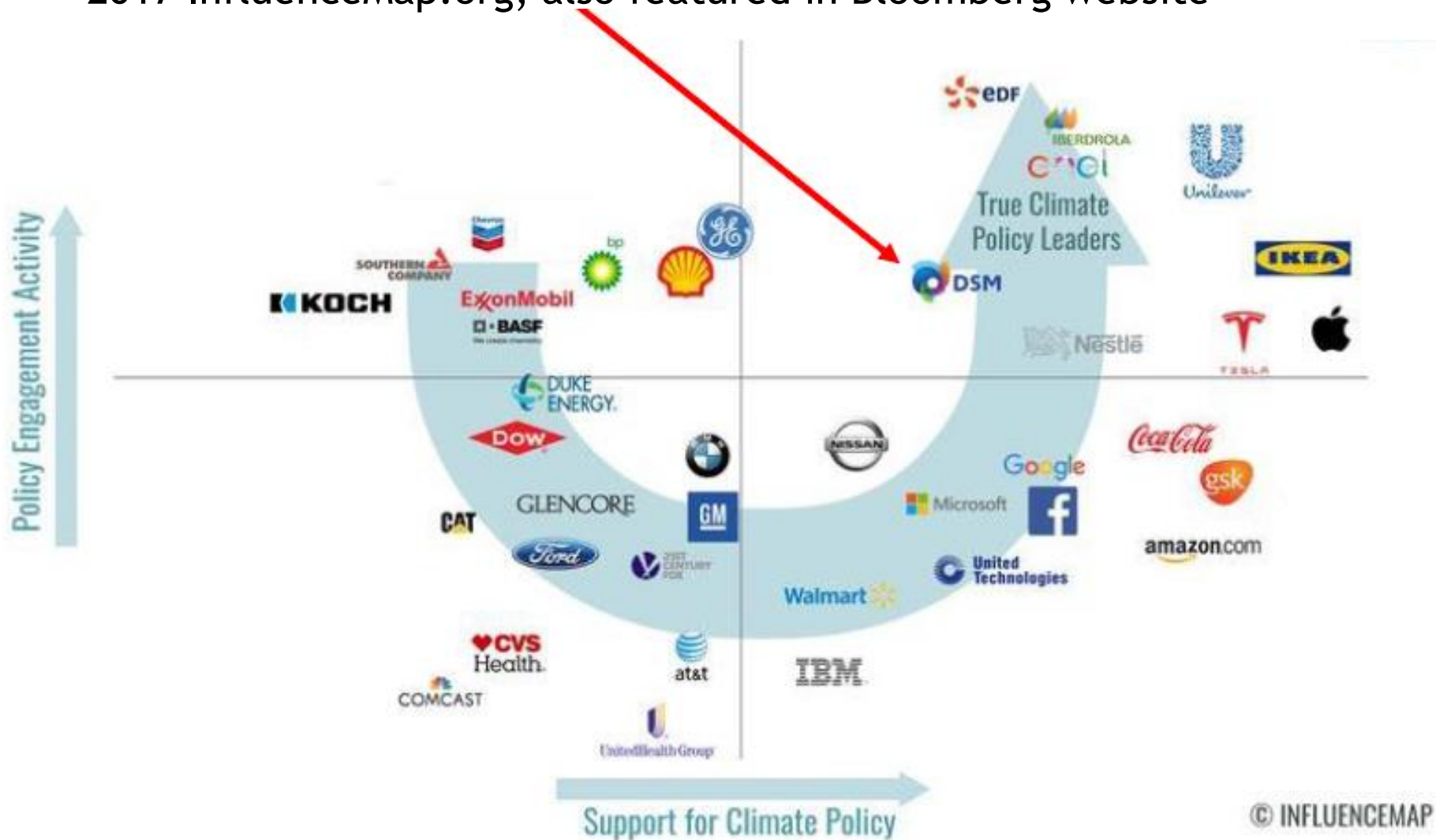
主催：DSM環境フォーラムVol.1.5Tell me climate change運営事務局

