

# Working Towards Circular

Efforts the Biopharmaceutical Company Bristol-Myers Squibb is  
Taking to Reduce Waste

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**25 Sept 2019**

# Bristol-Myers Squibb at a Glance



Chairman & CEO  
**Giovanni Caforio**



Business  
**Biopharmaceuticals**

**\$22.6**  
BILLION



In Revenue  
**2018**

**~23,000**  
Employees

[www.bms.com](http://www.bms.com)

**\$5.1\***

In 2018

BILLION  
INVESTED  
IN **R&D**



OPDIVO	\$6.7 Billion	<b>+36%</b>
ELIQUIS	\$6.4 Billion	<b>+32%</b>
ORENCIA	\$2.7 Billion	<b>+9%</b>
SPRYCEL	\$2.0 Billion	<b>0%</b>
YERVOY	\$1.3 Billion	<b>+7%</b>

2018 Largest-Selling Products

\* This non-GAAP amount excludes significant upfront and milestone payments for business development transactions and other specified R&D items. A reconciliation of GAAP to non-GAAP measures can be found on our website at [www.bms.com](http://www.bms.com).

# Presence in 47 countries



## Sustainability @ BMS

At Bristol-Myers Squibb, sustainability means conducting our business to help patients prevail over serious diseases in a manner that contributes to economic growth, social responsibility and a healthy environment now and in the future. [www.bms.com](http://www.bms.com)



“As a global company, we value our role as a conscientious citizen, one that improves health and promotes economic, social and environmental sustainability.”

Giovanni Caforio, M.D., Chairman of the Board and Chief Executive Officer

### *Our Commitment*

To our patients and customers, employees, global communities, shareholders, environment and other stakeholders, we promise to act on our belief that the priceless ingredient of every product is the integrity of its maker. We operate with effective governance and high standards of ethical behavior. We seek transparency and dialogue with our stakeholders to improve our understanding of their needs. **We take our commitment to economic, social and environmental sustainability seriously, and extend this expectation to our partners and suppliers.**

# 2020 Sustainability Goals

<b>PATIENTS</b>	 <b>Accelerate innovation to develop transformative medicines</b>  <b>Enhance patient access to medicines</b>
<b>BUSINESS</b>	 <b>Drive supply chain leadership on quality and integrity</b>  <b>Innovate to support a green, healthy planet</b>
<b>PEOPLE</b>	 <b>Be the employer of choice and the champion of safety</b>



# Challenges We Face with the Traditional Circle



- Our product is a medicine
- Medical devices (syringes, monitors) are bio haz waste
- Much of the waste is generated from producing our product

## Our approach

- Reduce waste wherever we can
- Reuse materials where possible
- Maximize effective use of resources
- Encourage responsible use of our product

