

who innovates with a  
conscience for the future?  
—  
we do.

2019 sustainability report



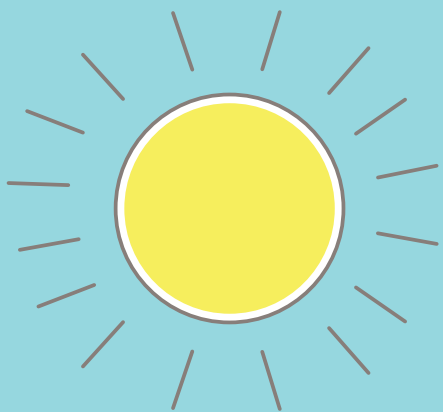
ashland.com

/ efficacy usability allure integrity profitability™

 **Ashland™**  
always solving

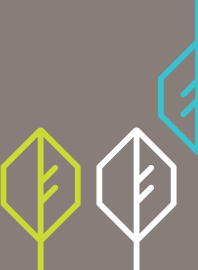






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our reduction in energy  
can power an electric  
car around the Earth's  
circumference about

22,630  
times



our reduction in greenhouse  
gas emissions is equivalent  
to the planting of about

117,350  
trees



our total hazardous  
waste reduction weighs  
as much as about

2,200  
African elephants



our reduction in total  
water withdrawal  
could fill about

3,200  
Olympic-sized  
swimming pools



cash and in-kind  
donations given by  
Ashland for 2019  
was over

\$600k

\*baseline 2013

## performance at-a-glance

	FY 2017	FY 2018	FY 2019
total energy consumption (GJ)	12,331,708	12,912,018	12,689,475
electricity (GJ)	3,663,687	3,781,792	3,619,252
% grid electricity	30	29	29
natural gas (GJ)	5,437,114	5,985,470	6,001,717
other fuels (GJ)	3,230,906	3,144,756	3,068,502
scope 1 emissions (MT CO <sub>2</sub> eq. emitted)	427,861	467,377	453,840
scope 2 emissions (MT CO <sub>2</sub> eq. emitted)	639,096	653,776	599,298
scope 3 emissions (MT CO <sub>2</sub> eq. emitted)	2,403,871	1,837,320	1,411,339
toxic release inventory (million pounds)	21	23*	21
number of Notice of Violations (NOVs)	11	10	4
finances from NOV settlements (USD)	\$138,073	\$71,800	\$42,766
hazardous waste disposal (MT)	53,763	58,474	48,355
water withdrawal (million m <sup>3</sup> )	77,638,867	79,577,137	72,514,637
number of incidents of non-compliance associated with water quality permits, standards, and regulations	not available	not available	1
employees at year-end*	6,500	6,400	6,000**
employee recordable injury rate	0.65	1.11	0.94***
employee lost-time incident rate	0.29	0.53	0.44***
employee fatalities	0	0	0***
indirect contractors**** recordable injury rate	0.56	1.43	1.58
indirect contractors**** lost-time incident rate	0.11	0.64	0.47
indirect contractors' fatalities	0	0	0
indirect contractors' hours	1,786,555	1,254,621	1,263,901
transport incidents	42	39	28
cash and in-kind donations** (USD)	\$938,503	\$671,926	\$618,520

\*While Ashland's total output of TRI materials increased from FY17 to FY18, our total release amount decreased.

The amount transferred for treatment prior to release increased.

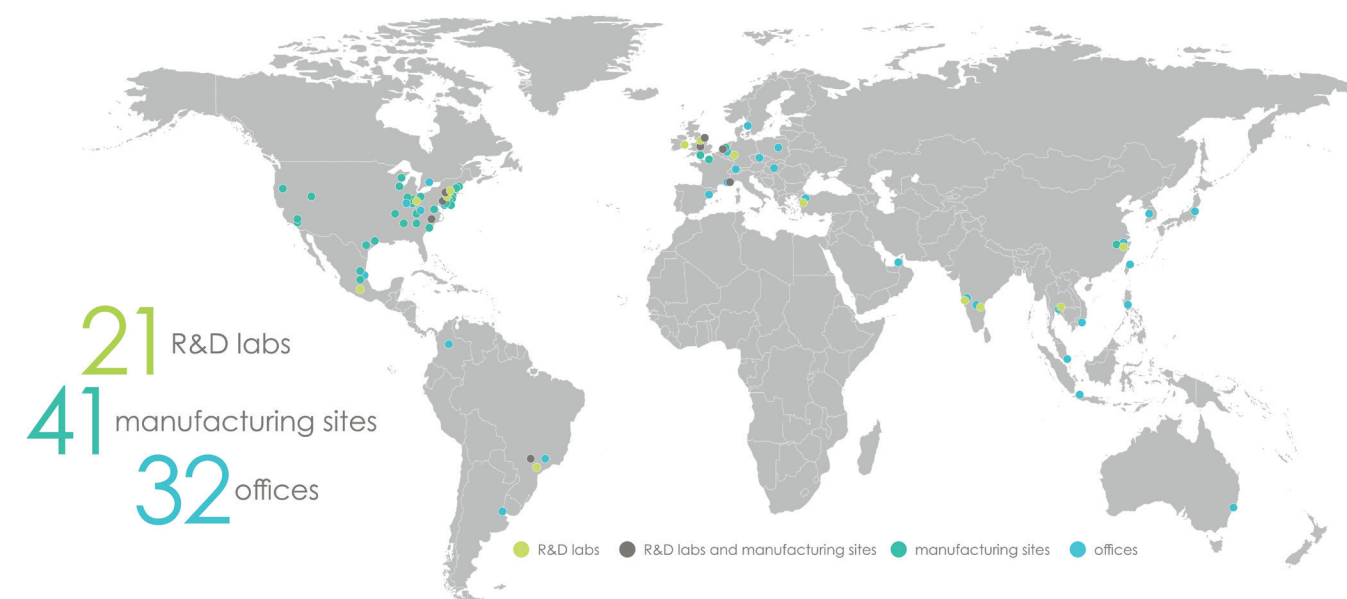
\*\*Employees include directly supervised contractors: these are employees defined as those employees on the entity's payroll, whether they are full-time, part-time, executive, labor, salary, hourly or seasonal employees.

\*\*\*Employee headcount based on headcount report including Composites dated 8/1/2019.

\*\*\*\*FY19 represents final TPRR and LTIR which includes Pharmachem, Avoca and Composites.

\*\*\*\*\*Contract employees are defined as those who are not on the entity's payroll, but who are supervised by the entity on a day-to-day basis, including independent contractors and those employed by third parties (e.g., temp agencies and labor brokers).

## global footprint



## our story

Ashland Global Holdings Inc. (NYSE: ASH) is a premier, global specialty materials company serving customers in a wide range of consumer and industrial markets, including adhesives, architectural coatings, automotive, construction, energy, food and beverage, nutraceuticals, personal care and pharmaceutical.

Ashland's employees are "solvers" who are passionate about creating technologies and solutions to improve customers' products and processes, reduce environmental impact, preserve natural resources and enhance the quality of life within the communities in which we operate.

From renowned scientists and research chemists to talented engineers and plant operators – we thrive on developing practical, innovative and elegant solutions to complex problems for customers in more than 100 countries.

We see chemistry everywhere and our people are distinguished by their ability to create and apply specialized chemistry in ways that enable customers to amplify the efficacy, refine the usability, add to the allure, ensure the integrity, and improve the profitability of their products and applications.

Solvers around the globe are working together to tackle complex challenges while finding innovative ways to operate more safely and sustainably. We're committed to expanding the use of natural, sustainable materials, and we're collaborating with customers to deliver breakthrough products downstream while reducing the environmental footprint. We consider sustainability a journey, not a destination, and we continue to make progress. Visit [ashland.com/sustainability](https://ashland.com/sustainability) to learn more.





# chairman's message

Discovering breakthrough solutions requires a passion and tenacity for innovation. At Ashland, we know that our success must include innovating with a clear conscience about the planet and our relevance is contingent on taking a multi-stakeholder view. Solvers around the globe have an earnest and heartfelt approach towards the local communities in which we operate. Our desire for a more sustainable and inclusive world means holding ourselves and our suppliers to increasingly higher sustainability and social standards. Superior product performance is table stakes.

Our core values and ethics call for each of us to do the right thing- always, everywhere. For nearly a decade, Ashland has been transforming. While many things have changed, we've held a constant and unwavering commitment to safe, compliant and responsible operations. Every employee around the globe operates under our Zero Incident Culture (ZIC), and we continuously strive for ZERO.

To achieve our sustainability goals, Ashland is focused on three core sustainability initiatives that are integrated into our global corporate strategy: sustainable sourcing, sustainable operations and sustainable solutions.

## sustainable sourcing

Ashland is resolute to solving with responsibly sourced raw materials. We have extended our sustainability initiatives beyond our fence line upstream to our supply chain. Several programs target the environmental, social and ethical performance of our suppliers and we are committed to ensuring that our products and services support innovation in developing countries. We network with like-minded organizations to leverage core competencies. At the heart of sustainable sourcing, is Ashland's supplier code of conduct.

## sustainable operations

Ashland's commitment to Responsible Care® and associated management system ensures a high level of environmental, health & safety performance. This global industry initiative advances the safe and secure management of chemical products and operations. Within Ashland, this program includes a global management system, employee involvement at every level of the organization and continuous improvement toward our goal of operating with zero incidents. These initiatives are helping Ashland meet our 2020 goals aimed at reducing energy consumption, greenhouse gas (GHG) emissions and hazardous waste.

## sustainable solutions

Consumers and Ashland's customers increasingly seek higher-performing products with a lower ecotoxicological profile. Stakeholders are also interested in understanding our actions toward community involvement, empowerment, worker's rights, fair labor practices, and responsible land management. Eco-standards, eco-labeling and more can mean success or failure in the marketplace. Ashland has integrated specific criteria for the review of environmental and life-cycle impacts at every stage of our new product innovations process, including applying green chemistry principles for raw material selection, supply chain, closed loop manufacturing operations, packaging, shipments to customers, customer operations and formulations, and the material's end-of-life.

## external recognition

In FY19, Ashland was recognized by many global industry organizations including the American Chemistry Council (ACC) and the Society of Chemical Manufacturers and Affiliates (SOCMA). For a broader list of our recognition, go to page 40. Here are some hi-lights:

- 20 Ashland sites were recognized for safety performance by the ACC; 14 sites received Certificates of Excellence, one site received a Certificate of Honor and five sites received Certificates of Achievement
- Ashland's Merry Hill facility was recognized for tremendous efforts and unique approaches to sustainability practices as part of SOCMA's 2019 Performance Improvement Awards program
- ACC recognized Ashland with a sustainability leadership award for environmental protection and circularity. Ashland's Benecel™ MX modified cellulose won the award for sustainably addressing the growing popularity of plant-based foods and meat alternatives while decreasing the environmental impacts of operations through initiatives that have helped reduce greenhouse gas (GHG) emissions and conserve water

## corporate responsibility

Ashland's facilities and procurement teams consistently seek ways to expand our positive social impact, employing minority, underprivileged or disadvantaged populations. We believe in the humanity of all people and we are committed to a culture of inclusion and diversity regardless of race, ethnicity, nationality, age, sex, gender identity, sexual orientation, religion, or disability. We are dedicated to achieving a more collaborative environment of innovation that leverages the talents of our diverse, global workforce to drive a sustainable, competitive advantage. Our goal is to create an environment where all our employees are seen, heard and have an equal opportunity to fulfill their potential. Ashland will continue placing an increased focus on the environmental and social impact of our actions.

