3M Italia

Pollution Prevention Pays - Industrial Eco-Efficiency

Why – What – How

Carlo Müller

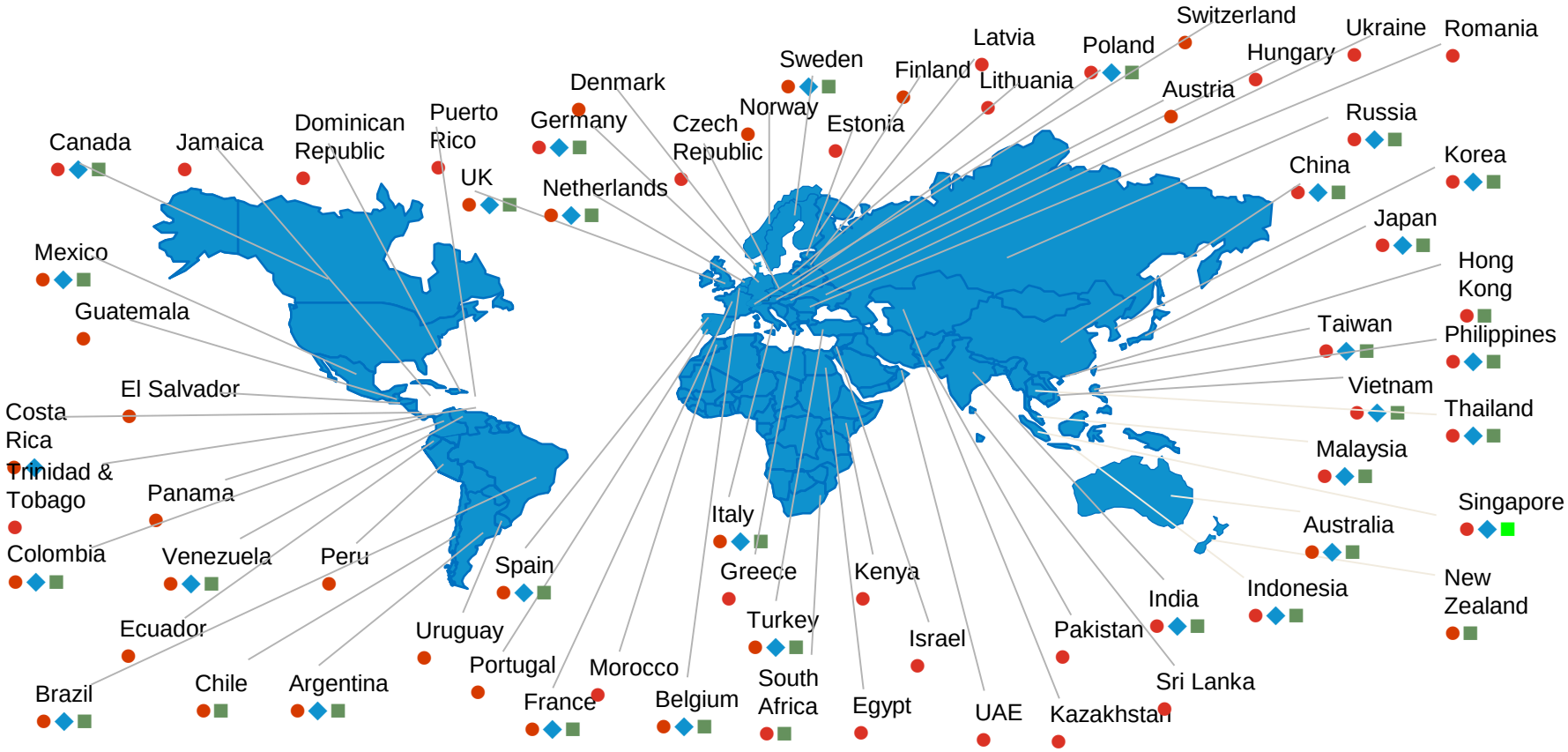
3M Science. Applied to Life.™

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

- 36 international LAB
- 48 Customer tech center
- 46 Technology Platforms
- 6% global revenue to R&D
- 105000 Patents (1400 in Italy)
- 8300 R&D resources globally

