

3M Science.
Applied to Life.™

Pollution Prevention Pays



Outline

- 3M Introduction Video
- 3M's Pollution Prevention Program
 - 3P International and National examples
 - 3P CT examples
- 3M Sustainability Goals
- Elements for pollution prevention success





Pollution Prevention
Pays 3P
40th Anniversary

1975 – 2015





Corporate Profile

- Founded in 1902
- Headquartered in St. Paul, Minnesota
- Global Sales (Year-end 2014): \$31.8 Billion (USD)
- Operations in more than 70 countries
- 3M products sold in nearly 200 countries
- Employ 90,700 employees globally

Our Vision

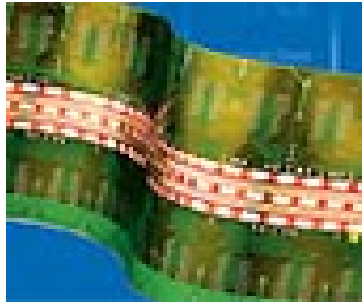
3M Technology Advancing Every Company
3M Products Enhancing Every Home
3M Innovation Improving Every Life



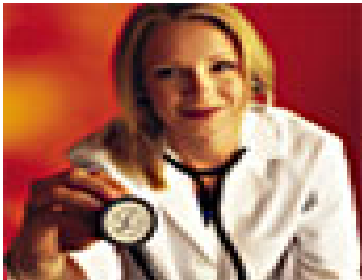
3M Business Groups



Consumer



Electronics and Energy



Health Care



Industrial



Safety and Graphics



3P is Linked to our Corporate Value



3M VALUES

- Act with uncompromising honesty and integrity in everything we do.
- Satisfy our customers with innovative technology and superior quality, value and service.
- Provide our investors an attractive return through sustainable, global growth.
- Respect our social and physical environment around the world.
- Value and develop our employees' diverse talents, initiative and leadership.
- Earn the admiration of all those associated with 3M worldwide.

3P Aligns to our 2025 Sustainability Goals – Reducing our Environmental Footprint



Raw Materials

- Reduce manufacturing waste by an additional 10%, indexed to sales
- Achieve “zero landfill” status at more than 30% of manufacturing sites



Water

- Reduce water use by an additional 10%, indexed to sales
- Engage 100% of water-stressed/scarce communities where 3M manufactures on community-wide approaches to water management



Energy & Climate

- Ensure GHG emissions at least 50% below our 2002 baseline, while growing our business
- Improve energy efficiency indexed to net sales by 30%
- Increase renewable energy to 25% of total electricity use

3P Overview



Dr. Joseph Ling
3M Staff Vice President,
Environmental Engineering and Pollution Control
1974 - 1984

Dr. Joe Ling launched the Pollution Prevention Pays (3P) program in 1975

“Pollution is ... unused raw material. By reducing the amount of pollution, ... [3M can] save money both on pollution control and on raw materials the next time around. It's a win-win situation.”

**Today 3P is a fundamental 3M philosophy
(Eliminate Pollution at the Source = Economic Benefit)**



Pollution Prevention Methods

Method	Description
Product Reformulation	<ul style="list-style-type: none">• Replace a part of entire product with less or no toxic chemical(s)
Process Modification	<ul style="list-style-type: none">• Alter a manufacturing process to reduce pollution (air, water, waste)
Equipment Redesign	<ul style="list-style-type: none">• Redesign of equipment with new concept to reduce pollution
Quality/Yield Improvement	<ul style="list-style-type: none">• Improve efficiency with reduced defects or use fewer raw materials to reduce waste
Recovery and/or Reuse	<ul style="list-style-type: none">• Develop/Improve system to recover or re-use waste stream
New Product	<ul style="list-style-type: none">• Develop product with environmental attribute/benefit to assist customer with reducing pollution

There are many ways to prevent pollution across the company through R&D, Manufacturing, Distribution, and Support Services.