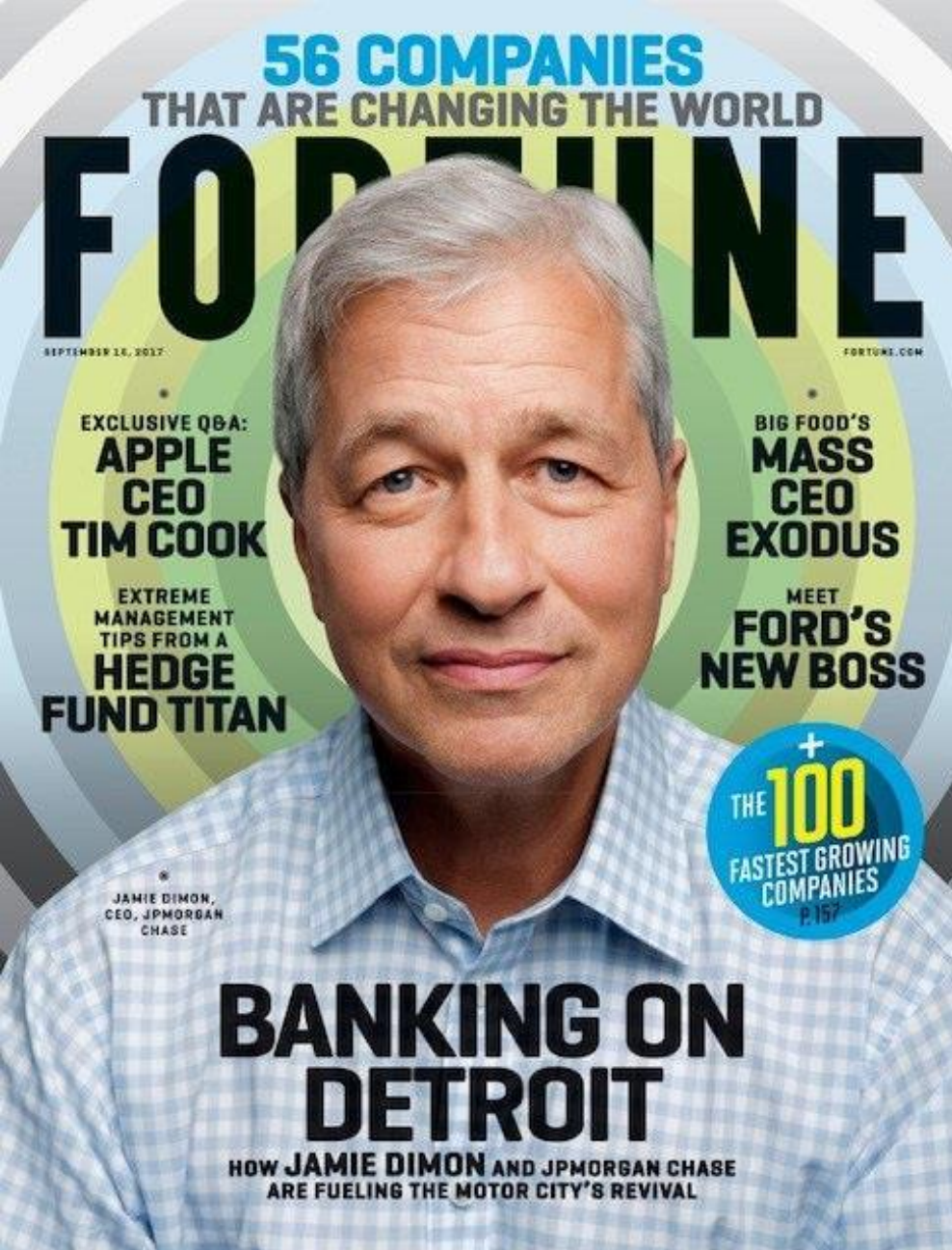
社内のビジョンとイノベーションの共有： DSM文化祭 2016



DSM among the leaders in “Carbon Policy Footprint”

2017 InfluenceMap.org, also featured in Bloomberg website





THE TOP 10

THE TOP 10

- 1 JPMorgan Chase
- 2 DSM
- 3 Apple
- 4 Novartis
- 5 LeapFrog Investments
- 6 Ant Financial
- 7 Walmart
- 8 Toyota Motor
- 9 Johnson & Johnson
- 10 Yara