Global presence

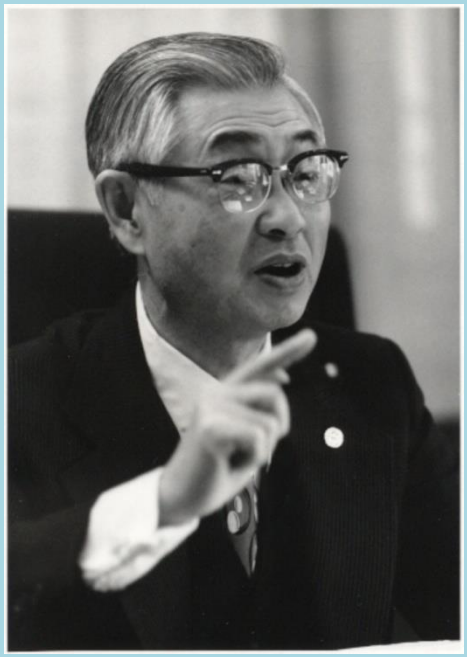


3P is Linked to our Corporate Values

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 Overview



Dr. Ling launched 3M's Pollution Prevention Pays 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."-Ling

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

3M's 2015 Sustainability Goals
3P Program Contributes to the Success!

Environmental Stewardship	Economic Success	Social Responsibility
Reduce VOC 15% by 2015 from 2010 base year, indexed to net sales	80% of Supplier Spend is Reviewed to Drive Conformance with 3M EHS, Transportation & Labor/Human Relations Standard by 2015	Develop Community Stakeholder Engagement Plans for Select Manufacturing Sites
Reduce waste 10% by 2015 from 2010 base year indexed to net sales	Enhance Environmental Attributes of New Products	Promote a Road to EHS Excellence at New 3M Sites
Improve energy efficiency 25% by 2015 from 2005 base year, indexed to net sales (BTUs/$)		
Develop water conservation plans at 3M facilities located in water scarce and stressed areas and drive continuous improvement in water management		

Addressing our environmental footprint

Pollution Prevention Pays

Waste

68%

reduction

in waste indexed to net sales (1990–2013)

Reduce waste *indexed to net sales* **10%** (2010–2015)

On plan

Greenhouse Gas Emissions

72%

reduction

in absolute greenhouse gas emissions (1990–2011)

Reduce greenhouse gas emissions *indexed to net sales* **5%** (2006–2011)

On plan

Since 2012 3M is collecting data according to its new scope 3 GHG inventory as baseline for setting a new greenhouse emissions goal.

Energy Use

49%

improvement

in energy efficiency (2000–2013)

Improve energy efficiency **15%** (2010–2015)

ACHIEVED

Volatile Air Emissions

98%

reduction

in volatile organic air emissions indexed to net sales (1990–2013)

Reduce volatile air emissions *indexed to net sales* **15%** (2010–2015)

ACHIEVED

Water

40%

reduction

in water use indexed to net sales (2005–2013)

Develop water conservation plans *for 3M sites located in areas with scarce or stressed water resources*