3M Corporate 3P Results

From 1975 through 2015, over **12,700** 3P Programs have prevented:



Raw Materials

More than
3.4
Billion
Pounds
of Waste



Water

Over 241
Million
Pounds
of Water
Pollution



Energy & Climate

Nearly
651 Million
Pounds of
Air
Pollution

Over 4.3
Billion
Pounds of
Pollution
Prevented

And Since 2005, we
have also prevented:

Nearly 1.4
Million Gallons
of Water
Usage
Prevented

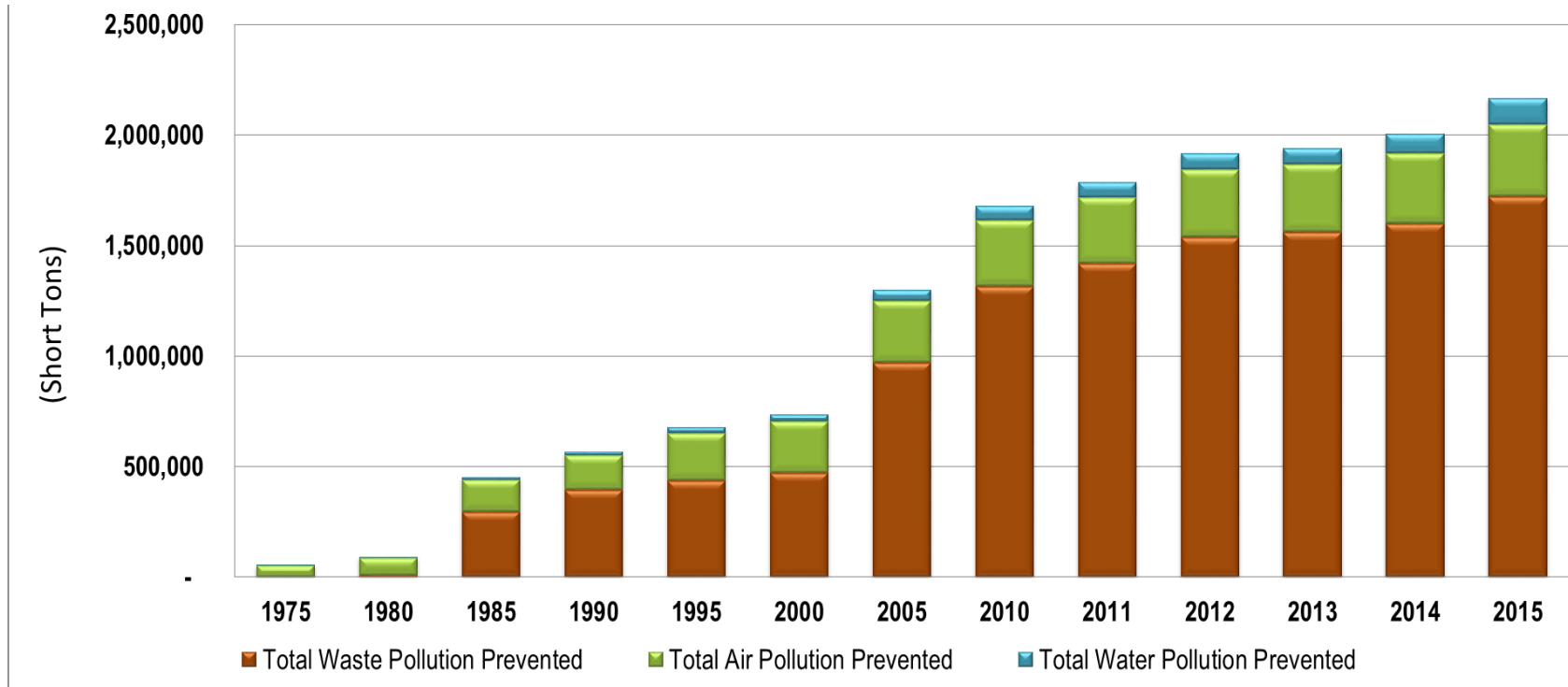
Nearly 9.3
Million
Metric Tons of
GHGs &
saved over
9.2 MM
MMBTUs

Grand Total Savings to 3M
of nearly
\$2 Billion USD



3P Global Progress - 1975 to 2015

Totals: 1st Year Savings ONLY



1975-2015 Totals

Total Projects	12,716
Total Monetary Benefit (\$USD)	1.96 Billion
Total Pollution Prevented (US lbs)	4.33 Billion

Program Objectives:

- 1) Prevent Pollution at its Source
- 2) Optimize use of resources and money spent (1st Year Savings Only Counted)
- 3) Global Involvement

3P Process





3P Award Measurement Criteria

What Qualifies?