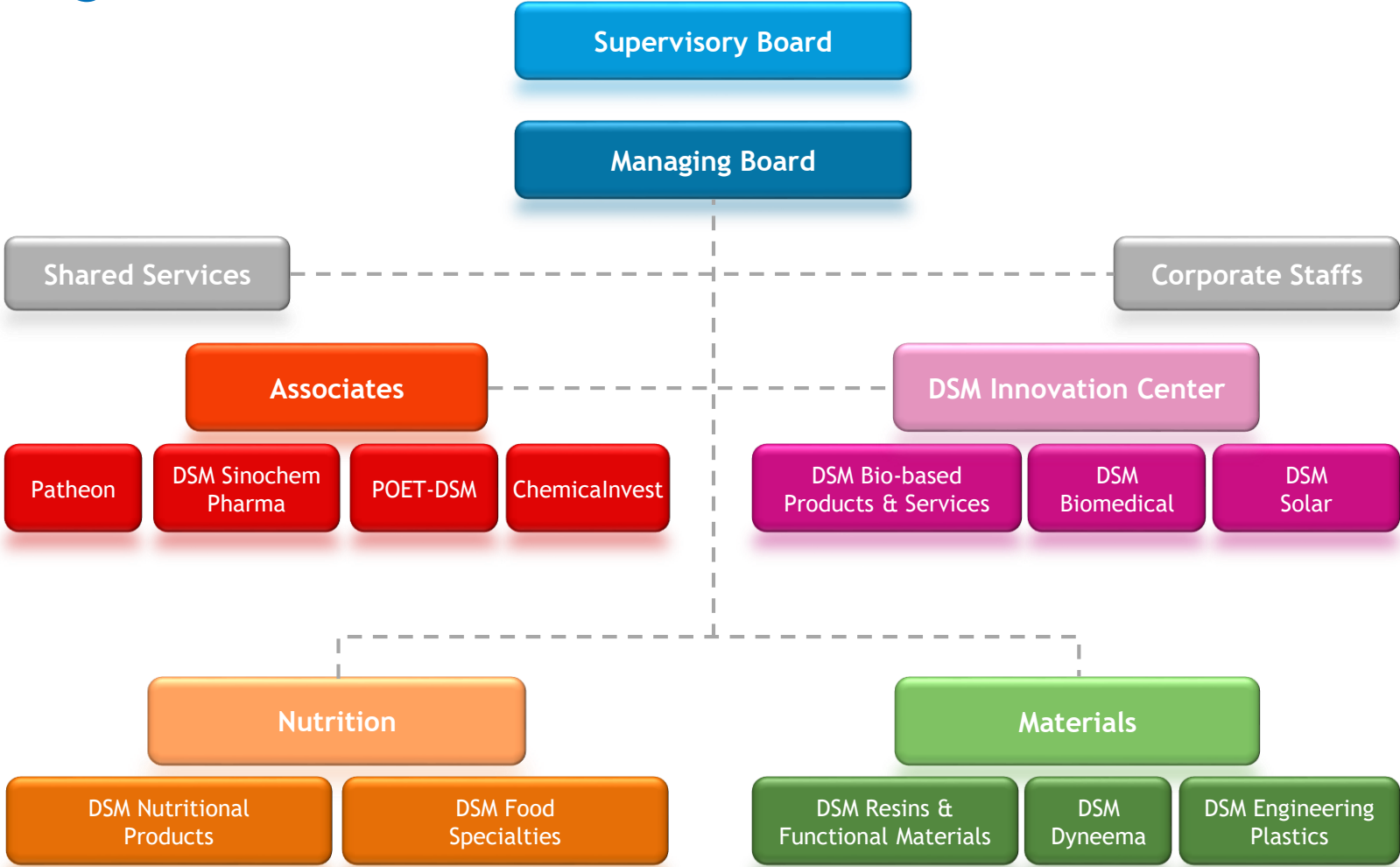
I want a
brighter world.