## charitable giving

Threats facing our planet are numerous and businesses large and small play a vital role. I am proud of the ongoing and proactive volunteerism from our solvers around the globe. They demonstrate Ashland's vision, mission and values by respecting, protecting, and advancing the people we work with, companies we serve, shareholders who invest in our future, the communities we're a part of, and the planet that we all share. More information can be found on page 44.

Ashland is proud to create innovations that answer specialized market needs while solving for ways to ensure a better future. We've begun our journey to innovate without depleting natural resources and to continuously improve with greater care and kindness for all populations around the globe. Beyond this report, our website contains more information about Ashland's progress.

Sincerely,

**Guillermo Novo**  
Chairman and Chief Executive Officer  
Ashland



# the Ashland way

Our vision, mission, and Way, are more than just words. They are our guiding principles.

At Ashland we share a core drive to solve technical problems that deliver breakthrough capabilities and transform what is possible. We also share a commitment to each other, our communities, sustainability, safety, commercial success, and much more.

Our initiatives are helping our customers make ethical choices, reduce our environmental footprint, and enhance the quality of life within our communities while ensuring the long-term sustainability of our product lines.

**our vision** is to make a better world by providing creative solutions through the application of specialty ingredients and materials

**our mission** is to develop practical, innovative, and elegant solutions to complex problems in applied chemistry, always pushing the boundaries of what's possible, and advancing the competitiveness of our customers across diverse industries

**our way** is to respect, protect, and advance the people we work with, companies we serve, shareholders who invest in our future, communities we're a part of, and planet we share

## global code of conduct



Our Global Code of Conduct (the "Code") is the foundation of everything we do. It details our core values of integrity and ethical behavior that define Ashland's Way of doing business. It applies to all employees, officers and members of the Board, and it guides us on how to carry out our daily activities in accordance with our values and applicable laws and policies.

We expect our agents, consultants, joint venture partners and other third parties to hold themselves to similar standards when acting on Ashland's behalf. Ashland takes appropriate measures when we believe third parties have not met our expectations or their contractual obligations. Training is required annually of all employees, including signing of a certification form that demonstrates the employees' understanding of the Code and their commitment to it.

[Learn more about our global code of conduct](#)

## responsible care®



**RESPONSIBLE CARE®**  
OUR COMMITMENT TO SUSTAINABILITY

Ashland has made formal commitments to improve the environmental, health, safety, and security performance of facilities, processes and products throughout the globe. Our company delivers on commitments through a comprehensive Responsible Care® program. This global industry initiative advances the safe and secure management of chemical products and operations. Within Ashland, this program includes a global management system, employee involvement at every level of the organization, continuous improvement towards the goals of operating with zero incidents, ensuring compliance, and reducing our environmental, health, safety and security impact.

[Learn more about Ashland and Responsible Care®](#)

## sustainability council

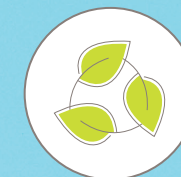
Ashland has a sustainability council that reports to the CEO and Board of Directors. The Council is responsible to prioritize focus areas, sponsor plans, track progress, evaluate, guide, and drive the completion of Ashland's environmental, sustainability, and corporate social responsibility goals.

This cross-functional, cross-regional team of leaders focuses on Ashland's sustainability efforts where we can make the most impact: sustainable sourcing, sustainable operations and sustainable solutions.

What follows in this report describes the steps Ashland is taking in each of these focus areas.







# sustainable sourcing

In 2019 we continued our program to measure and monitor the environmental, social and ethical performances of our suppliers.







As of FY2019 Ashland has received signed agreements which represent over **80%** of our raw material spend



Ashland wood- and cotton-derived cellulose ethers have a natural origin content of up to **85%**



**80%** of Ashland's personal care products launched in 2019 are nature-derived and/or COSMOS\*-validated



**100%** of our products containing palm, palm oil, or palm oil derivatives are sourced from Roundtable on Sustainable Palm Oil (RSPO)-certified suppliers and distributors

## supplier code of conduct

Ashland's suppliers are required to adhere to the highest legal and ethical rules and principles as set forth in our Supplier Code of Conduct. Suppliers are expected to implement work practices that consistently regard and protect the environment and prevent personal injury or property loss. This includes responsibly cultivating and harvesting raw materials that are sourced from nature and seeking third party verification.

## sustainability assessments

Ashland has partnered with EcoVadis for third party verification of supplier sustainability self-assessments to ensure they meet their commitments to environmental, social and ethical practices and behavior. The self-assessment focuses on environment, labor and human rights, ethics, and sustainable procurement.

**102** of our suppliers representing over **51%** of our raw material spend are on the EcoVadis platform\*

The average self-assessment score was 57.90 out of 100. Ashland will be working with suppliers that have low performance scores, so they understand the factors affecting their score and can improve.

Upon achieving a higher completion rate, verification of compliance will be evaluated for a sampling of the highest risk suppliers via independent third-party audits. Work towards this step has been initiated. The intent is to educate and help suppliers make progress on their own path toward becoming more sustainable companies.

## responsibly sourced materials



### palm oil



If present in products, Ashland sources palm, palm oil, or palm oil derivatives from Roundtable on Sustainable Palm Oil (RSPO)-certified suppliers and distributors. The supply chain model is Mass Balance which means that the certified palm oil is mixed in with conventional palm oil but monitored administratively.

The RSPO has developed a set of environmental and social criteria to which producers must comply. When they are properly applied, these criteria can help minimize the negative impact of palm oil cultivation on the environment and communities in palm oil-producing regions. There are also assurances of protection of ecosystems, biodiversity conservation, and basic or traditional cultural needs of the local communities are met.

Other RSPO principles require a significantly reduced use of pesticides and fires; fair treatment of workers according to local and international labor rights standards, and the need to inform and consult with local communities before the development of new plantations.

RSPO-certified producers have been independently audited so they can claim that they produce, use and/or sell sustainable palm oil.

### wood-sourced cellulose



Ashland wood- and cotton-derived cellulose ethers (Natrosol™ HEC, Benece™ HPMC, Aqualon™/Blanose™ CMC, Klucel™ HPC, Aqualon™ EC) provide formulators a wide range of nature-derived options for thickening, rheology modification, and film formation, with a natural origin content<sup>1</sup> of up to 85%.

Ashland's wood-based pulp suppliers have certifications from the Forest Stewardship Council (FSC) or Program for the Endorsement of Forest Certification (PEFC) that engage in forest management and have zero deforestation practices.

\*in 2018 there were 35 suppliers

<sup>1</sup>natural origin content per ISO 16128-2:2017





# sustainable operations

Ashland maintains a Responsible Care® management system to ensure that all operations achieve and maintain a high level of environmental, health, safety and security performance.







Our manufacturing sites continue to prove that achieving zero workplace injuries is possible.

By the end of FY 2019:

2 sites have been injury-free for more than **15 years**

5 sites have been injury-free for more than **10 years**  
but less than 15

11 sites have been injury-free for more than **5 years**  
but less than 10

32 sites have been injury-free for more than **1 year**  
but less than 5

## injury and illness performance

Cultivating a safety culture is intentional at Ashland and is best shown by our commitment to a Zero Incident Culture (ZIC). ZIC begins with the vision, values, beliefs, and actions of Ashland's leaders demonstrating that zero incidents are possible. It means developing processes where compliance is the minimum expectation, allowing employees to proactively manage safety above compliance on the journey to ZERO.

As an indication of our commitment to Responsible Care, we have obtained a third-party certification to RC14001, which includes the internationally recognized ISO 14001 certification and adds additional health, safety, security, and chemical industry requirements. Currently, Ashland has 30 international sites participating on a group RC14001 certification, and we are working toward certifying all our manufacturing locations. Also, as part of our commitment to health and safety, 16 of our sites have obtained an additional ISO 45001 certification, an international health and safety management system. [View the certifications.](#)

**Our recordable occupational injury and illness rates for the last three years are as follows:**

	FY 2017	FY 2018	FY 2019
employees+ at year end .....	6,500	6,400	6,000++
employee recordable injury rate ...	0.65	1.11	0.94+++
employee lost-time incident rate ...	0.29	0.53	0.44+++
employee fatalities .....	0	0	0+++

\* Employees include directly supervised contractors: these are employees defined as those employees on the entity's payroll, whether they are full-time, part-time, executive, labor, salary, hourly or seasonal employees.  
\*\* Employee headcount based on headcount report including Composites dated 8/1/2019.  
\*\*\*FY19 represents final TPRR and LTIR which includes Pharmachem, Avoca and Composites

As part of Ashland's Zero Incident Culture we strive every day to achieve zero incidents. We continue to make good progress on our journey. The total recordable incident rate (TRIR) increased from fiscal year 2017 to fiscal year 2018 due to the acquisition and integration of 14 newly acquired sites, which historically have had higher incident rates than the heritage sites. As demonstrated by the FY19 results, as integration to the Ashland Zero Incident Culture has continued for the newly acquired sites, performance is beginning to improve and once again is trending toward the desired result of ZERO.

## industrial hygiene and occupational health program

Ashland has a state-of-the-art Industrial Hygiene and Occupational Health (IH and OH) Program that establishes the requirements and responsibilities for industrial hygiene and medical surveillance programs at all Ashland facilities. This program contains all the requirements and programs that we will use, on a global basis, to manage and control employee exposures to chemical, physical, and biological hazards. These programs include the following subjects:

- employee exposure and risk assessment
- general chemical hazards
- chemical specific hazards
- active pharmaceutical ingredients
- physical hazards
- biological hazards
- engineering controls
- personal protective equipment
- respiratory protection
- medical surveillance

Industrial Hygiene and Occupational Health are complex topics, and our facilities are also responsible for identifying and complying with all applicable regulatory requirements that apply to them at their local sites. We have Environmental, Health and Safety (EHS) subject matter experts (SMEs) that help assist these facilities as needed to comply with these local requirements, as well as those of Ashland. When Ashland's requirements are stricter, we apply these regardless of the location's local rules.



### The Society of Chemical Manufacturers & Affiliates (SOCMA)

Bronze awards: Ashland, Ohio; Columbus (Harmon), Ohio; Kenedy, Texas  
[learn more on page 40](#)



### The National Safety Council

On January 24, 2019, the National Safety Council announced Bill Wulfsohn as one of the CEOs Who "Get It," a recognition of leaders who demonstrate their commitment to worker safety and health.  
[learn more on page 40](#)

## safe driver training program

Ashland ended the 2019 fiscal year with nine motor vehicle accidents (MVA) and zero in the fourth quarter. That is the best year on record! Every year, the number of MVAs has decreased, but Ashland's ultimate goal is ZERO!

We attribute this achievement to our commitment to overhaul safe driver programs beginning in 2015 and focusing each year on data-led targeted training programs both online and behind the wheel.

The targeted training modules are paced out every few months in small doses, commonly referred to as 'micro-learning.' Micro-learning has been shown to increase retention and thought in adult learners as compared to a longer training done once a year.

There are multiple stages of the training:

**part 1:** Ashland policy review and executive message video to drivers

**part 2:** Four targeted training micro-learning courses throughout the year focusing on the areas which internal data analyses shows the greatest opportunity for improvement. All modules are available through our web-based third-party provider and are provided in the language of the trainee and contain country-specific visual content.