Fundamental Project Awards

Meets Basic 1st year Requirements

- ≥ \$1000 USD Saved
- ≥ 1000 Lbs Prevented

AND/OR

- Any Energy Savings

Exceptional Project Awards

Meets Basic 1st year Requirements

AND

- Utilize a Unique or Original Design
- AND/OR
- Involve Significant Technical Accomplishment

3P Recognition



- Quarterly Awards given by Top Management
 - Standard Projects (Meet minimum requirements)
 - Certificate of appreciation (template available to Plant Managers to distribute)
 - Exceptional Projects (Meets exceptional criteria)
 - A recycled glass tile, coordinated by the 3P Administrator.



- Annual Awards to Division / Country

- Exceptional Project of the Year (for each project category) - Plaque
- Most % Increase in Pollution Prevention (Division and Country) - Plaque
- Joe Ling Award (Best Project of the Year) - Harvest Plaque Award





Example - Recycling 3M Off-Spec Material into New 3M Product

PROJECT: Menomonie, Wisconsin - Personal Care Division-Hook Jumbo Reclaim

SUMMARY: This project reclaimed polypropylene scrap from the hook film making process and implemented an onsite process to regrind, qualify and incorporated back into good product. Most polypropylene waste produced at hook lines has been reclaimed through this innovative process change.

KEY ACCOMPLISHMENTS:

- ✓ Intense product testing and analysis on 20 global products to achieve equivalent performance
- ✓ Reclaim process from external to internal
- ✓ Significant waste reduction and shipping savings

1st Year Savings
Total Pollution Prevented:
10.5 Tons-Waste
Energy Reduction:
78MMBTUS



Example - Incorporating “Green” in Design

PROJECT: 3M Center, Home Care R&D - Fur Fighter™ Upholstery

SUMMARY: The team identified and implemented packaging redesign project on the consumable hair pick-up product which included the composition used in the handle, reductions in amount of packaging used, and significant improvement in yield of usable substrate.



KEY ACCOMPLISHMENTS:

- ✓ Significant cost reductions
- ✓ Virgin polycarbonate replaced with post industrial polypropylene recycle (mostly from other 3M processes)
- ✓ Significant packaging savings (weight, size, and amount)

1st Year Savings
Total Pollution
Prevented:
110 (Short Tons)



Example - Solvent & Hazardous Air Pollutant Elimination

PROJECT: 3M Perth, Canada - Filament Tape Solvent Usage Reduction

SUMMARY: The product was reformulated to eliminate solvent and other hazardous pollutants used to dissolve natural rubber for coating. In addition, the product is now made in one plant versus two plants/trips resulting in transportation cost savings.

KEY ACCOMPLISHMENTS:

- ✓ Solvent & HAP Elimination
- ✓ Reduced Transportation
- ✓ Process Consolidation

1st Year Savings
Total Pollution Prevented:
3.4 Tons of air pollution



Example - Significant Reduction in Greenhouse Gases

PROJECT: 3M Cordova, Illinois - Improved Novec™ 1230 Cell Run Yield

SUMMARY: Through operational excellence, this team increased yield of Novec™ 1230 cell product by 12.3% by modifying unit operation, automating manufacturing process conditions, engineering improvements, contaminant control, and communications.

KEY ACCOMPLISHMENTS:

- ✓ Significant Process GHG Emission Reductions
- ✓ Raw Material Savings
- ✓ Increased Operating Flexibility

1st Year Savings
Total Pollution Prevented:
1,020,766 (Metric Tons CO₂^e)



Example - Packaging Redesign to Reduce Raw Materials

PROJECT: 3M Hwaseong, Korea - Packaging Redesign to Eliminate Paper Box for LCD Film

SUMMARY: The project team developed reusable packaging and set up a return process with the customer. The new reusable packaging has increased productivity for both 3M and its customer by increasing pallet density and improving material flow.