BRIGHT SCIENCE. BRIGHTER LIVING.™

Organization



DSMのルーツと基盤技術



Hoffman La Roche's
Vitamins (1930s)

化学合成技術 &
バイオテクノロジー

Gist-Brocades
(1869)

ライフ
サイエンス

バイオテクノロジー



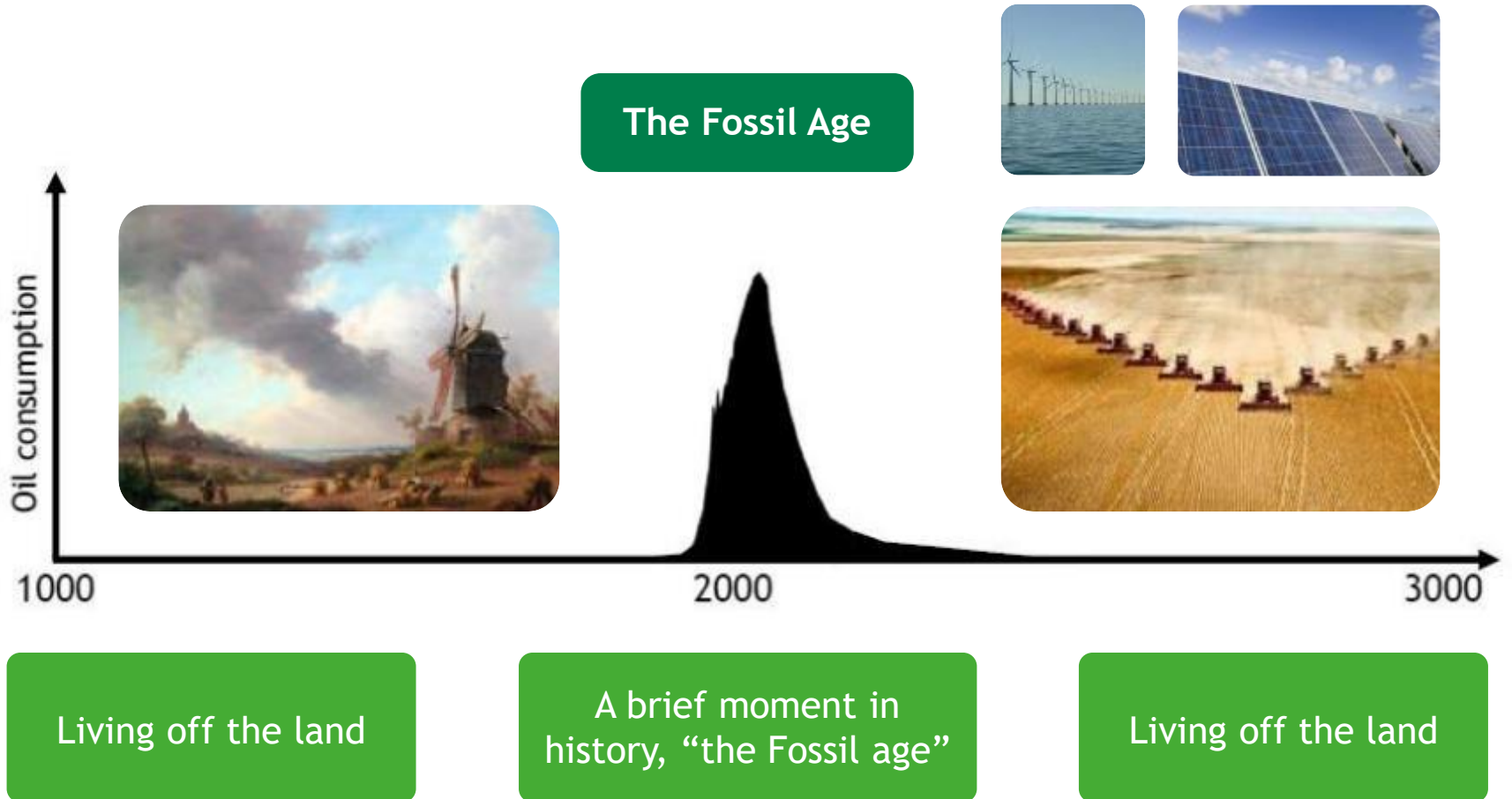
DSM
(1902)

マテリアル
サイエンス

エネルギー, 化学 &
ポリマー技術

ビタミン
必須脂肪酸
カロテノイド
プレミックス
酵素
ミネラル
カルチャー&酵母
ニュートラシューティカル、
セルロース系バイオエタノール
バイオメディカル素材
バイオプラスチック
高機能プラスチック
・繊維
コーティング及び複合樹脂
機能材料
ソーラー向け先進表面加工技術

Why Renewable Energy?