**part 3:** Using a risk-based process, drivers who achieve certain thresholds will also take a 1-day defensive driver behind the wheel in-person training class hosted by various providers around the world.

## good catch program

Work-related injuries, incidents and environmental releases are just the most visible result of latent opportunities. The aim of Ashland's "Good Catch" Program is to identify those underlying unsafe conditions or behaviors that could lead to an undesirable outcome. At Ashland we have defined a "Good Catch" as anything that falls within three different areas of opportunity:

### near misses or near hits

occurrences that could have but did not result in an incident

### substandard condition or behaviors

occurrences that could have but did not result in an incident/near hit

### suggestions

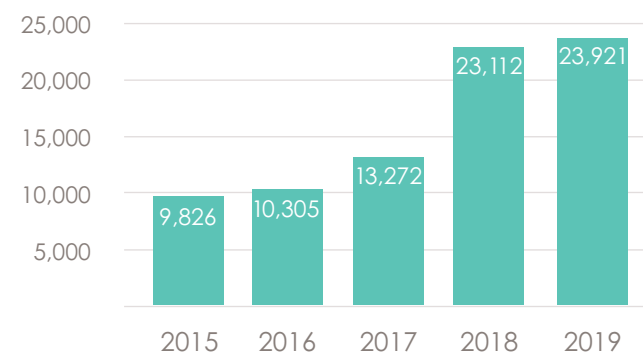
ideas related to environmental, health, safety, quality, and regulatory compliance



see something,  
do something

Ashland has reported over  
**23,921** good catches in FY2019

good catches have increased through the years



### American Chemistry Council (ACC)

20 Ashland sites were recognized for safety performance by the ACC; 14 sites received Certificates of Excellence, one site received a Certificate of Honor and five sites received Certificates of Achievement.  
[learn more on page 41](#)

## ergonomic kaizen rapid improvement events

Ashland facilities have been holding Ergonomics Kaizen Rapid Improvement Events. It is a multi-disciplinary team approach to improve workplace ergonomics. The goal of these events is to train a wide variety of employees on how to identify and eliminate awkward work postures that could increase the risk of ergonomic injury, all in a very short period. The focus is on identifying quick, simple, improvements to improve safety, efficiency and quality. Items can be fixed during the event or are placed on a 30 - 60 - 90-day improvement plan with monthly follow-up until completion. In FY2019:

**69** employees participated in  
**8** events globally at plants and research labs

combined, these teams identified  
**402** ergonomics and safety hazards for improvement

Several fixes that teams have found are common throughout our manufacturing facilities, and all plants are encouraged to implement these fixes at their locations:

- 5S of storage and warehouse areas
- purchase and use start-assist pallet jacks
- install hose reels for flexible air lines
- purchase and use portable stairs with handrails
- install handles and improved casters on portable tanks
- install valve extension handles to hard-to-reach process valves

## process safety performance

At Ashland, process safety management calls for an unwavering commitment to process safety through our Zero Incident Culture, an understanding of the hazards and risks throughout our manufacturing processes along with robust systems to manage the risk, and a continued focus to learn from experience.

Our management systems are designed to prevent the uncontrolled release of hazardous substances with the aim of avoiding significant incidents with the potential for serious injuries, environmental impact and property damage. We apply our hazard identification and risk assessment systems to fully understand the hazards of our operations and implement engineering controls and other management systems to reduce our risk, where necessary. In addition, we focus on training emergency personnel within our business and planning with local response teams to ensure we are prepared to respond to incidents effectively to keep employees and communities safe.

We apply good engineering practices to managing the life cycle of our manufacturing equipment from design and installation, through operation and proper maintenance, to decommissioning.

We are also focused on continuous improvement of our management systems by conducting periodic internal audits, investigating all process safety incidents and relevant near misses, and implementing associated recommendations. In addition, we collaborate with external organizations such as the Center of Chemical Process Safety and American Chemistry Council as we look to improve on our systems. The table below outlines our process safety metrics for this reporting period.

	FY 2017	FY 2018	FY 2019
process safety incidents count	18	26	16
process safety total incidents rate	0.25	0.34	0.23
process safety incidents severity rate	0.06	0.20	0.14

## transport incidents

Ashland sets global operational expectations for transportation safety that are designed to ensure compliance with transportation regulations and to minimize the risk to people and the environment. Through a global transportation risk process, Ashland identifies its transportation hazards, characterizes and ranks those hazards to assess and manage potential risks within each region.

Ashland's common carriers are expected to be in full compliance with applicable laws and Ashland's Global Supplier Code of Conduct, have a satisfactory safety performance and be in good financial standing, as regionally determined. Carriers are assessed on an ongoing basis to minimize any potential future risk and their performance is monitored through Ashland's incident management system. Ashland supports investigations and developing corrective action plans with carriers for incidents involving Ashland products.

**57%**

of our sites have gone over

**1 year**

with

**zero**

process safety incidents

**43%**

of our sites have gone over

**3 years**

with

**zero**

process safety incidents

**zero** North America private carrier reported transport incidents

**27** North America common carrier reported transport incidents involving Ashland product

**1** Asia Pacific common carrier reported transport incidents involving Ashland product

**zero** EMEA and Latin America third-party common carrier reported transport incidents involving Ashland product



## environmental 2020 goals<sup>2</sup>



10%↓

reduction in  
energy consumption  
intensity



10%↓

reduction in  
greenhouse (GHG)  
gas emissions intensity



10%↓

reduction in  
hazardous waste  
generation intensity

<sup>2</sup> baseline is 2013

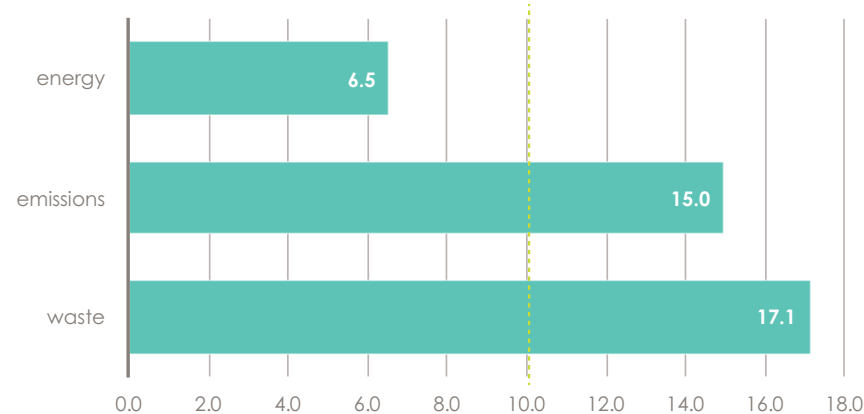
## environmental performance

In 2016, to demonstrate our commitment to always solving with respect to a more sustainable future, Ashland set 2020 environmental goals to reduce our energy consumption, greenhouse gas (GHG) emissions and hazardous waste generation.

Our sites conform to ISO 14001 and RC 14001 standards. ISO 14001 is a global standard for environmental management systems. Using this framework as a foundation, the ACC added elements of health, safety, security and chemical industry initiatives to create the RC 14001 technical specification. Ashland chooses to certify our sites to RC 14001, where the ISO 14001 certification is also automatically earned.

Following is a link to our sites that are certified with [ISO 14001 and RC 14001](#).

### progress toward 2020 goals



Note: In 2017 Ashland revaluated our hazardous waste data and found that we had been inaccurately accounting for progress toward our hazard waste reduction goal due to regulatory changes that impacted one plant where we sell a by-product stream as fuel. Due to a regulatory change and Ashland's decision not to register the by-product stream under REACH, the stream was considered hazardous waste in 2016 and 2017 whereas it had not been historically accounted for as hazardous waste in our baseline. For reporting year 2017, we have corrected the baseline.

Ashland is proud to announce that as of the end of calendar year 2019, we have met two of our 2020 goals of a 10 percent reduction in greenhouse gas (GHG) emissions intensity and a 10 percent reduction in hazardous waste generation intensity.



reduction in green-  
house gas emissions  
is equivalent to the  
planting of about

117,350

trees



our reduction in  
energy can power an  
electric car around the  
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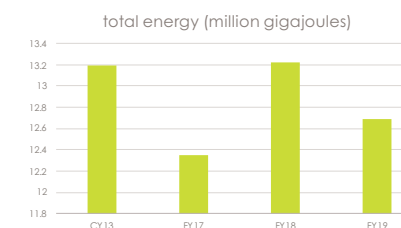
our total hazardous  
waste reduction  
weighs as much  
as about

2,200

African elephants

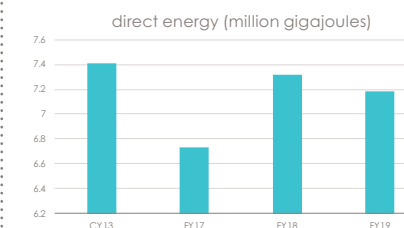
### total energy consumption

Ashland uses "The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard" for guiding the reporting of energy and greenhouse gas emissions. For reporting purposes, we convert this number to gigajoules (GJ) for both our direct and indirect energy consumption. An increase from FY17 to FY18 was largely driven by product mix.



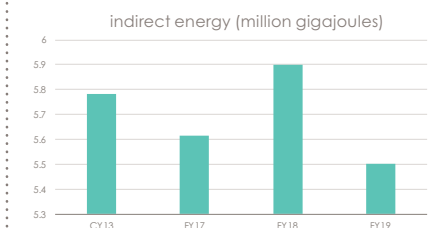
### direct energy consumption

Direct energy consumption is the amount of primary energy combusted on site by Ashland. Direct energy sources include natural gas, coal, liquified petroleum gas, diesel and fuel oils, and gasoline.



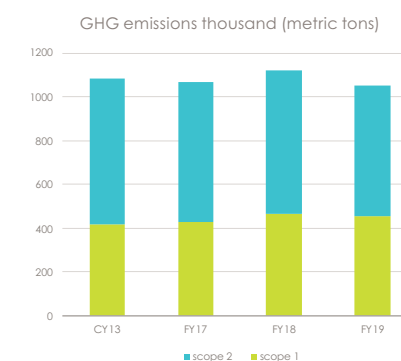
### indirect energy consumption

Indirect energy refers to the energy consumed by Ashland that is generated by, and purchased from, external suppliers. Ashland consumes indirect energy through electricity and steam.



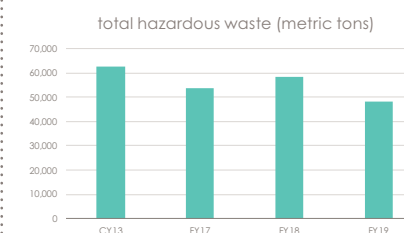
### greenhouse gas emissions

Ashland's greenhouse gases are the result of our consumption of direct and indirect energy sources.



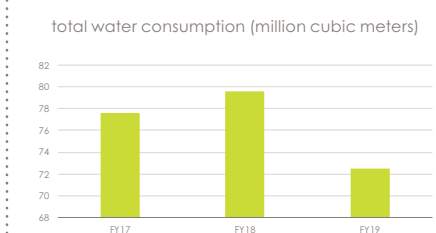
### hazardous waste

Ashland has extensive global programs for waste minimization, recycling and treatment of disposal of generated wastes. We manage our hazardous waste in accordance with governmental regulations and our internal policies and procedures.