KEY ACCOMPLISHMENTS:

- ✓ Reusable Packaging
- ✓ Return Process for Customer
- ✓ Increased Productivity for 3M and Customer

1st Year Savings
Total Pollution
Prevented:
2,019 Tons waste



Example - Increase Storage Capacity/Reduce Needed Transportation

PROJECT: 3M Sumare, Brazil - Storage Capacity Increase in Warehouse 22

SUMMARY: This project modified existing space in the Sumare building 22 warehouse to add 440 storage locations eliminating the need for storage in leased warehouses and truck transportation to and from the warehouses.

KEY ACCOMPLISHMENTS:

- ✓ Increased Storage Capacity
- ✓ No Leased Warehouses
- ✓ Fuel Greenhouse Gas Reduction

1st Year Savings
Total Pollution Prevented:
Metric Tons CO₂^e

3P Joe Ling Award (Annual Best Overall Project)

PROJECT: 3M Hilden, Germany - Photo-Oxidizer and Boiler System for Exhaust Air Treatment and Building Heating

SUMMARY: The project team developed a process and equipment to enable solvent and solvent-less operations while meeting environmental requirements and providing heating to the maker processes and bay building for energy savings

KEY ACCOMPLISHMENTS:

- ✓ Migrated to solvent-less technology
- ✓ Reduced operational costs, improved environmental performance



1st Year Savings
Total Pollution Prevented:
42 tons

Energy Reduction:
38,252 MMBTUs



Example – Raw material replaced with recycled materials

PROJECT: 3M Purification, Inc.– Raw Material Substitution

SUMMARY: The project team worked to qualify recycled cardboard into the product instead of purchasing new materials.

KEY ACCOMPLISHMENTS:

- ✓ Raw material savings
- ✓ Waste stream reduced
- ✓ 92 Tons of cardboard waste reused

1st Year Savings
Total Pollution Prevented:
92 Tons waste





Example -Batch size optimization

PROJECT: 3M Purification, Inc.– Batch optimization

SUMMARY: Utilized existing resources to qualify adjusting batch size to optimize materials, labor, and energy.

KEY ACCOMPLISHMENTS:

- ✓ Reduced processing time
- ✓ No additional equipment required
- ✓ Reduced waste, water use, and energy

1st Year Savings
Total Pollution Prevented:
43 Tons waste
240,000 gal water
144 Metric Tons CO₂^e



Example – Automation to reduce waste materials

PROJECT: 3M Purification, Inc. – Automated cutting

SUMMARY: Automation of a manual cutting process

KEY ACCOMPLISHMENTS:

- ✓ Improved process control
- ✓ Increased raw material utilization
- ✓ 3.6 tons of waste reduced

1st Year Savings
Total Pollution Prevented:
3.6 Tons waste
157,000 gal water



Example – Reuse of Reverse Osmosis Water for Testing Filters

PROJECT: 3M Purification, Inc.– Reuse RO water

SUMMARY: While local reuse was utilized for testing filters, the team identified redistributing waste water directly back into RO system. An automated system installed to toggle between reclamation and discharge based on product recipe.

KEY ACCOMPLISHMENTS:

- ✓ Expanded on existing reuse
- ✓ Saved energy costs
- ✓ Saved water and sewer costs

1st Year Savings
Total Pollution Prevented:
1.1 Million gal water
8 Metric Tons CO₂^e





Example – Energy Savings with CL&P upgrades

PROJECT: 3M Purification, Inc.– CL&P upgrades

SUMMARY: Upgrade lighting with new fixtures.