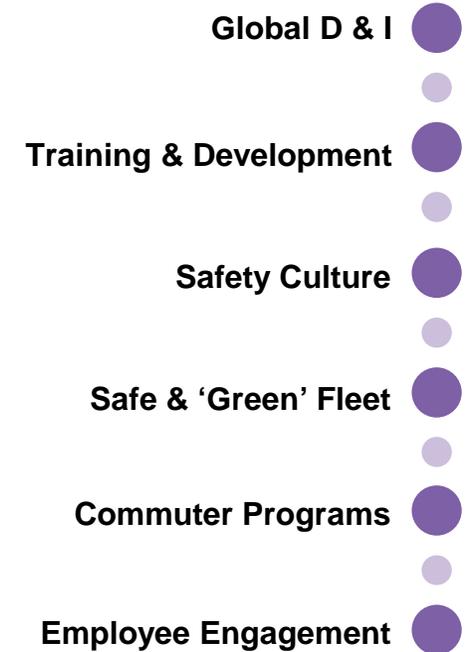
## Facilities



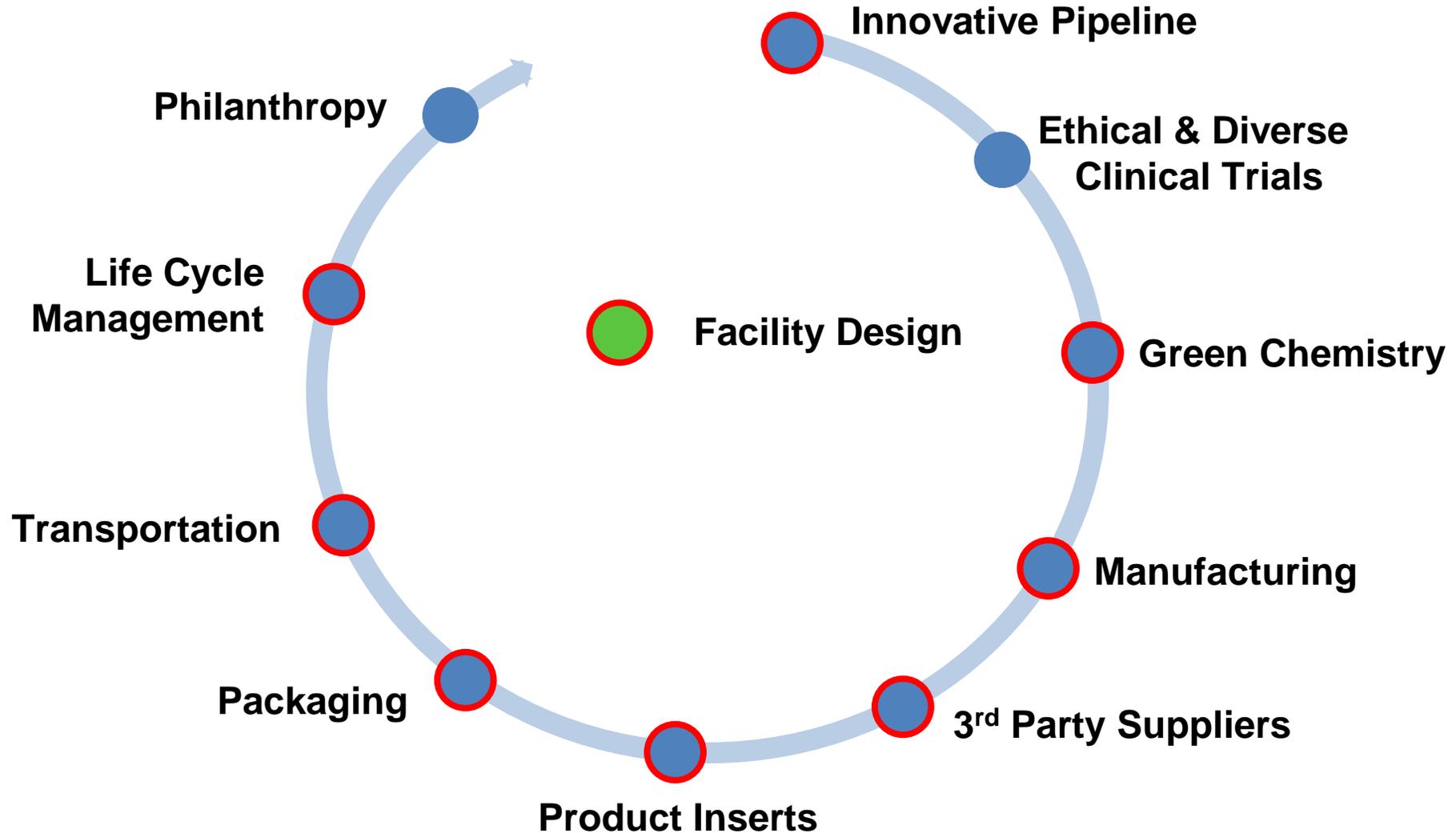
## Core Business



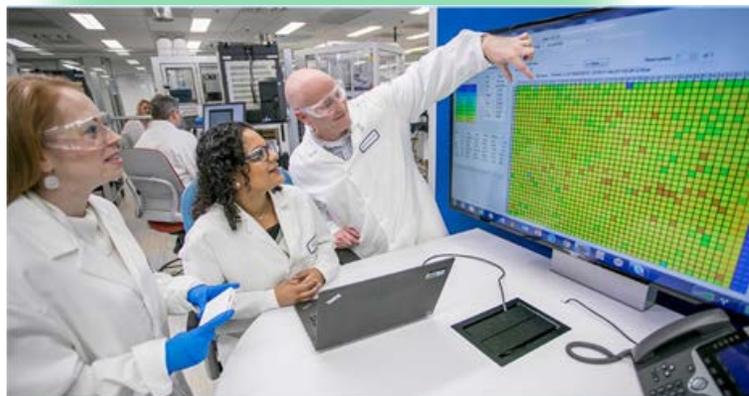
## Workforce



# Efforts Toward Building a Circular Economy

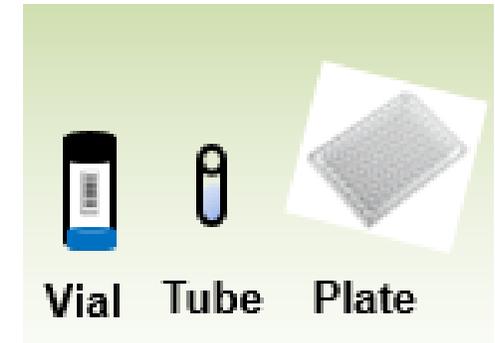


# Innovative Pipeline



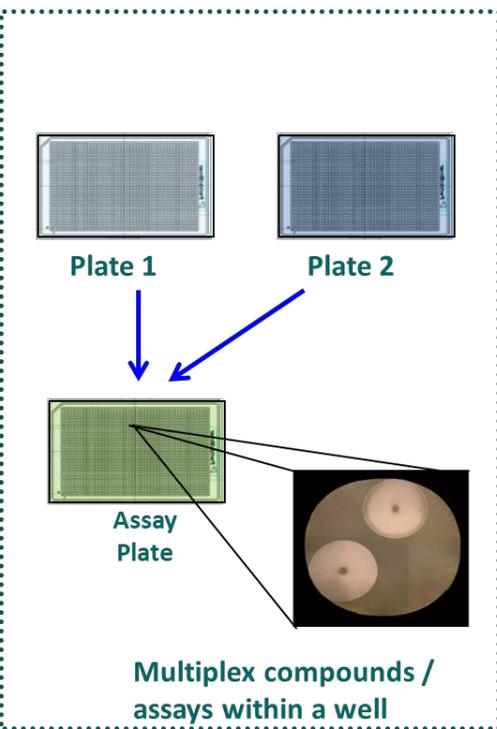
## Advances in Technology

- Miniaturization >16-fold compression
- >100-fold reduction in volume
- Fluorescent vs radioactive reagents
- Ultra High throughput = MORE testing in LESS time
- Millions of each: plastic plates, tubes, tips per year