### water consumption

Ashland's manufacturing operations account for a majority of the company's water footprint (97.7%). Ashland estimates that an additional 0.3% of water use comes from non-manufacturing sites. We continue to refine our tracking to establish a baseline for water usage and plan to evaluate reduction goals in the future.



CY13 is not included in graph as there is no established baseline for water.

### short- and long-term strategy to manage scope 1 emissions

Ashland leadership sets goals and discusses management of our greenhouse gas emissions. Ashland also directly tracks Scope 1 and 2 emissions for further analysis of areas of improvement and progress towards achieving environmental goals. The purpose of our emission production management is to ensure Ashland is reducing our emissions and taking responsibility for our environmental impact, as well as protecting the air quality surrounding our sites. In the short-term, Ashland is committed to our 2020 emissions goal and has leadership in place to ensure achievement. Currently, emissions reductions activities are led by individual manufacturing sites. Some examples of reduction programs include the installment of motion sensors and process improvements. Our Sustainability & Environmental team is actively working with each Ashland business unit to solidify long-term emission reduction strategies and identify opportunities for our plants to operate more sustainably.



# Ashland Production System and sustainability

In October 2017, Ashland began the implementation of the Ashland Production System (APS) at our Nanjing, China plant. Since then, Ashland has launched this system at eight of our plants in Asia, North America and Europe. The plan is for roll-out is to launch this program in five more sites before the end of 2020.

A key principle of APS is continuous improvement through the elimination of waste. The lean philosophy of APS helps Ashland to produce exactly what the customer wants with the absolute minimum amount of resources. This results in APS projects that reduces our use of energy, reduces wasteful by-products, and thereby reduces our impact on the environment.

On these pages are examples of APS projects that minimized impacts on the environment.

## Freetown, Massachusetts

improved site energy efficiency and implemented numerous energy-reduction projects



between 2017 – 2019, the site actively switched most building and road lighting to LED and to-date, have an estimated energy reduction of **526,000 kWh/yr (303 MT CO<sub>2</sub> saving)**



variable frequency drives (VFDs) were added to heat circulation pumps and upgrades were made to their heating controls, so now the systems can operate based on load demand which **significantly reduced energy consumption for an estimated electricity reduction of 178,000 kWh/year (89 MT CO<sub>2</sub> saving)**



In 2018, an air-cooled condenser was installed on one of the main plant chillers. During periods of low cooling demand (late fall, winter, and early spring) the plant can operate on a single chiller leaving the second chiller off. The air-cooled condenser also eliminated the need for cooling tower water to remove the heat generated from the chillers, which reduced water usage by 3.7MM gal/year. **The plant reduced electricity usage by 1.8 MM kWh/year (896 MT CO<sub>2</sub> saving).**



## American Chemistry Council (ACC)

Awarded Ashland with a sustainability leadership award for environmental protection and circularity.  
[learn more on page 41](#)

## Doel, Belgium

focused on lowering our carbon footprint



decreased potable water use, and reduced waste to the extent where the only waste going to landfill is construction waste or that which is legally mandated



a co-generator designed to generate both electrical power and heat for use in a process application was installed; it produces 2000 kwh electricity and 2250 kwh heat each hour which is utilized by the plant



installed two new energy efficient compressors at the wastewater treatment for **a savings of 525.6 Mwh/year**



extra drainage was created as a result of revamping the parking space area by our wastewater treatment plant (WWTP) providing an extra 25,000 m<sup>3</sup> groundwater per year which is used at the WWTP, thereby reducing the need for the equivalent amount of potable water



all packaging waste streams are recycled or reused, foils, paper, pallets, and other packaging are recycled; IBC's are returned to our supplier for reuse; super sacks are being re-used for internal use (6-7 cycles) and reconditioned bags are being used for selected finished products



we determined a thinner foil could be used for packaging cellulose; this solution represents **a savings of 3,565 kg foil per year**



methyl cellulose waste goes to composting and other process waste streams are going to incineration with energy recuperation



insulation waste from construction is the only waste stream that still goes to landfill



all dining-related waste streams can be sorted separately due to a new waste station; almost all plastic was replaced with biodegradable plastic; plastic cups were replaced by paper cups which are disposed in a separate recycling waste stream for use in manufacturing toilet paper



## The Society of Chemical Manufacturers & Affiliates (SOCMA)

Ashland's Merry Hill facility was awarded SOCMA's 2019 Sustainability award  
[learn more on page 40](#)

## Zwijndrecht, the Netherlands

focused on programs aimed at energy savings and employing circular economy principles



improved winterization of process lines with automated on/off valves that supply steam when the outside temperature drops below 5-10°C; energy savings in FY2019 are estimated at **375 kNm<sup>3</sup> of natural gas savings per year (665 mt CO<sub>2</sub>)**



re-used solvents from the dryer area diverting acetone from distillation or waste, and minimizing the amount required for distillation saves **38 kNm<sup>3</sup> of natural gas per year (67 mt CO<sub>2</sub>)**



optimized temperature control of acetone distillate to reduce the natural gas consumption by **68 kNm<sup>3</sup> per year (120 mt CO<sub>2</sub>)**



optimized purification control for a **46 kNm<sup>3</sup> reduction in natural gas consumption in FY2019 (81 mt CO<sub>2</sub>)**



reduced reflux ratio against new guideline setting so the natural gas consumption has been **reduced by 17 kNm<sup>3</sup> per year (30 mt CO<sub>2</sub>)**



replaced conventional lighting with LED which **saved 27,750 kWhr (15 mt CO<sub>2</sub>)**



replacement of harbor water pumps **reduced the electrical energy by 49,500 kWhr per year (26 mt CO<sub>2</sub>)**



stretch wrapper replacement for finished goods packaging which employed natural gas, was replaced by a stretch wrapper at **a savings of 12 kNm<sup>3</sup> natural gas per year (22 t CO<sub>2</sub>)**





Ashland solvers are passionate about innovation and we rethink chemistry to help our customers formulate more sustainably, with future generations in mind.

Our commercial solutions enable our customers to amplify the efficacy, refine the usability, add to the allure, ensure the integrity, and improve the profitability of their products and applications.

Many Ashland products launched in 2019 helped our customers to develop formulations with more "eco-friendly" attributes such as nature-based ingredients, responsibly sourced raw materials and/or products that are biodegradable. Our products enabled more informed decisions about the ingredients they use and their impact on the planet we share.



# sustainable solutions



Our initiatives are helping consumers make ethical choices, reduce our environmental footprint, and enhance the quality of life within our communities while ensuring the long-term sustainability of our product lines. Ashland solvers develop products to help customers make educated choices about the ingredients they use and their impact on the planet we share.

Depending on the market or application, Ashland can provide ingredients that are characterized by:

naturality: ISO16128:2-2017

naturality: renewable carbon (bio-based) content

COSMOS\* standard validation

biodegradability (OECD) and likelihood of environmental persistence

upcycling

## naturality: ISO 16128

To solve for the growing personal care market and consumer interest in our natural and nature-derived ingredients, Ashland has evaluated the natural and natural origin content of many grades of its specialty ingredients product lines, applying the ISO 16128-2:2017(E) standard.

ISO 16128-2:2017 provides guidelines on definitions for natural cosmetic ingredients and approaches to calculate the natural origin content of products. Section 4.3 of the ISO standard references the determination of Natural and Natural Origin Indexes of ingredients, including nature-derived ingredients.

### As examples:

- Ashland cellulosic and guar chemistries derived natural values are calculated using molecular weight, formulation details for the product, and analytical data from production
- Ashland biofunctional and preservatives chemistries derived natural values are calculated using weight fraction, formulation details for the product, raw material supplier data, and where applicable, analytical data from production
- Ashland finished products as sold to the customer factor in formulated water as referenced in the ISO standard 16128-2 (Section 5.1), and the calculations provided are for our finished products, as sold to customers



## naturality: renewable carbon (bio-based) content

Another indicator of a product's naturally sourced origin is the percentage of renewable carbon that comes from plants, corn, and other biomass starting materials. These calculations determine the amount of carbon in a product that comes from a renewable source, as opposed to a limited petrochemical source. The renewable content calculation only considers the part of a material that is organic carbon.

Calculation of renewable carbon (bio-based) content can be done by testing or theoretical calculation. For Ashland, we typically know which component constituents are unambiguously known as either bio-based or petroleum sourced, and therefore apply a theoretical calculation based on the known reaction stoichiometry and material.



## COSMOS\* standard

The COSMOS\* standard is an international non-profit association that establishes common requirements and definitions for organic and/or natural cosmetics. It was developed at the European and international level by the founders of the COSMOS\* standard AISBL:

BDIH (Germany)   COSMEBIO & ECOCERT (France)   ICEA (Italy)   SOIL ASSOCIATION (UK)

### main objectives

- promote the use of products from organic agriculture, respecting biodiversity
- use natural resources responsibly, respecting the environment
- use processing and manufacturing that are clean and respectful of human health and the environment
- integrate and develop the concept of "Green Chemistry"

### validation requires an ingredient meet criteria which define it as natural in origin and processing

- free of contaminants (GMOs, heavy metals, aromatic hydrocarbons, pesticides, etc.)
- RSPO-certified (if relevant)
- does not contain nanomaterials
- has no gamma and X-ray irradiation

### conditions ingredients must meet

- physically processed agro-ingredients
- chemically processed agro-ingredients
- water; as well as minerals and ingredients of mineral origin listed in Appendix IV of the COSMOS\* standard
- other ingredients, such as natural ingredients containing petrochemical moieties and preservatives, listed in Appendix IV of the COSMOS\* standard





# biodegradability

There are increasing ecological, consumer and regulatory drivers for companies to be better informed about the environmental impacts of their products, particularly if at their end-of-life they should be discharged or released into the environment.

Biodegradability is a measure of persistence in the environment and assessed by the ability of microorganisms to break down the parent molecule into smaller constituents. Ashland is committed to supporting products and solutions that are sustainable and biodegradable in the environment.

biodegradation testing equipment at our Bradford, UK research and development (R&D) facility



Biochemical Oxygen Demand (BOD) bottles in the incubator for use in the OECD 301D methodology, a respirometry test that predominantly measures biodegradation by dissolved oxygen and testing.



Respirometers for use in the OECD 301F methodology, an aerobic biodegradation test that determines the biodegradability of a material by measuring oxygen consumption.

We have taken a unique approach to address this concern by developing in-house biodegradation testing capabilities at our Bradford, UK research and development (R&D) facility. Ashland can now quickly and internally screen and assess the degradation potential of our materials at following standard OECD methodologies, but also in environments that may more closely mimic realistic ecosystems.

Specifically, we have in-house biodegradation capabilities that allows us to:

- conduct initial screening to filter those products/raw materials in determining those that have better biodegradation profiles (which would be otherwise quite costly, and time-limiting, if relying on outside resources)
- investigate structure/performance relationships to enable tailoring of biodegradable materials
- analyze the results including seeing what goes on beyond the time period of the testing (ergo, our "not persistent in the environment" categorization); when sending this out to an external lab one wouldn't necessarily get that information
- better able to control and mimic environmental scenarios that may be more applicable to real-life conditions (e.g., sea water/marine life, surface water)

Biochemical Oxygen Demand (BOD) bottles in the incubator for use in the OECD 301D methodology, a respirometry test that predominantly measures biodegradation by dissolved oxygen and testing.