KEY ACCOMPLISHMENTS:

- ✓ Reduce electricity usage
- ✓ Incentives used

1st Year Savings
Total Pollution Prevented:
410 Metric Tons
(greenhouse gases)

Sustainability Goals Overview



Sustainability at 3M

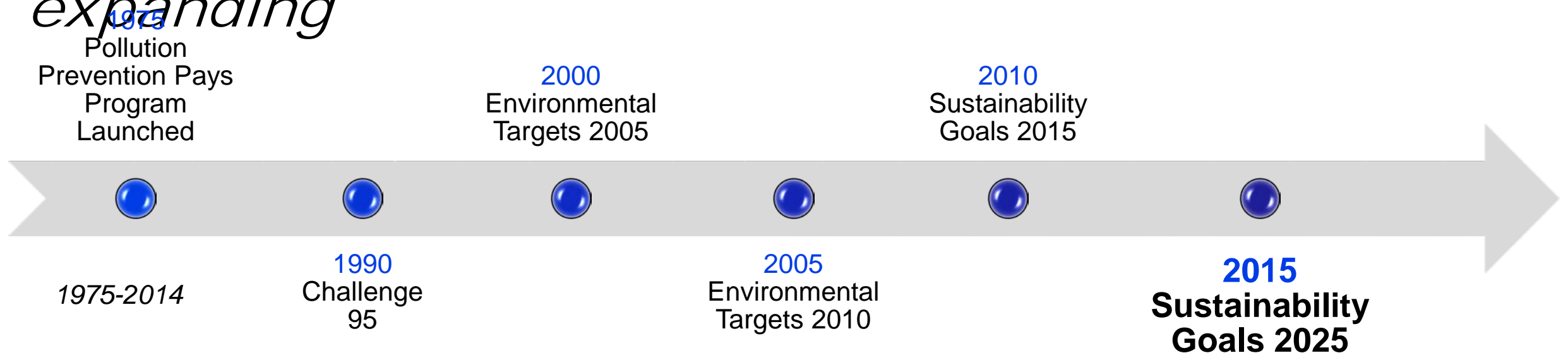


“...development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

– United Nations, 1987

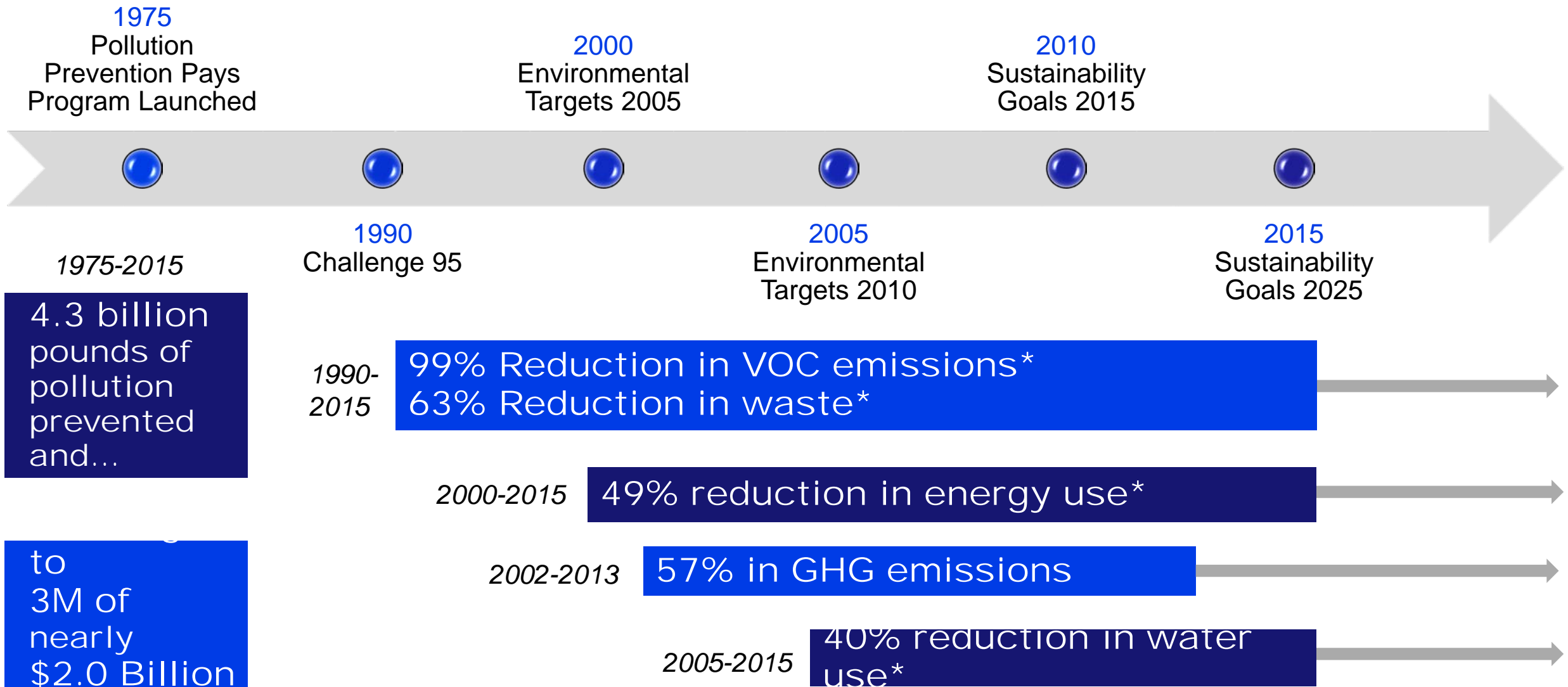


Our sustainability journey continues... *and is expanding*



- Delivering Excellence in Operations
- Innovating to Improve Lives
- Enriching Our Communities

Our sustainability journey



Our 2025 Sustainability goals



Energy & Climate

- Improve energy efficiency indexed to net sales by 30%
- Increase renewable energy to 25% of total electricity use
- Ensure GHG emission at least 50% below our 2002 baseline, while growing our business
- Help our customers reduce their GHGs by 250 million tons of CO₂-equivalent emissions through use of 3M products



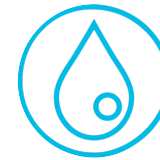
Raw Materials

- Invest to develop more sustainable materials and products to help our customers reach their environmental goals
- Reduce manufacturing waste by an additional 10%, indexed to sales
- Achieve “zero landfill” status at more than 30% of manufacturing sites
- Drive supply chain Sustainability through targeted raw material traceability and supplier performance assurance



Health & Safety

- Provide training to 5 million people globally on worker and patient safety



Water

- Reduce global water use by an additional 10%, indexed to sales
- Engage 100% of water-stressed/water-scarce communities where 3M manufactures on community-wide approaches to water management



Education & Development

- Invest cash and products for education, community and environmental programs