NUTRITION CLUSTER

人間および動物向けの微量機能栄養素材を提供



Vitamins:

are essential nutrients required for growth and well-being. DSM has all 13 Vitamins including A, D, E, K, C, all B vitamins, folic acid and pantothenic acid

Carotenoids:

Essential antioxidants increasing performance and consistent pigmentation a/o for salmon, eggs

Nutritional Lipids:

Omega-3 and -6 play a critical role in proper brain function, vision process, immune and inflammatory responses and hormone-like molecules

Feed Enzymes:

Solutions developed to meet challenges of global livestock farming. Reducing costs by improving feed conversion and animal health

NUTRITION CLUSTER

More examples of nutritional products



Food & Beverage Enzymes:

natural proteins that act as catalysts for biochemical reactions, used in dairy, baking, beverages, oil & fats and grain processing



Minerals for animals:

that are needed by the body in very small amounts that cannot be made by living organisms



Yeasts, cultures and probiotics:

providing taste and texture and adding specific health benefits

PERFORMANCE MATERIALS CLUSTER

Examples of materials of DSM



Specialty polyamides
safety components
e.g. for airbags,
lighting & gastank
systems in auto;
connectors &
sockets, wire &
cable, LED-lighting,
packaging



DSM Dyneema
is the global supplier
of Dyneema[®], the
world's strongest
fiber[™], used for
medical sutures,
fishing, aquaculture
nets, ropes, slings,
cut-resistant gloves,
vehicle & personal
ballistic protection



Innovative resins
for sustainable
coatings systems,
including:
waterborne resins,
powder resins and
100% UV curable
resins



UV-curable optical fiber materials for
high-speed fiber
networks connecting
the world

EMERGING BUSINESS

3 innovation platforms in DSM Innovation Center



DSM Biomedical

Innovative materials that deliver more advanced clinical procedures and improved patient outcomes



DSM Bio-based Products & Services

Advanced enzymes and yeast platforms: enabling advanced bio-energy and bio-based chemicals



DSM Advanced Surfaces (Solar cell materials)

Smart coatings and surface technologies to boost performance in the solar industry

Bringing Life Sciences and Materials Sciences competences together

C-suite guide to Internal Carbon Pricing

I want to take action on the major climate-related trend of



A GLOBAL CONSENSUS FOR CLIMATE ACTION



A STRONGER PUSH FOR CLIMATE-RELATED FINANCIAL DISCLOSURE



A GRADUAL SHIFT TOWARDS LOW-CARBON INVESTMENTS

My main goal is to

DEMONSTRATE CLIMATE LEADERSHIP by contributing a fair share of effort to achieving the Paris Agreement

FOLLOW THE FSB-TCFD RECOMMENDATIONS by building resilience against climate-related risks

RESPOND TO THE LOW-CARBON TRANSITION by seizing opportunities in a low-carbon future



The potential approaches I could use are

INTERNAL CARBON PRICE IN CAPITAL EXPENDITURE DECISIONS

INTERNAL CARBON PRICE IN PROCUREMENT DECISIONS

SUPPLIER FUND FOR CARBON FOOTPRINT REDUCTION

INTERNAL CARBON PRICE IN R&D DECISIONS

INTERNAL CARBON PRICE IN OPERATIONAL DECISIONS

INTERNAL CARBON FEE ON BUSINESS UNITS

REMUNERATION BASED ON AN INTERNAL CARBON PRICE

PURCHASE OF CARBON OFFSETS AGAINST STRICT STANDARDS



Working together with our climate partners.....

By joining forces with other businesses, jointly sending a positive signal, we can de-risk politics: *business wants to partner* on climate action



Caring for Climate



We welcome the focus on climate change at the 2015 World Bank Group/IMF Spring Meetings

Let's partner on climate action. Now.