Respirometers for use in the OECD 301F methodology, an aerobic biodegradation test that determines the biodegradability of a material by measuring oxygen consumption.

## in-house biodegradation testing

Because we have in-house biodegradation testing capabilities, we are better able to inform our customers of the biodegradation profiles of our materials/products and make the following distinctions:



**Biodegradable:** Has attained a sufficient level of biodegradation that meets the requirements for 'ready' or 'inherent' according to OECD or related methods such as, 301, 302, or 306. Or product has been assessed as being biodegradable based on a read-across to a chemical with similar structure or the product components have been analyzed for biodegradation potential.



**Not expected to persist in the environment:** Defined a level of biodegradation within standard OECD methods where there is evidence of ongoing biodegradation such that we are confident that the substance is not expected to persist in the environment. For example, if there is evidence for ongoing biodegradation on timescales beyond the standard OECD methodologies.

Since starting three years ago, we have tested more than 100 samples applying one of the various OECD validated "screening" assays (e.g., OECD 301A-F, 306 methodologies), typically each one conducted over a duration of 28 days. More than half for our final products or R&D formulations in the personal care market, and more than 30 for industrial and energy applications.

Ashland's commitment to biodegradation testing and products has led us to partnerships with several of our customers, both to share knowledge and refine each other's understanding of sustainability and environmental impacts. Consequently, we have been able to collaborate on specific projects that meet our customers' needs for developing formulations with enhanced biodegradation profiles. Our internal testing capabilities allows us to quickly determine the best solutions for these new technologies.

Such interactions with our customers have opened a wider a 'two-way' dialogue where Ashland's internal cadre of chemists, microbiologists, toxicologists, meet and speak with similar experts of our customers, to share knowledge and allow for open discussions on topics such as improving methodologies and interpretation of biodegradability data.

In addition, Ashland has made biodegradation a main component of our personal care R&D new product development process. We utilize our laboratory in Bradford for testing multiple, varying solutions, employing a variety of methodologies, that then provides our researchers near-immediate results and feedback to assess their chemistry against biodegradable potential.

Biodegradability is an important feature for a number of consumer products, particularly in some of the industries and applications we serve (e.g., personal and home care, energy business). Because of this we have made biodegradation testing mandatory for products destined for such markets as part of our new product development process. This enables us to develop products and collaborate with our customers in their eco-conscious design efforts.

Ashland is aware that materials persist in the environment at different rates and our expertise in this area lets us look beyond the test results to a more environmentally relevant assessment of persistence. This allows us to make a judgement on chemistries that would not be expected to persist in the environment and is another way of expanding sustainable product lines.

### cellulosics

Cellulose ethers are natural-based substances that are biodegradable based on the specific starting material, and the modification, both type and level of substitution. Ashland provides solutions that are readily biodegradable via standard OECD methods.



### guar

Our guar-based polymers are polysaccharides with substituted sugar residues that are inherently biodegradable based on the charge density of the polymer structure and the overall viscosity. Ashland provides solutions that are readily biodegradable via standard OECD methods.



### biofunctionals

Ashland biofunctional products are composed of naturally derived substance that are readily biodegradable via standard OECD methods.





37

biofunctionals  
are COSMOS\*  
validated and readily  
biogradable



16

biofunctionals are  
100% natural



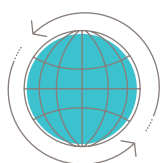
26

biofunctionals are  
98-99% natural



12

biofunctionals are  
generated as a result  
of upcycling



## upcycling (circular economy)

Upcycling, also known as creative re-use, is the process of transforming by-products, waste materials, useless, or unwanted products into new materials or products of better quality and environmental value.

Ashland solvers help co-value and re-purpose unused products, avoiding taking out too much from nature, and increasing the profitability of raw materials.

Examples of products that are generated as a result of upcycling:

product name	natural origin source	primary use of natural source	upcycled waste/byproduct
ederline™ biofunctional	apples	pulp used for food & drink	waste apple seeds and skin
perenityl™ biofunctional	pears	pulp used for food & drink	waste pear seeds and skin
d'orientine™ biofunctional	date palm	date pulp used in food products	waste date kernel
suberlift™ biofunctional	oak tree	cork used to make cork toppers	waste cork oak
aquarize™ biofunctional	rice	food	by-product of processing raw rice
vegetal ceramides BGC™ biofunctional	rice	food	by-product of processing raw rice
achromaxyl™ biofunctional	colza seeds	pulp used to make colza oil	waste colza seeds
oleanoline™ is biofunctional	olives	food	waste leaves
phytoRNx baobab™ biofunctional	seeds	baobab oil used for food	waste baobab seeds
elixiance™ biofunctional	pink pepper tree	pink pepper berries used for decorative purposes	waste leaves and twigs
cb2-skin™ biofunctional	patchouli	essential oil	waste patchouli
marine hydrolyzed collagen A™ biofunctional	fish	fish for food industry	waste fish skin
Selected cellulosic products sourced from cotton linters	cotton	cotton used for textiles, animal feed, cottonseed oil	by-product from cottonseed oil mills







## personal care and household care

Ashland is a leader in nature-derived polymers based on cellulose and guar and leverages this expertise to offer and innovate in a broad range of nature-based ingredients across functional categories. Natural offerings include antimicrobials, rheology agents, film formers, hydration agents, encapsulates, and other ingredients contributing to the allure and performance of personal care formulations.

In fact, 80% of Ashland's personal care products launched in 2019 are nature-derived and/or is COSMOS\*-validated. **67 of our personal care products are COSMOS\*validated.** Some highlights include:

### clearhance™ c conditioning polymer

ClearHance™ C conditioning polymer is nature-based. It is a highly charged cationically-modified galactomannan derived from cassia gum. The cassia gum is not farmed or cultivated but picked in the forests of India mainly by peasants in local villages.

Our supplier has confirmed that the *Cassia (tora)* seed is exempted from being regulated under the National Biodiversity Act (NBA) and is, therefore, considered as a "normally traded commodity." Furthermore, these products have been excluded from the definition of a biological resource (National Biodiversity Authority, Ministry of Environment, Forest and Climate Change, Government of India).

Some key properties of this polymer include:

- percentage natural per ISO 16128 = >69
- biodegradable test pending
- cold-processable
- short dissolution time

### antaron™ eco ethylcellulose

The Antaron™ tradename has long represented best-in-class water resistance. Antaron™ ECo ethylcellulose meets this performance standard while using natural, sustainably sourced raw materials. Based on wood-derived cellulose, this ingredient is made in a water-based manufacturing process, minimizing the use of solvents. This product has a high total renewable content and has 68-70% natural origin content.

### advantage™ revive film former

A patent pending solution for dry shampoo that delivers superior cleaning with improved sebum removal while leaving visibly less to no residue on the hair. It delivers cleaning with less output to help save on unnecessary product waste.

### styleze™ es-1 polymer

A nature-derived derived hair styling polymer, Styleze™ ES-1 polymer delivers voluminous style for bouncy, defined waves and curls. Some key properties of this polymer include:

- percentage natural per ISO 16128 = 89
- COSMOS\*-validated
- readily biodegradable

Ashland offers a wide range of nature-derived conditioning polymers from guar, proven to enhance the functional and aesthetic properties of personal care applications. Our cationic guar portfolio is manufactured with a proprietary, water-based derivatization process, that is considered more environmentally friendly than traditional solvent-based processes. Ashland's guar is also responsibly sourced, ensured via our social audits (SMETA) and QA audits (ISO 9001) at our guar split suppliers. Ashland combines the best practices in the field of corporate social responsibility.

Our line of biofunctionals are examples where our products are eco-consciously designed from field-to-skin with these factors in mind.





## natural biofunctionals

New products from Ashland Vincience™ biofunctionals are developed by uncovering unique and innovative molecular signatures from plants sourced from around the world. Employing a sustainable approach to sourcing any new biofunctionals is crucial. The process involves working hand-in-hand with suppliers and partnering closely with local communities to ensure sourcing is being conducted responsibly and ethically and has a minimal impact on the local environment and ecosystems. [Learn more.](#)

### chromafend™ biofunctional

Chromafend™ biofunctional from Ashland's Vincience™ laboratories in France is extracted from golden flax seeds (linseed) that are organically grown and ecoextracted. With clinically proven benefits on gray hair reduction, it can be used in hair treatments.

Some key properties of this biofunctional include:

- percentage natural per ISO 16128 = >99
- COSMOS\* validated
- biodegradable

### procataline™g2 biofunctional

Procataline™ biofunctional is a pea extract enriched with chia and designed to help hair combat the effects of oxidative stress.

Air pollution has been associated with oxidative stress, scalp sensitivity and hair damage, and consumers are now looking at cosmetic solutions to protect hair and scalp from air pollution.

Some key properties of this biofunctional include:

- percentage natural per ISO 16128 = >99
- COSMOS\* validated
- biodegradable

## new technologies at vincienc

Ashland scientists have identified new technologies allowing the extraction of a wide array of molecules in plants. These new technologies permitted the creation of cosmetic science platforms to better understand plant biology and identify molecular signatures in plants. Such cutting-edge technologies include: Plant Small RNA technology and Super Critical CO<sub>2</sub> process, to capture the desired benefits from plants.

## plant small RNA technology (PSR™ technology)

Ashland patented a totally new type of technology based on an aqueous extraction process, leading to plant extracts rich in a wide range of phytomolecules and in low molecular weight ribonucleotides. These are the small RNAs responsible for epigenetic regulation in plants, which ensure the plant's survival, growth and adaptation when faced with environmental stresses. The richness of the PSR™ technology extract therefore offers superior benefits compared with conventional plant extracts.

This technology requires minimal processing utilizing aqueous-based extraction with no need for synthetic solvents. All substances used and all waste generated are either natural or nature derived and is 100% readily biodegradable.

### rosaliss™ biofunctional

Rosaliss™ biofunctional is an extract of fresh flowers of *Rosa centifolia* obtained using Ashland's PSR™ technology. It is sourced in Provence in the south of France. The rose is cultivated without pesticides and only the flowers are hand harvested so that the rose bushes stay alive over the years. The roses are grown in Grasse, close to the factory, thereby reducing the carbon footprint associated with transport.

The Provence rose looks fragile, but it is a very resistant flower able to face stressful environmental conditions. This is because of the plant's small RNAs reserve, which helps regulate its gene expression to synthesize selected phytocompounds in response to stress.



## supercritical CO<sub>2</sub> process

Supercritical carbon dioxide is used as the extraction solvent for creation of essential oils and other herbal distillates. Unlike hexane and acetone solvents, it is less hazardous and non-flammable, and the CO<sub>2</sub> can evaporate into the air or be recycled by condensation.

### cb2-skin™ biofunctional

Cb2-skin™ biofunctional is a patchouli-derived biofunctional extracted from the supercritical CO<sub>2</sub> process. It offers an alternative solution to controversial cannabis derivatives, such as cannabidiol (CBD) oil or hemp oil in personal care applications.

The supercritical CO<sub>2</sub> process enables the extraction of the volatile fraction rich in essential oil and a polar fraction rich in fatty acids, flavonoids and phytosterols. This extraction process has low impact on the environment, low waste generation, as well as requires a limited use of water for production. Cb2-skin™ biofunctional is validated as natural according to the COSMOS\* standard for natural and organic cosmetics.

Farmed in Colombia, we have a fully integrated and sustainable sourcing program that allows Ashland to control the entire supply chain and ensure that the whole process respects the biodiversity and the natural resources.