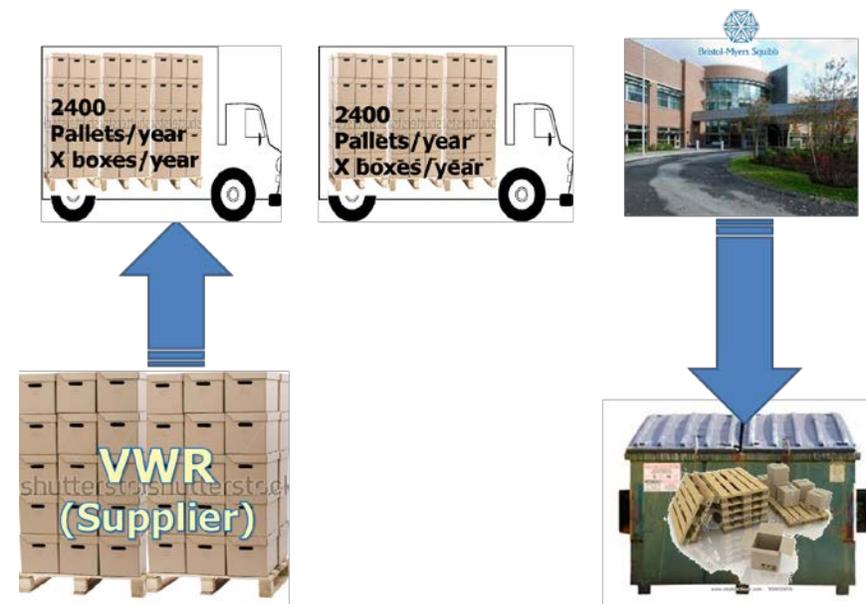


# Innovative Pipeline – Reduce, Reuse, Recycle

## Reduce Consumption



2012



## 2018 Supply Chain Recycling



Aug 2014 – July 2019  
>8500 orders  
**>18,300 lbs waste AVOIDED**

# Waste Reduction Programs with 3<sup>rd</sup> Party Suppliers

Engage with >5 critical suppliers in sustainability initiatives

VWR	Mettler Toledo	Life Tech	Essentra	Stericycle
<p><i>Wood Pallet / Totes Recycling</i></p> <ul style="list-style-type: none"> <li>• Pallets recycled and reused</li> <li>• Plastic totes for high volume consumables in Lead, Discovery and Optimization</li> </ul>	<p><i>Plant a Tree Program</i></p> <ul style="list-style-type: none"> <li>• Every time BMS ships, Plant a Tree</li> </ul> <p><b>3,734 Trees since inception!</b></p>	<p><i>Styrofoam Shipment</i></p> <ul style="list-style-type: none"> <li>• Consolidated shipment of Styrofoam</li> <li>• Compacting and Recycling initiatives</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Med-Guide and insert consolidation (Orencia)</i></li> <li>• <i>Localization of supply in PR for all brands</i></li> </ul>	<p><i>Recycling Programs</i></p> <ul style="list-style-type: none"> <li>• Medical waste</li> <li>• Medical container</li> </ul>



# Waste Reduction Programs with 3<sup>rd</sup> Party Suppliers

Pipet Tip Box Recycling Program, TerraCycle®

Creates Park Benches from hard-to-recycle plastic



Quarterly evaluation of BMS purchases to ID opportunities to

- Reduce use of hazardous solvents
- Eliminate significant amount of packaging waste

## Bristol-Myers Squibb (Global) + MilliporeSigma Environmental opportunity dashboard

Currently Using**		Potential Replacement
2-Propanol 3,687 L		Already a greener alternative* ✓
Acetone 7,469 L		Already a greener alternative* ✓
Acetonitrile 40,247 L		Acetone, ethanol†
Chloroform 152 L	Ethyl Acetate	2-Me-THF†