- 100% participation in employee development programs to advance individual and organizational capabilities
- Double the pipeline of diverse talent in management to build a diverse workforce



Applicability summary of operational goals



All Facilities

- Reduce manufacturing waste by an additional 10%*
- Reduce water use by an additional 10%*
- Improve energy efficiency by 30%*

Select Facilities

- Achieve “zero landfill” status at more than 30% of manufacturing sites
- Engage 100% of water-stressed/scarce communities where 3M manufactures on community-wide approaches to water management

Primarily Corporate (Engineering) Responsibility

- Increase renewable energy to 25% of total electricity use
- Ensure GHG emissions at least 50% below our 2002 baseline, while growing our business

* Facility targets indexed to output.



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Elements for Pollution Prevention Success



Elements for Pollution Prevention Success

1. Understand the competitive advantage of a pollution prevention culture
 - Recognize this as a business strategy
2. Set long term goal ideologies
 - Consider incorporation of pollution prevention into your company's mission, vision, or value statements.

Elements for Pollution Prevention Success

3. Generate momentum

Employee's are a very valuable resource –

- Internal marketing (recognition events, posters, contests, etc.)
- Engage them in activities that differ from their jobs from time to time

Elements for Pollution Prevention Success

4. Network – HWAC is a fantastic opportunity to learn and network with your peers. Congrats to you!
5. Consider your measurements of success
 - What are your goals or expectations?
 - Who are those expectations for?
 - Who will you review the results with?



Thank you!