### Sustainable Beauty Awards

Ashland won the Best Sustainable Ingredient award for Cb-2 skin™ biofunctional at the Sustainable Beauty Awards, during the 2019 European Sustainable Cosmetics Summit. [learn more on page 41](#)

## oral care

When the makers of a toothpaste brand wanted to improve their formulation's nature-derived index, they asked Ashland's solvers for help. Ashland delivered by formulating two new Captivates™ HC encapsulates with greater than 99 percent natural origin content, as calculated by ISO 16128 2:2017, a leading industry standard. The toothpaste includes vitamin E capsules in a transparent toothpaste gel. During brushing, the capsules break releasing this natural antioxidant.

## pharmaceuticals

The pharmaceutical business launched products in 2019 to drive future growth and serve the needs of pharmaceutical customers. Two products, Viatel™ bioresorbable polymers and our Aquarius™ genesis film coating system, provide our customers opportunities for: energy savings, reduction of exposure to hazardous solvents, and/or waste reduction.



### viateℓ™ bioresorbable polymer

Ashland has a significant history in pharmaceutical specialties with one of the largest ranges of products for oral solid dosage forms. In 2019, we introduced Viatel™ bioresorbable polymers, enabling us to enter the injectable drug delivery market.

Starting from monomers derived from renewable resources, Ashland's scientists have developed a unique manufacturing process designed to eliminate residual solvents from the final product. Thus, there is no need for our customers to remove them from the finished product thereby avoiding their employees from exposure to hazardous solvents and eliminating the need for their disposal and the time and energy required to divert and collect such waste.

The primary benefit of bioresorbable polymers is they break down via hydrolytic degradation into the monomer components lactic and glycolic acid— both of which are resorbed by the body.

Additionally, all Ashland Viatel™ bioresorbable polymers meet typical drug and device regulatory thresholds for tin catalyst levels established by health authorities. In



# plant-protein foods



Plant-protein foods has emerged as one of the biggest eating trends over the past year. Propelled by a variety of consumer concerns, including concerns for animals, health and the environment, plant-based eating goes beyond the traditional veggie burger. Many types of food and beverages are including proteins that are sourced from plants. Plant-focused foods can also describe non-dairy beverages, protein shakes or even non-dairy desserts, like whipped topping.

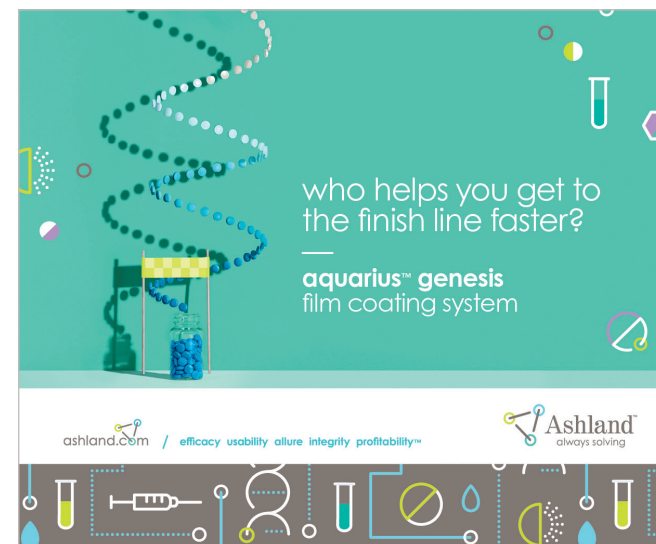
The growing popularity of plant-based foods has spurred innovation in end applications, ingredients and textures. Although products are usually suitable for vegetarian or vegans, they may also appeal to a wider audience.

Ashland innovations like Benecel™ methylcellulose, Blanose™ carboxymethylcellulose and Aerowhip™ hydroxypropyl cellulose solve these industry challenges. Offering improved texture/bite and mouthfeel, these additives help customers overcome textural and functional challenges in their products.

New this year, Benecel™ MX modified cellulose is a low temperature gelling methyl cellulose product. This product was specifically created to provide a firm texture to products that are eaten warm, like vegetable burgers or meat reduced sausages. Its unique thermal reversible gelling capability also ensures a juicy eating experience. Because of the increase in demand for plant-based protein products, Benecel™ MX methyl cellulose has become one of Ashland's fastest growing products.

fact, the Ashland process allows us to supply many of our Viatel™ bioresorbable polymers with significantly lower tin levels than regulatory requirements.

Bioresorbable polymers are also the key ingredients in degradable medical devices, providing structural strength for load-bearing products such as sutures, stents, screws and plates.



## aquarius™ genesis film coating system

Ashland has a new, high-solids film-coating system for immediate-release applications. The Aquarius™ Genesis film coating is designed for application at up to 35% solids while producing films with outstanding strength, adhesion and smoothness.

The pharmaceutical industry is moving from traditional batch manufacturing to continuous manufacturing, which can save time and money by reducing waste, eliminating loss from failed batches and cutting inventory overhead costs. Aquarius™ Genesis film coating can significantly increase the throughput of continuous coaters, thus resulting in energy savings associated with reducing processing time for our customers.

This new film coating is also scalable across traditional batch coating equipment, providing shorter application times and therefore higher throughput and less energy requirements. When purchase of a new coating line or expansion of an existing one is being considered, the use of our Aquarius™ Genesis film coating system can substantially reduce the needed capital investment.



## American Chemistry Council (ACC)

Awarded Ashland with a sustainability leadership award for environmental protection and circularity.  
[learn more on page 41](#)

## nutraceuticals and nutrition

Ashland launched several new products to meet consumer and customer needs in the nutrition and nutraceutical space, expanding Ashland's ever-growing portfolio of health and wellness specialty ingredients.

### nordic cherry® tart cherry extract

Targeting the sports nutrition enthusiast, NordicCherry® tart cherry extract is one of the most bioactive, full-spectrum, whole fruit tart cherry extracts on the market. It supports muscle recovery and enables the consumer to recover faster after a workout.

Tart cherries are naturally high in:

- proanthocyanins
- anthocyanins
- phenolic acids

NordicCherry® tart cherries are processed in close proximity to the farms where they are grown in Denmark. It is manufactured using a water extraction process and the pulp waste is returned to the earth as fertilizer. There is full traceability from farm to finished powder.

### organic MCT powders

A growing trend in lifestyle eating is the ketogenic diet. Consumers who follow a keto regimen eat a diet high in protein and "healthy" fats. Medium Chain Triglycerides (MCTs) are one such popular fat. Although typically, MCTs are in a liquid oil form, this can limit a consumer's flexibility to incorporate MCTs into their diet. Ashland has created MCTs in powder form with both 50% and 70% oil loads. The powder form can easily be incorporated into a variety of applications. These new MCTs are produced from organically certified, non-GMO coconut oil. No chemicals are used in their processing. The MCT powders can also be certified organic.

### aquarius™ TF titanium dioxide-free film coatings for nutraceuticals

Aquarius film coatings are now available for nutraceuticals in a titanium dioxide-free form - Aquarius™ TF coatings. Titanium dioxide is a widely used opacifier/whitening ingredient in food, dietary supplements and drugs. Among the regulatory agencies it has become a controversial ingredient mainly due to the presence of nanoparticles. Such nanoparticles could possibly pose a health risk to certain individuals. Aquarius™ TF coatings provide excellent brightness and coverage without the use of titanium dioxide.

# specialty additives and intermediates and solvents

In addition to the consumer-facing products and technologies, here are a few industrial solutions with a nod to sustainability:

### natrosol™ 250HHBR 5070 & HVR 10000 hydroxyethylcellulose (HEC)

Introduced to the coatings industry in 2019 were 2 new nature-derived cellulosic thickeners that offers higher thickening efficiency vs. any competitive cellulosic product on the market worldwide. High thickening efficiency means less thickener dose is required to achieve target viscosity of the paint formulation.

For example, when compared to Natrosol™ HHBR HEC, the previous Ashland benchmark for high efficiency, these new products offer comparable performance at reduced weight percent dosing:

- For Natrosol™ HHBR 5070 HEC that means a 10% lower dose is required to match HHBR's performance with full biostability maintained
- For Natrosol™ HVR 10000 HEC that means a 14% lower dose is required to match HHBR's performance

This would mean less product packaging, and fewer or lighter shipments necessary, thereby reducing the associated CO<sub>2</sub> emissions associated with transport.







### aquaflow™ NHS-380 synthetic rheology modifier

Aquaflow™ NHS-380 liquid synthetic rheology modifier was launched for the Chinese market in 2019. Specifically, Ashland R&D moved quickly after new regulations were announced in 2018 that specified more stringent requirements and testing methodologies for compliance to China's Green Label for Paints and Coatings. Ashland developed a fully compliant new Aquaflow™ grade with the ability to maintain highest performance standards coupled with full Green Label compliance, an important environmental standard for the Chinese market. Ashland's new Aquaflow™ NHS-380 retains all the performance benefits of Aquaflow NHS-300, a highly efficient, market-preferred liquid thickener for premium paints and coatings.

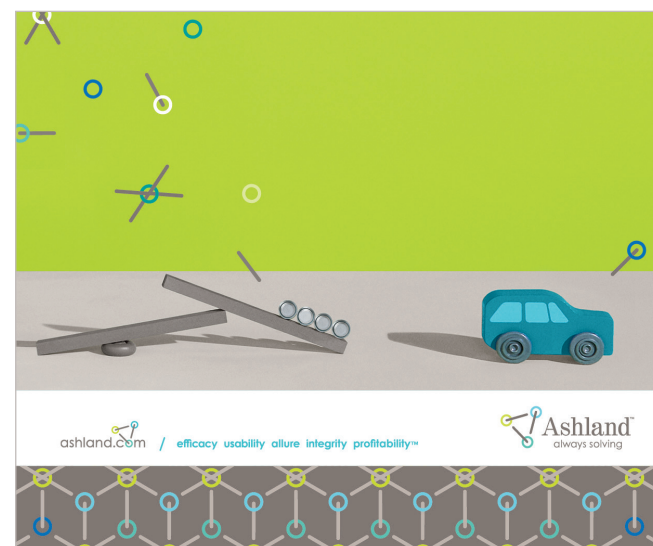
### ceramic and non-ceramic substrates and particulate filters (vehicle and industry pollution reduction)

Fossil fuel-based cars are not going away in the very near future, and along with their usage comes their hazardous emissions. Automotive emissions are composed of hydrocarbons, nitrogen oxide, carbon monoxide, fine particles and other toxic thermal degradation products. For decades, governments worldwide have imposed air emission limitations, both generally and on motor vehicle emissions. These emission limits are becoming stricter and stricter, and increasingly they are coupled with regulatory mandates to make vehicles more fuel efficient.

The automotive industry has been grappling for years with the challenge of increasing fuel efficiency without

compromising the engine performance their customers demand. To meet this need, Ashland has created our Culminal™ methylcellulose derivatives and Benecel™ methylcellulose derivatives as binders used during the production of catalytic substrates and particle filters. They allow further decrease of the ceramic honeycomb substrate wall thickness, an increase in the number of channels to gain surface area needed for more efficient purification and/or more compact catalysts and to increase open surface area for reduced back pressure.