Plastic reduction in new tip rack design – launched March 2018



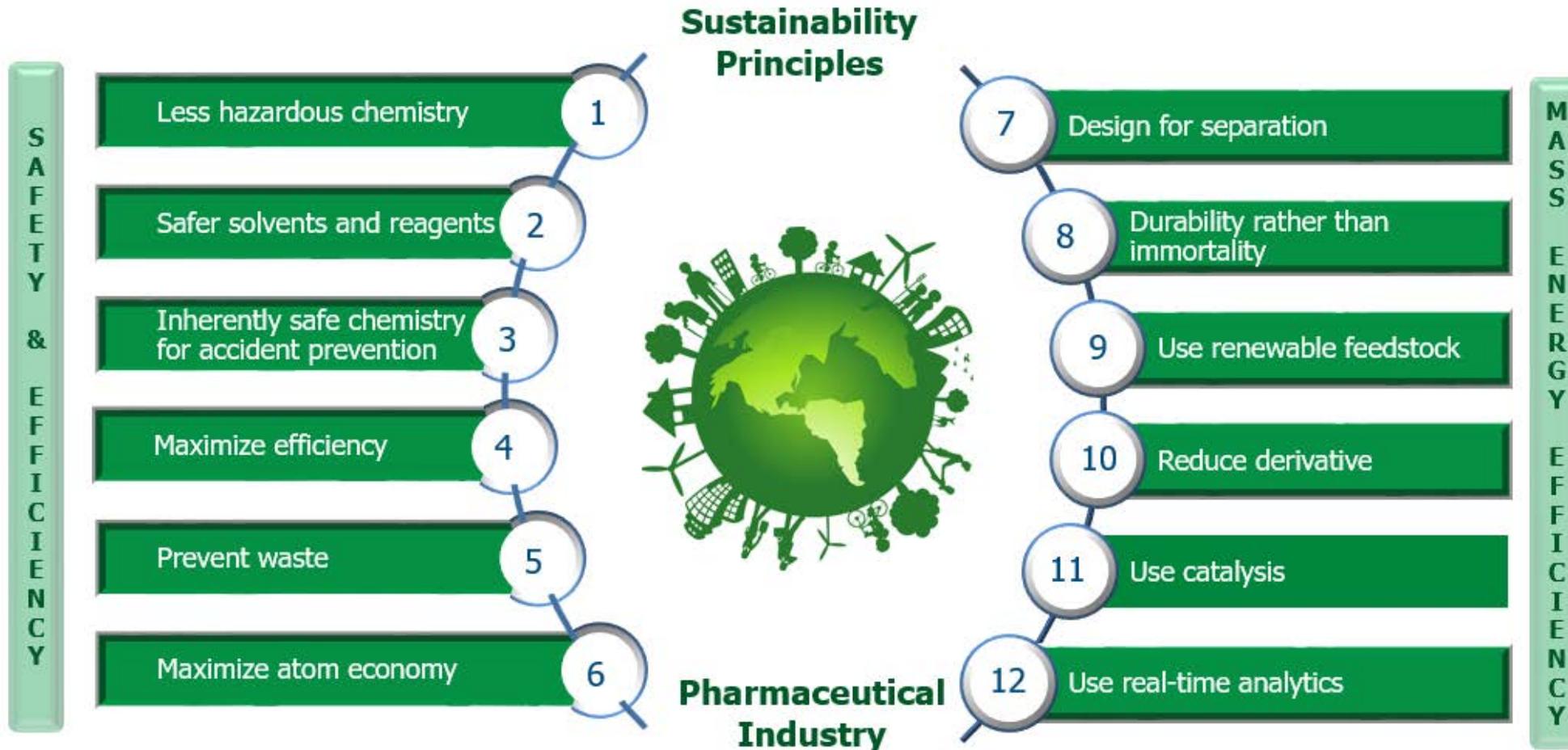
	2018	1H 2019
Total Racks	52,710	36,388
Total Plastic Reduction (lbs)	2863	2003
Total Plastic Reduction %	23%	24%

## ThermoFisher Refurbished / Reclaimed Parts Usage



# Green Chemistry

Responsible and sustainable development and manufacturing of life-saving medicines to support the world's growing population in the times of global climate change.



Anastas, Warner; The 12 Principles of Green Chemistry  
Anastas, Zimmerman; 12 Design Principles of Green Engineering



# Green Chemistry Goals & Strategy

## BMS Corporate Sustainability Goal

Integrate green design and reduce waste throughout our product portfolio.

Target: >90% of new products in R&D Portfolio assessed for improved environmental impact