We are CEOs from 48 companies and 20 economic sectors. With operations in over 150 countries and territories, together we generated over \$1.2 trillion of revenue in 2014.

In the spirit of the World Economic Forum to foster public-private cooperation, we affirm that the private sector has a responsibility to engage actively in global efforts to reduce greenhouse gas emissions, and to help the world move to a low-carbon, climate-resilient economy.

We call upon governments to take bold action at the Paris climate conference (COP21) in December 2015 to secure a more prosperous world for all of us. We are already taking action, and we stand ready to work together with the international community to help deliver practical climate solutions.

We have prepared a statement outlining our vision. Please go to medium.com/@ClimateCEOs to read our full message. #ClimateCEOs

Signatories

- Olaf Persson, President and CEO, AB Volvo
- Pierre-Henri de Goeunec, Chairman and CEO, Accor
- Joel Marval Estracarralé Dorrego, Chairman and CEO, Acciona
- Tom Böhme, CEO, Alcoa
- Michael Orlowski, Chairman of the Board of Management (COO), Allianz SE
- Georgy Hoshkova, Chairman, Anup Group
- Gavin Patterson, CEO, BT Group
- Walter O. Cordero, President and CEO, Danfoss
- Frank Appel, CEO, Deutsche Post DHL Group
- Henk Poels, CEO, DOW Energy
- Andrew N. Liveris, President, Chairman and CEO, Dow Chemical Company
- Federico Storti, CEO and General Manager, Enel SpA
- Hans E. Weibull, President and CEO, Bosch
- Gábor Mészáros, Chairman and CEO, GDF SUEZ
- Bernardo Guadín, CEO, Grandis Investments
- Alfred Göttsche, Chairman and Managing Director, Hindustan Construction Company
- Shant Gulvat, Group CEO, LGSD Holdings
- Ignacio S. Galia, Chairman and CEO, Iberdrola
- Peter Agre, President and CEO, IUSA Group
- Ralph Harter, CEO, ING Group
- Sandra Wu Wen-Hsi, Chairperson and CEO, Industrial Kwong Co. Ltd.
- Grano Lafont, Chairman and CEO, L'Oréal
- Marc Golland, CEO, Mérieux SpA
- Nicolau von Dornum, Chairman of the Board of Management, Munich Re
- Torben Møgel Pedersen, CEO, PanelCommark
- Eric Rondón, CEO, Philips Lighting
- Felix Sjöberg, CEO and Chairman of the Managing Board, Royal DSM
- Franz van Herten, President and CEO, Royal Philips
- Jean-François Trépo, Chairman and CEO, Solvay Group
- Franky Dennis Wijaya, Chairman and CEO, Sinar Mas Agribusiness and Food
- Jean-Pierre Clamadieu, CEO, Solvia
- Christian Rønning-Tønnesen, President and CEO, Statoil
- Jean-Louis Chassagné, CEO, SunEdison
- Tobias Nilsson, President and CEO, Sunbly Holdings
- Todd Taft, Chairman, Sutton Energy
- Michel M. Lile, Group CEO, Swiss Re
- Maximilian Murensch, Chairman of the Board, Teclis Corporation
- Fred Palm, CEO, Unilever
- Andreas Frieß, Chairman and CEO, Varta
- Anders Runer, Group President and CEO, Vestas Wind Systems
- Anthony Pratt, Executive Chairman, Vey Industries
- David W. Kelley, Chairman and CEO, The Weather Company
- Kwok Khuen Hong, Chairman and CEO, Wincor International

... to realize our climate commitments!

Among other, we've made the following commitments to our climate partners. Together with hundreds of other companies, we can have a major impact.



Procure 100% of electricity from renewable sources

Caring for Climate



Put a price on carbon



Responsible corporate engagement in climate policy



Join the Low Carbon Technology Partnerships Initiative (LCTPi)



Mission of DSM

**Our purpose is
to create brighter lives
for people today
and generations to come**

**We connect our unique
competences in life sciences
and materials sciences
to create solutions that nourish,
protect and improve performance**