Driven by a demand for improving fuel efficiency there is also a relatively new engine technology that marks a shift from port injection to direct injection. This is being used to increase fuel efficiency (lowering CO<sub>2</sub>-emissions) and comes with the need for more complex purification elements, which now need to include gasoline particle filters, which use cellulose ethers for plastification and green-strength aid in the manufacturing process. Green strength is the type of strength needed after the extrusion so that the formed honeycombs keep their shape before and during the drying and sintering/firing process.



Ceramic substrates have a very high surface area to "wash" the emissions, along with a particle filter to eliminate the fine particles from diesel and gasoline combustion emissions. A specialized Culminal™ methylcellulose derivative was designed to provide plastification for the extrusion process of these substrates and gives the very thin walls of these catalytic converters green strength/stability before and during drying and firing.

Another use of Ashland's cellulose ethers is to help shape activated carbon which is used to help in fuel recovery. Adding our product to the formulation allows these activated carbon products to be made into different

formats. These products can now be sheeted, pressed, granulated or extruded into different shapes, including honeycombs, that allows for the collection, recovery, and recycling of evaporating fuel.

We have also developed another solution, when applicable, where there is a need for a wash-coat in the manufacturing process of the ceramic catalysts. There is a step where a wash-coat (a mix of precious metals) is applied to the surface of the ceramic substrates. This wash-coat is needed to initiate the catalytic reaction. For wash-coats, we have identified another Ashland cellulosic, Natrosol™ hydroxyethylcellulose, to use to control the rheology under harsh conditions.

Thus, helping the automotive industry's existing use of fossil fuel-based engines, Ashland has a number of solutions to help control air emissions and improve fuel efficiencies without compromising performance.

## performance adhesives

### soy-based polyols

The United Soybean Board (USB) was founded in 1991 and has a long history of providing grants to promote soy-based products and to drive high-value commercial products. In 2019, Ashland's Structural Adhesives business was selected as a recipient of such funding for research on soy-based polyols in the development of sustainable adhesives and sealants. They will be designed to enable use of light-weight substrates in the transportation market to improve mileage and reduce fuel consumption.

Bio-based polyols are excellent raw materials for Structural Adhesive polyurethane technology. Low modulus structural adhesives and sealants enable dissimilar material bonding in light-weighting vehicle applications. The value-adds include a renewable resource as a raw material, and the potential for a lower cost formulation.

## performance adhesives hosts sustainability forum

In February 2019, the Performance Adhesives business unit hosted the first of its kind - an informal Sustainability Forum at our Dublin, Ohio, site. Several customers participated to brainstorm what sustainability means throughout the label and packaging value chain.

At the end of the half-day forum, participants came away with a more comprehensive understanding of how each partner views sustainability and offered creative ideas and actions on how to successfully tackle this challenging initiative.

Over the next year, Performance Adhesives visited multiple packaging and converting customers to determine and assist with their Sustainability needs. Although their customers' sustainability goals differ, it became clear that the biggest market driver is for packaging to be recyclable or compostable. Performance Adhesives is now in the process of developing these products to meet these market requirements.

Ashland is proud to be a valued member of the VIA Alliance\*Partnership - an alliance of best-in-class raw material packaging manufacturers that provide industry-leading materials, printing effects/finishes, and technologies to the consumer packaging industry.



gathering for a photo are (left-to-right): Joe Spinnato and Catherine Heckman, along with Stephanie Love and Dan Haney from Haney





## external recognition

### Ashland is on a sustainability journey.

We are delighted to be recognized by external organizations who evaluate industry progress, and who have recognized our performance in 2019.



### The National Safety Council Winthrop-Sears Medal

In January of 2019, the National Safety Council announced Bill Wulfsohn, Ashland's former Chief Executive Officer and Chairman of the Board, as one of the CEOs Who "Get It," a recognition of leaders who demonstrate their commitment to worker safety and health, both on and off the job. The Medal recognizes entrepreneurial achievements in the chemical industry and is named in honor of two of America's earliest chemical entrepreneurs, John Winthrop, Jr., considered the nation's first chemist, and John Sears, who founded its salt industry.



### American Chemistry Council (ACC) Responsible Care® Awards

The American Chemistry Council (ACC) recognizes sites for significant achievements in health and safety through implementation of EHS&S management systems through Responsible Care® (RC). In 2019, 20 Ashland sites were recognized for their safety performance; 14 sites received Certificates of Excellence, 1 site received a Certificate of Honor, and 5 sites received Certificates of Achievement.



### The Society of Chemical Manufacturers & Affiliates (SOCMA) Performance Improvement Awards

The Society of Chemical Manufacturers & Affiliates (SOCMA) acknowledges member companies for their outstanding commitment to environmental, health, safety and security (EHS&S) practices. For 2019 performance, Ashland received the following recognition:

#### bronze award

- Ashland, Ohio site for overall EHS and ergonomics performance
- Harmon, Columbus, Ohio site for 27% reduction in waste generated per pound of product produced
- Kenedy, TX site for their strong product stewardship program



### Society of Chemical Manufacturers & Affiliates (SOCMA) Sustainability Award

Ashland's Merry Hill facility was recognized for its tremendous efforts and unique approaches to sustainability practices as part of SOCMA's 2019 Performance Improvement Awards program. Ashland's Merry Hill facility was recognized for the outstanding job it has done in developing processes and reimagining resources to safeguard the environment. Ashland's Merry Hill plant used unique processes included in its sustainability program. The facility utilizes an air emission data system that captures real-time information tied to process transactions. The facility also is reimagining resources by returning nutrients that are left unused back to the earth to maintain and enhance nutrient rich fields to sustain harvest yields. The Merry Hill site achieved a 100 percent waste diversion rate, which reduces the need for additional fertilizers to be applied to the field. This reduction in fertilizer also decreases the likelihood of non-point source pollution in the form of field run off.



### European Sustainable Cosmetics Summit Sustainable Ingredient Award

Ashland won the Best Sustainable Ingredient award for Cb-2 skin™ biofunctional at the Sustainable Beauty Awards, during the 2019 European Sustainable Cosmetics Summit. Cb-2 skin™ biofunctional is an innovative alternative to cannabis derivatives such as Cannabidiol (CBD) oil or hemp oil. Sourced from a fully integrated and sustainable farm in Colombia, this patchouli-derived cb2 activator is associated with skin calming, soothing benefits, and greater skin comfort when skin is exposed to stress.



### American Chemistry Council's (ACC) Sustainability Leadership Award

Ashland's initiative, "Supporting the Trend toward Plant-Based Foods while Incorporating Circular Economy Practices," was selected by ACC's external judging panel as a winner of the 2020 Sustainability Leadership Award in the "Environmental Protection & Circularity" category. It was based on one of our products, a plant-based protein, and its manufacture.

There is a trend not only for increasing numbers of vegans and vegetarians, but also for eating plant-based proteins by those seeking variety in their diet, concern for animal welfare, allergen avoidance, and a desire to reduce the amount of meat that they consume. BeneceI™ MX modified cellulose (methylcellulose) was specially formulated for meat alternative and vegetable-based applications; it is the right hydrocolloid to help deliver a product with the desired eating quality and texture.

Also, at the site of manufacture of this product in Doel, Belgium, we partnered with neighbors on two closed loop initiatives:

- A steam network utilizing a neighboring plant's waste steam in our own production processes, resulting in improved energy efficiency, and decreased greenhouse gas emissions; and
- A sweet water project in collaboration with our neighbor, allows the use of rainwater to be further purposed, by its use in diluting wastewater for use at our onsite wastewater treatment plant.



### 2020 Women on Boards Recognition

In 2019, 2020 Women on Boards (2020WOB) recognized Ashland as being a Winning "W" Company for having at least 20 percent women on the board of directors. The year 2020 marks the 100-year anniversary of women's suffrage. In 2018, only 17.7 percent of board seats were held by women nationwide, which is up from 16 percent in 2017. Nearly one-fourth of public companies in the U.S. have no women directors on their boards. This honor indicates Ashland as a positive example for other global companies to follow.

2020WOB redefines successful corporate governance and gender diversity standards. They aim to educate corporate stakeholders on the importance of board diversity and they recognize and applaud companies like Ashland as an example of enlightened corporate governance.





corporate  
responsibility



# procurement power for social good

Ashland solvers look for systematic ways to track our social positive impact by employing those from underprivileged or disadvantaged populations.

Based on FY2019 spend in the U.S, minority-owned businesses equals 0.05%; women-owned businesses is 0.03%, and veteran-owned businesses is 0.24%.

In February 2020, Ashland implemented a new Procure-to-Pay software that has partner relationships with EcoVadis, and Dun & Bradstreet as well as sustainability scorecard capabilities. Ashland is looking to leverage these capabilities in FY 2021 to better assess supplier diversity, sustainability ratings, and overall risk through scorecard metrics and reports. This will bring greater visibility to our supplier diversity portfolio and allow Ashland to be better educated and aware proactively when making our sourcing decisions.

## charitable giving

cash and in-kind  
donations given by  
Ashland for 2019 was  
**\$618,520**

In 2019, Ashland's Charitable Giving platform allows employees the option of donating to one charity or making multiple gifts to more than 13,000 separate charities.

## solvers in action

At Ashland, our solvers at all levels around the globe are passionate about supporting the communities in which we live. We proactively volunteer our time and energy demonstrating community commitment in many ways. Here are a few hi-lights:

### China



Ashland China was recognized as the "Star of Charity" by the Shanghai Minhang Special School. This special honor commended Ashland for caring for mentally handicapped children for 12 years and volunteering their continued support.

This human services charity tradition is kept going through the dedication and devotion from each Ashland employee volunteer. Through their efforts, Ashland China's employees have provided lots of love and attention to those in need, enabling these children to grow up healthy and develop in a positive direction through various methods.

Ashland China curated an art exhibition with the Shanghai Minhang Special School which showed their masterpieces and Ashland's corporate social responsibility at same time. Volunteers guided children to complete a charity sale which was held to support the construction of a primary school in poverty-stricken areas. This event also promoted the children's self-care abilities.

### Europe

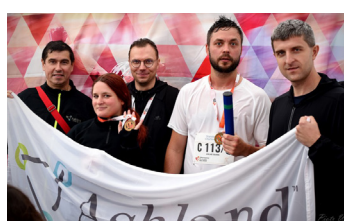


Members of our Schaffhausen, Switzerland office participated in a volunteer community day organized by Industry Organization of Schaffhausen (IVS) and the nature conservation organization "Pro Natura" and the sheltered workshop "altra Schaffhausen".



The team spent the day working to protect the natural habitats of plants and animals and to promote biodiversity in the nature reserves.

Employees at Benicarló, Spain spent a morning with the three- and four-year-old students of a local primary education school. The volunteer team helped build insect hotels and taught children to love bees through beekeeping.



Five employees from the Warsaw, Poland, office formed a team of "Ashland Solvers" to take part in the year's largest charity run

in Poland. The Poland Business Run Foundation collects funds for people who have recently had amputation surgery.

Employees in Istanbul, Turkey found a common interest in the Koruncuk Foundation to establish and promote villages for children that need protection,

who do not have a family, who were abandoned or whose existence is under threat. Following the 10K marathon, Ashland employees raised \$3,000. As reference, one child's monthly support is about \$100.