## Sustainability Strategy

Predict sustainability of proposed route, green by design

Environmentally friendly solvents/reagents

Less waste, increase in efficiency

Route Invention

Process Invention

Process Characterization

Discovery

commercial

Chemical and Synthetics Development

# Green Chemistry Sustainability Metric

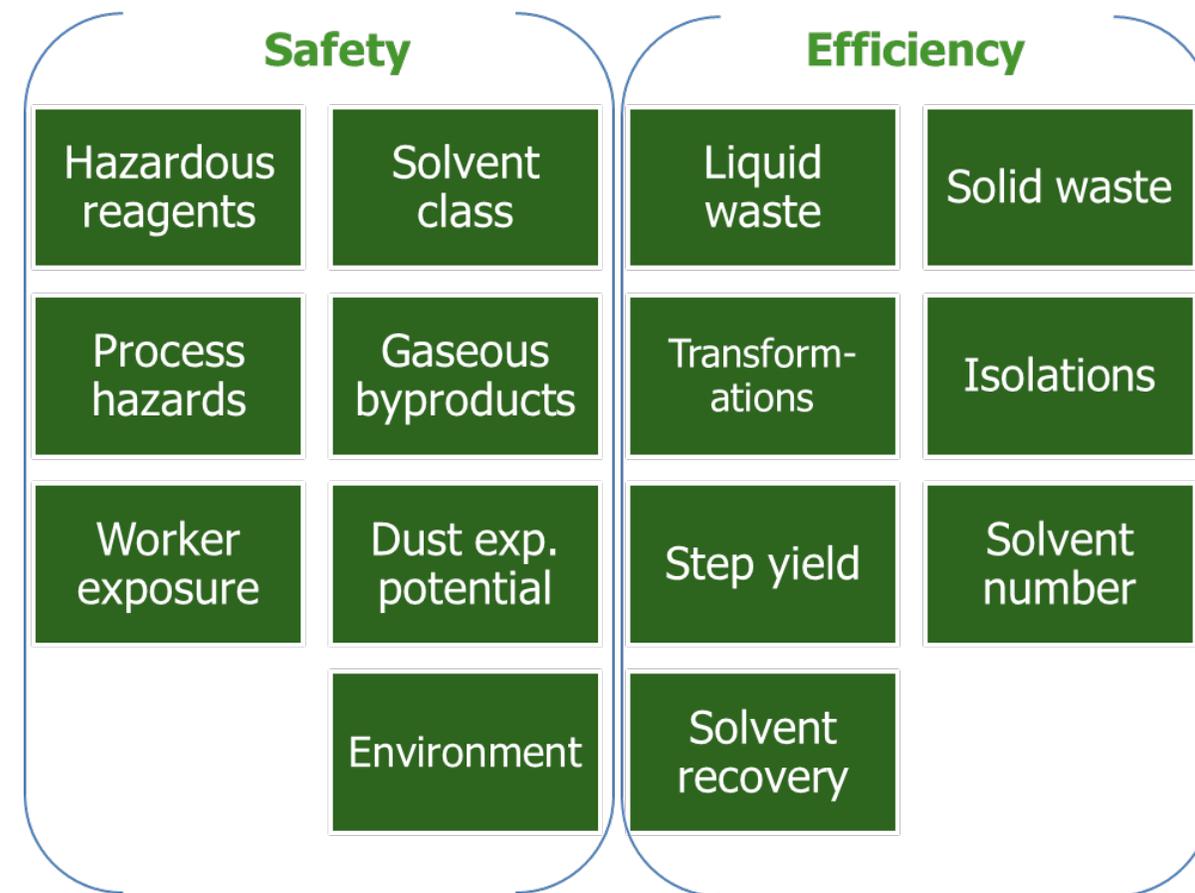
## Process Mass Intensity

$$PMI = \frac{\sum \text{mass of materials}}{\text{mass of isolated product}}$$

(mass of materials = solvents + reagents + workup + act. carbon + etc.)

- **Solvents contribute to 60-80% of PMI**
- Workup and crystallization contributes to most of the solvent usage

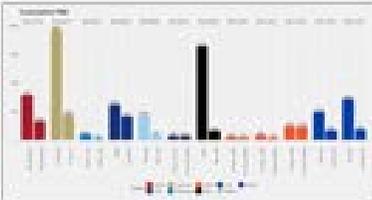
## Greenness Score



# BMS' Green Chemistry Impact (2018)

**Sustainability**

↓ **66%** reduction in PMI

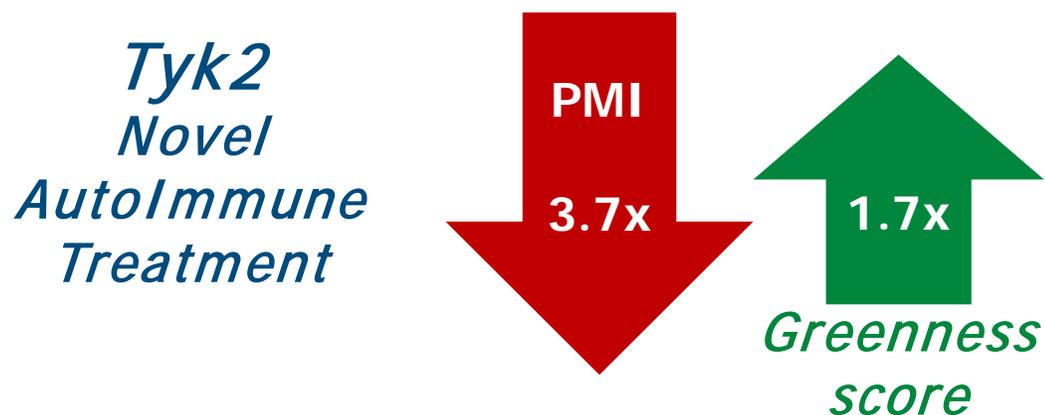


**eliminates 14MT** of waste in delivering 100Kg of 9 projects!

**Study Supplies Spend**

**\$57M** ↓ in 2019-2020 **cost avoidance** on R&D study supplies

Maximize efficiency (mass, energy, time) –



**Key efficiency factors –**

- Intensify reaction solvent volume
- Reduce/eliminate extensive work-ups
- Switch to direct-drop isolation

# Targeting Product Inserts

Opdivo is the first BMS medicine to be e-labeled.

>20 Changes to Prescribing Information (PI) leaflet in 3 years

~11 Weeks saved in time to update PI in electronic form

Benefits: Risk Mitigation and Cost Avoidance

Single source of information on BMS.com and accessible immediately upon authorization

Increase in indications requires larger insert; in 2 languages requires bigger box

Avoid need for bigger box = avoid costs for increased shipping

**Environmental benefits & savings from reduced paper production & waste**

Avoid product write-offs due to out-of-date label



From left: BMS-Canada Regulatory Affairs Director Richard Briand, Quality Assurance Director Céline Simard, and Senior Manager, Regulatory Affairs Martin Cloutier.



Victor Amadeo-Rodriguez, pharmaceutical project manager at Manatí, Puerto Rico, holds the larger carton that *Opdivo* for Canada avoided by switching to an "e-label" and its current carton.