On plan

Acquisitions:
PolyPore
Cuno

3M 2015 sustainability goals

Accelerating Sustainability Throughout 3M

Our Suppliers

Review Progress on Standard for Suppliers

Review at least 80% of Supplier Spend in High Risk Countries

On plan

Our Acquisitions

Promote a Road to EHS Excellence at New 3M Sites

On plan

Our Manufacturing & Operations

Reducing Our Environmental Footprint

On plan

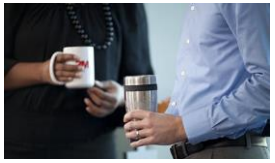
Our Communities

Engage Our Communities

Develop Community Stakeholder Engagement Plans at 3M Facilities

On plan

Our Customers



Further Enhance Sustainability Attributes of New Products

On plan

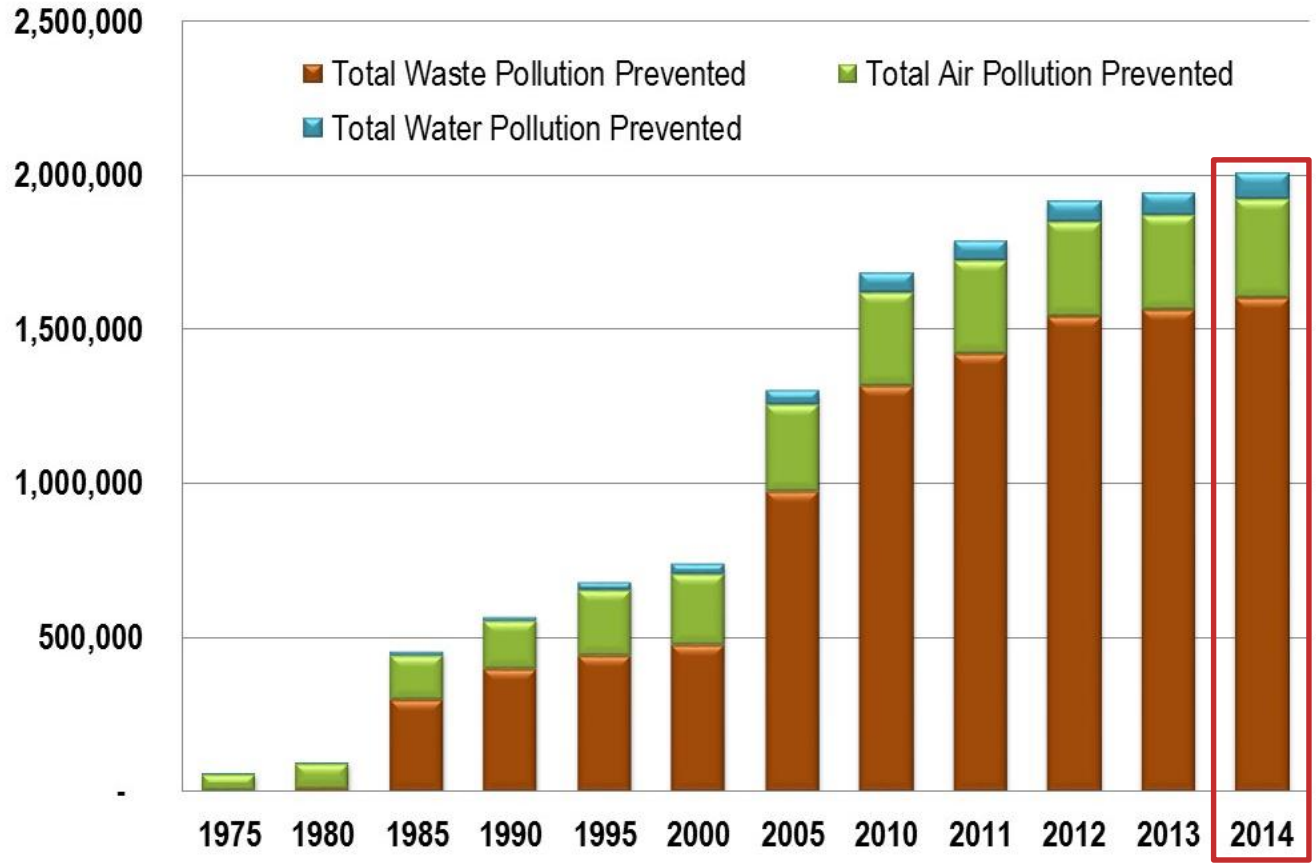
Pollution Prevention Methods

Method	Description
Product Reformulation	• Replace a part of entire product with less or no toxic chemical(s)
Process Modification	• Alter a manufacturing process to reduce pollution (air, water, waste)
Equipment Redesign	• Redesign of equipment with new concept to reduce pollution
Quality/Yield Improvement	• Improve efficiency with reduced defects or use fewer raw materials to reduce waste
Recovery and/or Reuse	• Develop/improve system to recover or re-use waste stream
New Product	• 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.