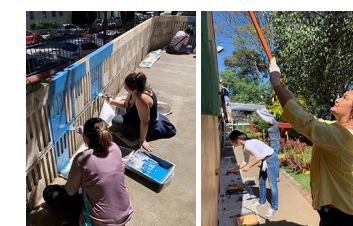
### India



An initiative towards plastic-free garbage, was started on Aug. 15, 2018, (Independence Day for India) by the Hyderabad, India, lab's team of solvers to beat plastic pollution. In this program, Ashland employees segregated, washed and dried plastic packages from their homes and/or their

neighbors' homes. In six months, Ashland's Hyderabad lab solvers saved around 12,000 plastic packages, weighing 62 kilograms, which was destined for landfill. The collected plastic packages were then delivered to a recycling company for use in the construction of roads.

### Latin America



Volunteers from Ashland in Brazil continued with the revitalization of the CEI Lapa school in São Paulo, Brazil. The school serves dozens

of children up to 4 years of age. After commencing the revitalization project a few months ago, the volunteers continued the project by painting the exterior areas.

### Rest of Asia



A nursing home in Singapore, provides medical, nursing, relaxation, day care, home care, education, psychosocial,

pharmaceutical, dietary, counselling and rehabilitation to their residents and families. Ashland employees visited with more than 80 residents who are not eligible for a government-funded nursing facility, and cannot afford a more expensive, private facility. The team from Ashland organized games, sang and danced with the residents.

### North America



Employees from Dublin, Ohio spent a day splitting wood, power washing, cleaning, and more at Recreation Unlimited for the United Way Community Care Day. This is the seventh year that Ashland has participated in this event at Recreation Unlimited.

In Wilmington, Delaware Ashland hosted employee's children for the National Take Your Child to Work Day. Attendees participated in STEM-based fun experiments, lab tours and more.

In keeping with the Earth Week theme, children learned that water is a precious resource from WaterAid, a charitable organization that is working to make clean water, decent toilets and good hygiene a reality for everyone around the world. Kids had to design and build a watertight container to carry water.

At our Parlin, New Jersey plant, Ashland sponsored bike riders for the "Ride New York City for Multiple Sclerosis" charity ride. Ashland's riders, consisting of employees both past and current and their family members, raised \$1,600 to help fight multiple sclerosis!

Texas City, Texas, plant volunteers hosted a January birthday celebration for residents of Independence Village, a local living center for adults with special needs. The employees hosted a birthday party at Independence Village each month of 2019.

This year's Earth Day theme led the Hopewell, Virginia, team to pair up with the City of Hopewell Public Works Stormwater Department to plant a pollinator garden at Riverside Park in Hopewell. The park just completed a \$2 million restoration to clean up the park and to improve stormwater discharges in the area.

The Hopewell team cleaned up debris, laid a slate walkway, installed a shallow pollinator pool; and planted over 35 Virginia native pollinator plants.

Ashland is committed to better preparing the next generation of chemical engineers for their careers in industry by ensuring undergraduates are exposed to and have opportunities to learn about the area of process safety. We are a sponsor of AIChE's Doing a World of Good Campaign Undergraduate Process Safety Learning Initiative, which is an industry-led collaborative effort to improve and accelerate process safety education at the university level.



# wildlife habitat council

Since 2014, four former Ashland remediation sites have achieved certification through the Wildlife Habitat Council (WHC), a non-profit, non-lobbying organization dedicated to increasing the quality and amount of wildlife habitat on corporate, private and public lands. We are also laying the groundwork to apply for certification for an additional site (i.e., Hopewell, Virginia).



## Ashland Research Center - Wilmington, Delaware

At this site, Ashland employees have been involved since 2014 with Wildlife at Work (WAW), a Wildlife Habitat Council (WHC) program. Together, we have restored the habitat around a closed landfill (2.3 acres) and installed nesting sites for birds. We also assist in annual monitoring to continue to maintain the habitat and promote nesting. We are currently discussing potential expansion of this WAW program at this site. This is a WHC Certified Silver site.



## Former Hercules Brunswick Plant - Brunswick, Georgia

Ashland achieved certification in the WHC WAW program for this facility in 2014. The project is centered around a 2.85-acre former stockpile area that was converted to a wildflower meadow providing critical habitat to a variety of wildlife species, including pollinators, grassland birds, reptiles, and small mammals. Since the initial certification, the project has expanded to include additional forest habitat and installation of nesting sites for birds. Species inventories are conducted routinely, and the habitat is maintained thru rotational mowing and removal of invasive vegetation.



## Hercules Incorporate 009 Landfill - Brunswick, Georgia

Ashland achieved certification in the WHC Wildlife at Work (WAW) program for this Superfund site in 2014 with goals to increase the site's biological diversity and raise environmental awareness in the community. An Urban Reforestation Area, Pollinator Garden, Bird Boxes, Natural Regrowth Area were maintained and monitored through routine species inventories. Game cameras are also used to monitor the wildlife that inhabit the site. We restarted the monitoring program in spring 2020 and the goal is to achieve certification in 2021.



## Old York Road Site - Burlington, New Jersey

This site was formerly a landfill. WHC has designate this site as a WHC Certified Gold site. Employees at Ashland are working closely with Rutgers University to provide educational opportunities to students in the sciences to track species' diversity and life cycles. This includes providing the students an education lab they can work at while gaining experience credits. There is annual rotational mowing of landfill caps to promote meadow features.

## Hopewell Former Landfill Site - Hopewell, Virginia

Though we have not started the process for certification at this Hopewell landfill site, we had WHC walk the site and provide us a report highlight recommendations for wildlife enhancements. We incorporated many of their ideas into the design of the landfill capping project:

- planting of native grasses and wild flowers
- installation of raptor perches and nesting platforms
- bank clearing of the nearby pond to provide basking, calling and perching spots for invertebrates and birds, and a habitat for fish



Now that the capping project is complete we are looking for a partner to team with to begin the WHC certification process.



# inclusion and diversity

Inclusion and diversity is essential to Ashland's culture and high performance organization. We embrace inclusion and diversity as a key business imperative and actively seek to value, leverage and empower the diversity of our people and value-chain partners. We believe a global, diverse workforce and inclusive environment amplifies the unique qualities of every individual, enabling each of us and the organizations we work with to reach our full and highest potential.



In 2019, Ashland Women's International Network (AWIN) refreshed its vision and mission to more accurately reflect the evolution of the company and the professional network.

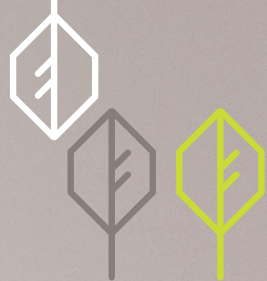
As part of the execution of the vision and mission, AWIN continued to bring meaningful content and professional development opportunities to the Ashland population.

Two of those initiatives were an extension of the Dare to Soar program, held in October 2019 where previous SOAR participants attended a two-day conference focused on Communication and Congruence. Mid-year, the global AWIN team facilitated a variety of workshops as part of "Solving the Workload Puzzle" program aimed at assisting employees identify workload imbalances and navigate workload discussions with managers during a period of organizational transition. In addition to the global initiatives, the local chapters held a variety of programs such as webinars, professional development book discussions, or leader speaker series. Overall, 2019 was a successful year for AWIN and the group is entering 2020 with a renewed focus on leadership development with exciting new opportunities!

There was active participation, lively conversations, sharing of experiences throughout the two-day event. There were constructive videos, interactive discussions, educational facts and interesting tips, and challenging conversations.







## core values

### safety

Ensure that Ashland people, places and products are safe.

### ethics

Do the right thing. Always. Everywhere.

### integrity

Be open and honest.  
Be personally accountable. Speak up.  
Treat everyone with dignity and respect.

### people

Recruit, retain, and reward passionate, tenacious, solvers.

### foresight

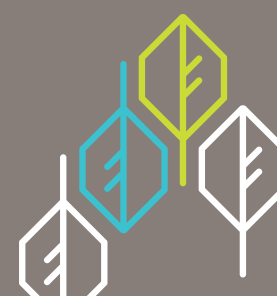
Consider the sustainability and long-term implications of our actions.  
Plan for contingencies and invest in the future.

### passion

Commit to win. Take shared pride in our achievements.  
Celebrate success.

### partnership

Be a collaborative and proactive partner to customers and colleagues.





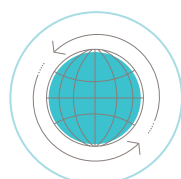
# 2025 sustainability goals

With 2020 upon us, and the goals we previously set nearing completion, Ashland is thinking about the future. As we continue our journey to becoming a more sustainable company, Ashland has a greater focus on environmental and social strategies. Our proposed 2025 goals will be broader and more ambitious than previous goals, still with a focus on sourcing, operations and solutions to address the markets we serve. We are always solving™.



## sustainable sourcing

continue to focus on assessing our suppliers via EcoVadis and engage our highest risk suppliers via third party environment, social and ethical audits



## sustainable operations

continue to reduce our environmental footprint and focus on increasing renewable energy in our manufacturing locations



## sustainable solutions

focus on launching products that have sustainable benefits and meet our customers' sustainability needs, while also completing lifecycle assessments (LCA) for our key product families



## water consumption

Ashland continues to gain understanding of our overall water footprint and work toward reducing it. Our plan includes a water management standard to provide a global framework for our company. The standard will require Ashland operations to manage water resources by understanding our water footprint, complying with regulatory requirements, implementing systematic conservation tactics, and reporting water usage. For now, we track water usage at all manufacturing sites to inform our developing management approach.

Our recent water stress analysis allows our Sustainability and Environmental team to identify sites which are currently operating in high water stress regions, or which will likely be operating in high water stress within the next few years. The analysis identified three Ashland manufacturing sites operating under extremely high water stress conditions. Our approach will include strategies for managing these sites' water usages sustainably and our Environmental 2025 Goals will include water usage and reporting.

# board of directors

## Guillermo Novo

Chairman and CEO, Ashland Global Holdings Inc.

## Brendan M. Cummins

Former CEO, Ciba Specialty Chemicals

## William G. Dempsey, Ph.D.

Former Executive Vice President, Global Pharmaceuticals, Abbott Laboratories

## Dr. Jay V. Ihlenfeld

Former Senior Vice President, 3M Company

## Susan L. Main

Senior Vice President and Chief Financial Officer, Teledyne Technologies Incorporated

## Jerome A. Peribere

Former President and CEO, Sealed Air Corp.

## Craig A. Rogerson

Chairman, President and CEO, Hexion Inc.

## Ricky C. Sandler

Chief Executive Officer, Chief Investment Officer, Eminence Capital, LP

## Janice J. Teal, Ph.D.

Former Group Vice President and Chief Scientific Officer, Avon Products Inc.

# executive and corporate officers

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Chairman and CEO, Ashland Global Holdings Inc.

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Vice President, Finance and Principal Accounting Officer

## Min Chong

Senior Vice President and General Manager, Specialty Additives and Intermediates and Solvents

## Peter J. Ganz

Senior Vice President, General Counsel and Secretary; Chief Legal & Compliance Officer

## John P. Goswell

Vice President, Internal Audit

## Scott A. Gregg

Vice President, Tax

## Ashok Kalyana

Senior Vice President and General Manager, Life Science

## Osama Musa, PhD

Senior Vice President and Chief Technology Officer

## Keith C. Silverman, Ph.D.

Senior Vice President, Global Operations, Quality and EHS

## Xiaolan Wang, Ph.D.

Senior Vice President and General Manager, Personal Care and Household

## William C. Whitaker

Vice President and Treasurer

## J. Kevin Willis

Senior Vice President and Chief Financial Officer



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