# Greener Packaging Materials



## CURRENT ORENCIA BNU PACKAGE

Blue Polyurethane Foam

Made With Ozone Depleting Chemicals  
Not Recyclable



## NEW ORENCIA BNU PACKAGE

Recyclable Polypropylene Plastic Partition

Recyclable Polyethylene Foam Pad



Annual CO2 Emissions Reduction = 320,000 Tons  
Same Amount of CO2 Emissions Produced By 62 Cars  
\$900,000 Shipping Savings/year



# Sustainability Initiatives within Transportation



By end 2016:



Logistics INITIATIVES  
CHANGING the mode of  
PRODUCT SHIPMENT from  
AIR TO OCEAN:

Reduced CO<sup>2</sup> emissions 95%

Lowered annual transportation  
costs by \$7,000,000

Progress  
Continues



- Implemented **re-usable thermal shipping containers** for market distribution in Canada, Mexico and Puerto Rico
- Initiated effort to eliminate thermal protective pallet cover on shipments from Italy to US, **saving ~ 80 yd<sup>3</sup> of landfill waste/year**
- Italy – Australia ocean lane validated Eliquis® (**est up to 10X improvement in carbon footprint per unit**)
- Simultaneously converted from Barge service to LNG (Liquefied Natural Gas) Vessels attributing an **additional 14% improvement in GHG emissions.**
- Higher density new shipping container from Italy to China and US to Korea, resulting in **400% improvement in GHG emissions**

# Reducing Waste in our Fleet



- 25% of new cars offered to field reps are now hybrids
- Expect hybrid use to increase to >5% in 2019 (from 0% in 2018)



GREEN FLEET

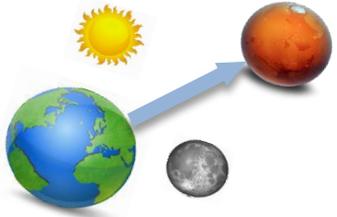
REDUCED

carbon output of our fleets by  
**3% (243,000 pounds),**  
 indicating our  
**COMMITMENT**  
 to environmental sustainability

- Total Number of Accidents Avoided since Jan 1, 2014 = 1,220
- Total Savings just from “Bent-Metal” = \$3.1M
- Estimated Total Savings (includes Direct/Indirect Costs, Medical, Litigation, Lost time etc)\* = \$29.5M



# Tackling Scope 3: Employee Travel



**250 million** miles annually flown by US and Canadian Employees →  
70,000 metric tonnes CO<sub>2</sub> and is 15% of our total GHG emissions

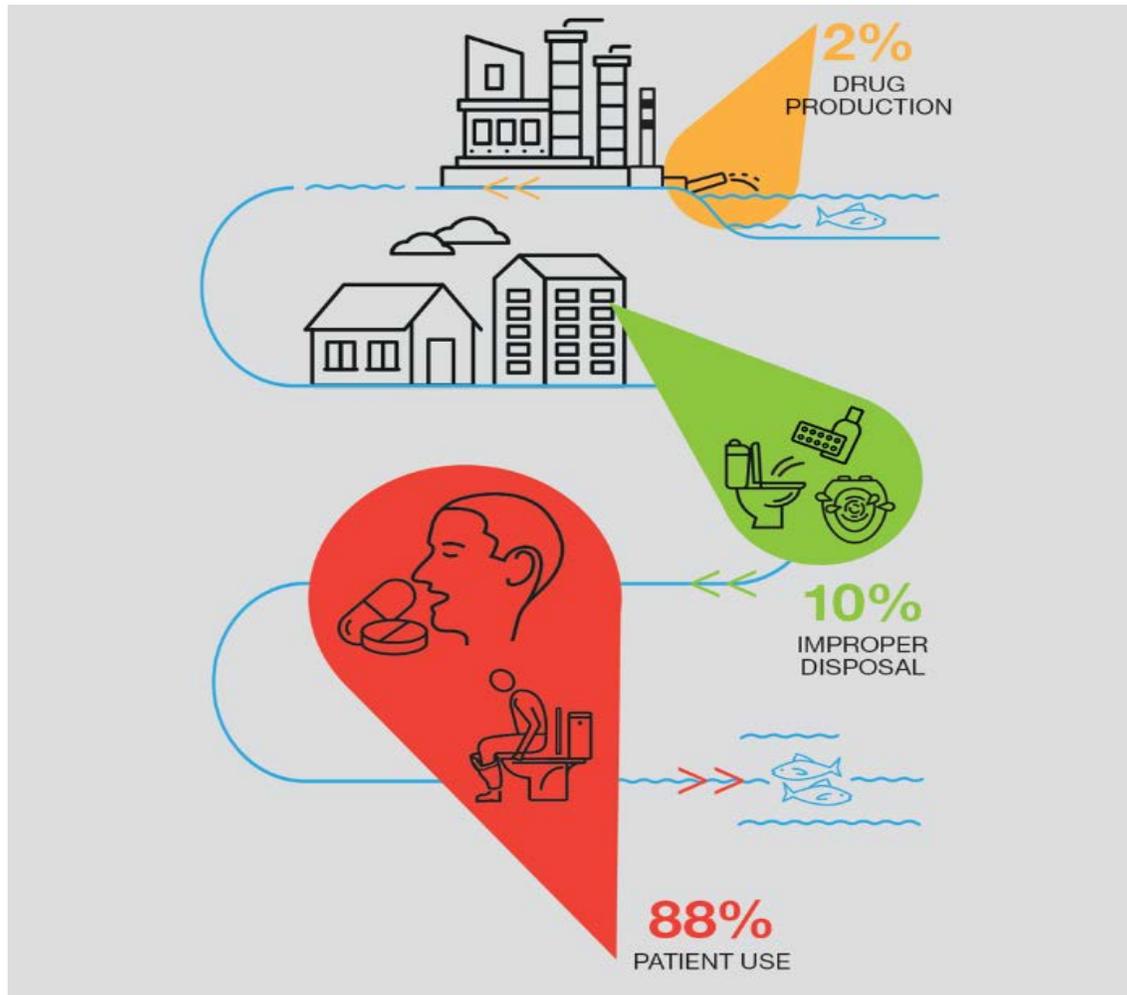
- While achievements are being made to reduce travel, it remains a necessary component of our business, driving *innovative ideas* to help attain our environmental commitment

## Partnered with CarbonFund.org to secure travel offsets for employee travel

- Participants traveled with a **100% net neutral CO<sub>2</sub> emission profile** for air travel
  - Helped fund the Russas-Valparaiso Project within the Amazonian Basin
  - Provided BMS a tax-deductible donation
  - Established & validated a **proof-of-concept** that can readily be applied across the company
- To Date, applied to 3 International Events (625 travelers) and all 2019 travel from employees in Global EHS&S
- Plans for additional events in 2020 and multiple departments/divisions



# Product Stewardship Pharmaceuticals in the Environment (PiE)



<https://www.thechemicalengineer.com/features/something-in-the-water/>

## Disposal & Safe Storage

### FDA Disposal in Household Trash

NO Drug Disposal?

Follow these steps:

Go to [www.fda.gov](http://www.fda.gov)

1. Mix drugs with kitty litter or used coffee grounds in a zip lock bag (no crushing of tablets or capsules)
2. Seal plastic bag
3. Place in the trash



GASoAS: Building Community Capacity to Prevent Rx Drug Abuse...

8

# Lifecycle Management – Extended Producer Responsibility

## Responsible Use & Drug Takeback



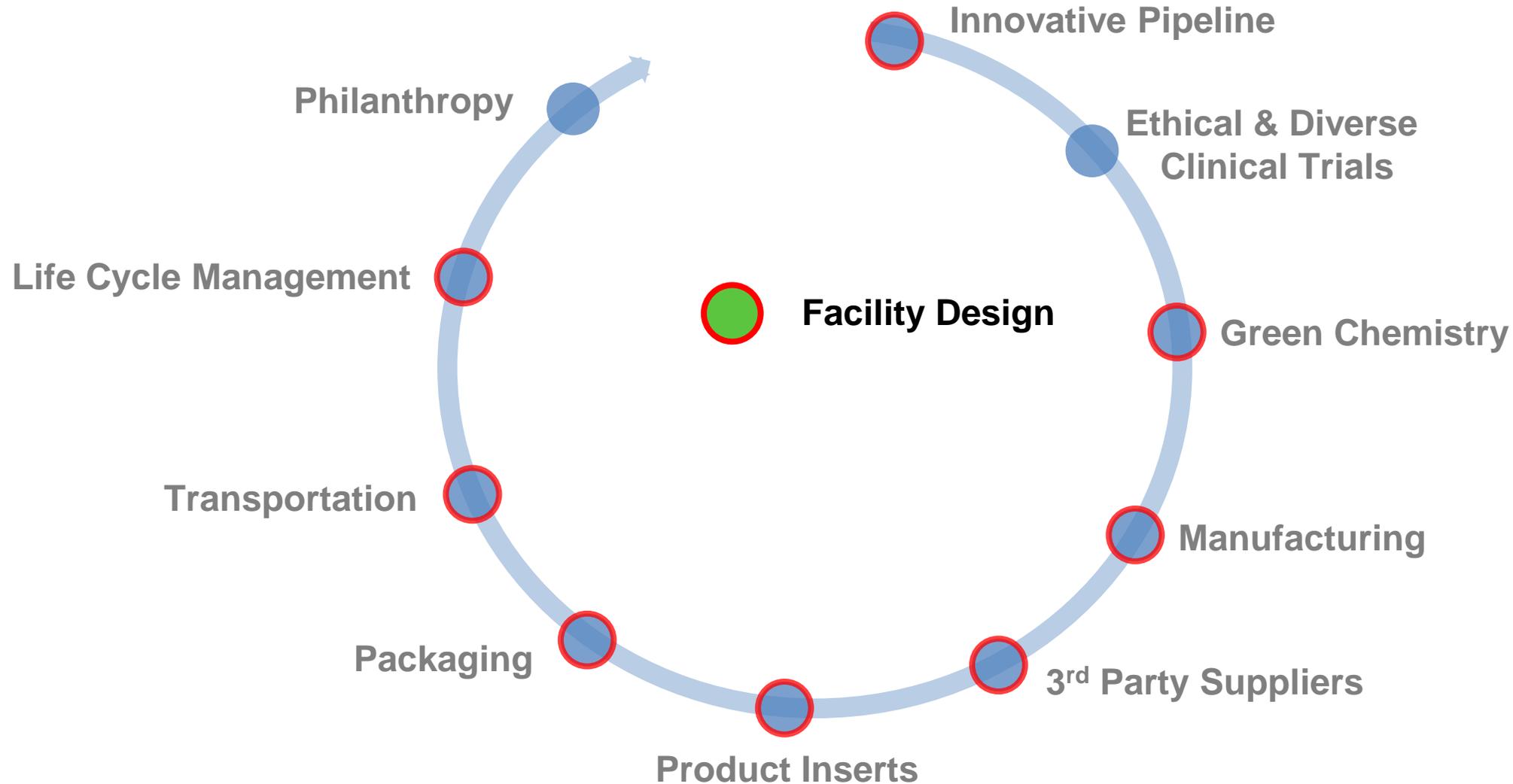
Global internal and external educational campaigns supporting official drug takeback

### Patient support package for Orencia

- Guidebook for responsible use
- 24/7 OnCall support
- Instructions for proper disposal
- Secure sharps container
- Pre-labeled container return box



# Efforts Toward Building a Circular Economy



# Reducing Waste in Our Operations

## BMS Environmental Performance 2018 vs. 2015

Greenhouse Gas Emissions: **↓ 10.44 %**

Scope 1: **↓ 2.5 %**

Scope 2: **↓ 21.9%**

Scope 3: **↓ 14.8%**

Total Energy Consumed: **↓ 3.9 %**

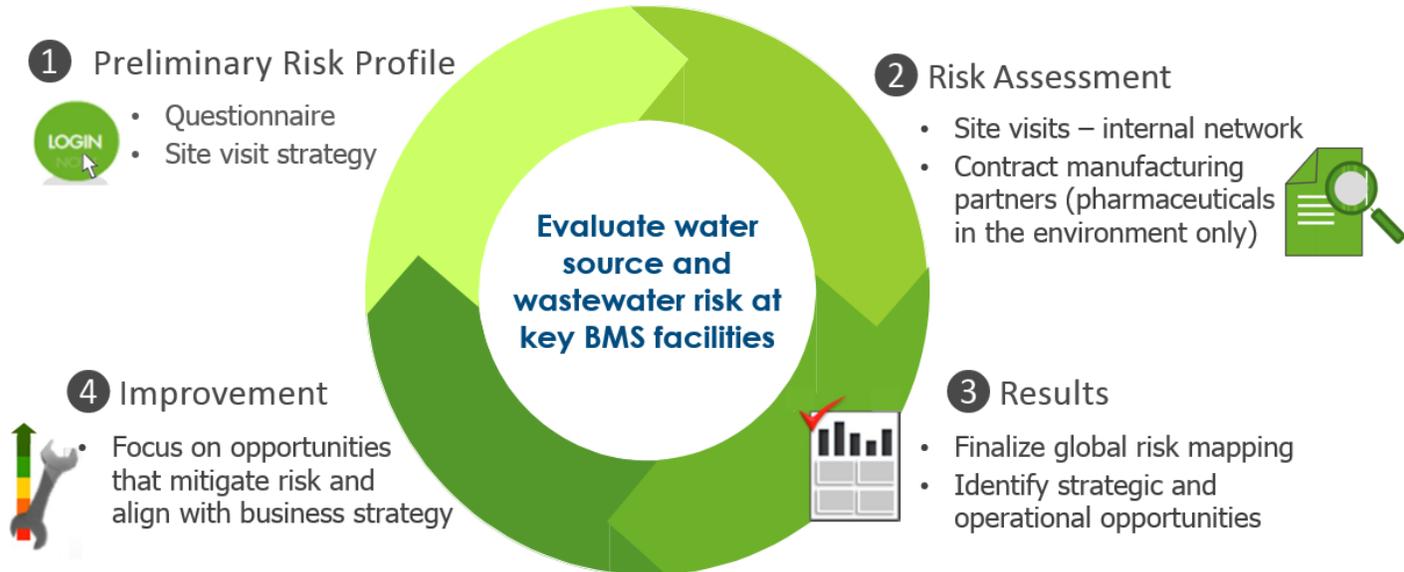
Water Used: **↓ 4.4 %**

Waste Generated: **↓ 46.1 %**

Recycling Efforts: **↑ 4.6 %**



## Project Water Compass



# Facility Design

Sustainability at Bristol-Myers Squibb means delivering on our mission to extend and enhance human life, including the way we design, construct and renovate our facilities.

In 2009, BMS established a **Design Standard for new construction and major renovations** based on elements taken from nationally recognized programs for energy efficiency and green building design, including:

- LEED, Leadership in Energy and Environmental Design
- United States Green Building Council's (USGBC) rating system
- Green Globes, the Green Building Initiative (GBI) rating system
- Energy Star, the Environmental Protection Agency (EPA) rating system for buildings
- International Organization for Standardization (ISO) 14000

# Facility Design



Since 2009, BMS has received:

- 7 Silver LEED certifications
- 4 Gold LEED certifications
- 1 Silver or Gold Pending
- 2 Certified sites Pending



Energy Star Partner of the Year

- 6 consecutive years

Partner of the Year, Sustained Excellence

- 2 consecutive years



Partner (2016)  
Challenge (2019)



# Facility Waste – BMS Cruiserath Biologics: Zero Waste to Landfill

\$1 billion state-of-the-art LEED Silver biologics manufacturing facility completed in 2Q 2018.

The site established a **zero to landfill waste policy from the very start of operations** and developed an extensive waste management programme to ensure the highest rate of reuse and recycling is achieved.



- 35 separate waste streams with zero waste being sent to landfill
- Onsite inactivation of biohazardous waste
- 100% green electricity
- Free reusable cup and water bottle to all staff
- Paper towels removed from all toilet facilities
- Staff awareness and training of waste management issues
- Extensive signage, labelling & posters for all bins & waste containers

↓ 99.6%  
paper cups

↓ 5 tonne  
paper

# Natural Resource Management



## Niagara Falls...

Since 2009, BMS has cumulatively saved the amount of water that flows over the falls...

...in 14 minutes!

## Hoover Dam...

Since 2009, BMS has cumulatively saved the amount of energy generated by the dam...

...for 222 days!



Since 2009, BMS has cumulatively saved GHG emissions equivalent to forested acreage which could cover

...two-thirds of the state of Delaware!

# Questions & Thank You