3P Global Prevention: 1975-2014

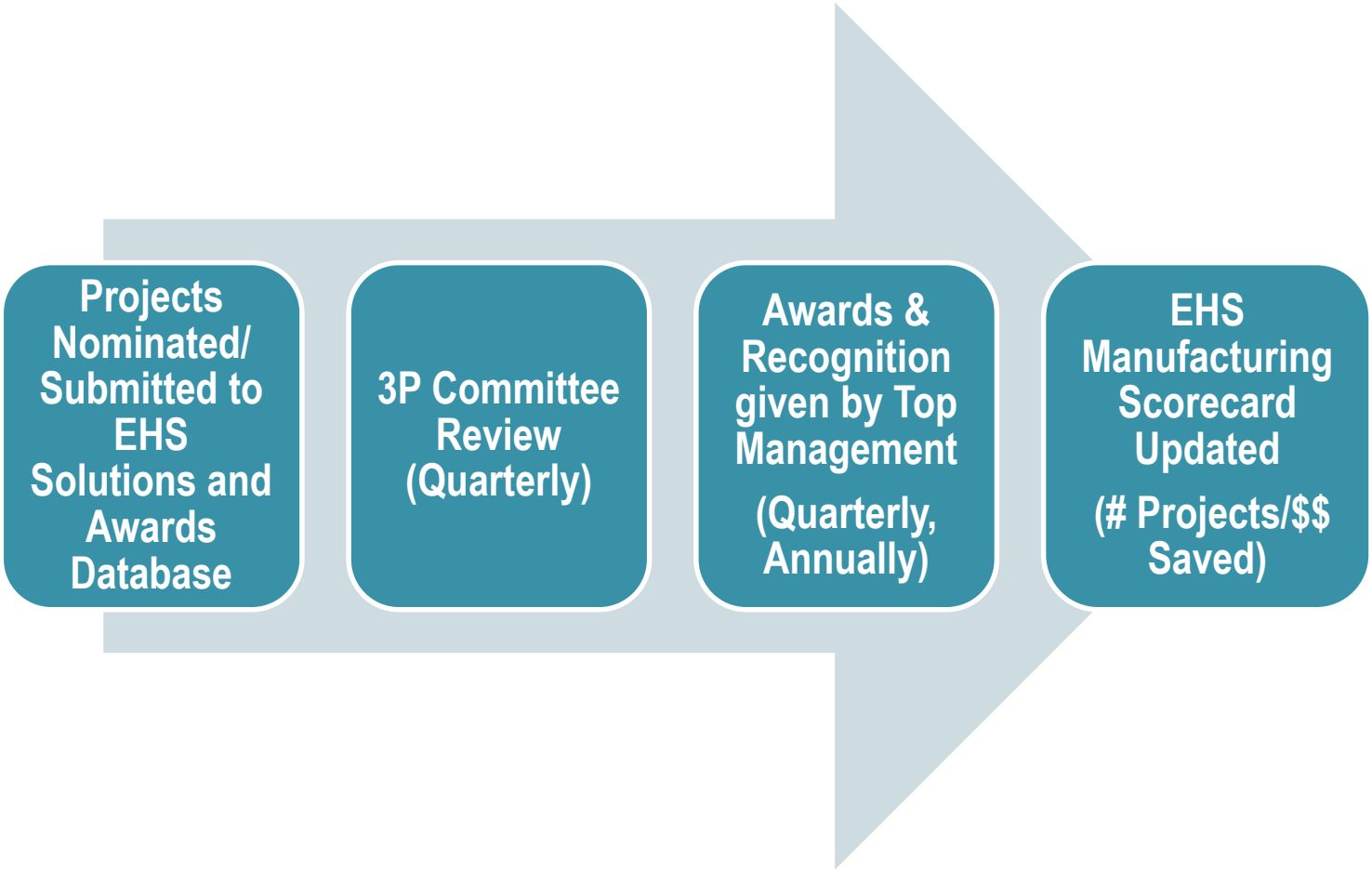
First Year Savings Cumulative Totals (Air, Water Pollution, Waste)



Total Projects	Nearly 11,800
Total Monetary Benefit ($USD)	1.86 Billion
Total Pollution Prevented (US lbs)	4.1 Billion

The 3P program has been tracking pollution prevention data for Air, Water, and Waste since 1975.

3P Process



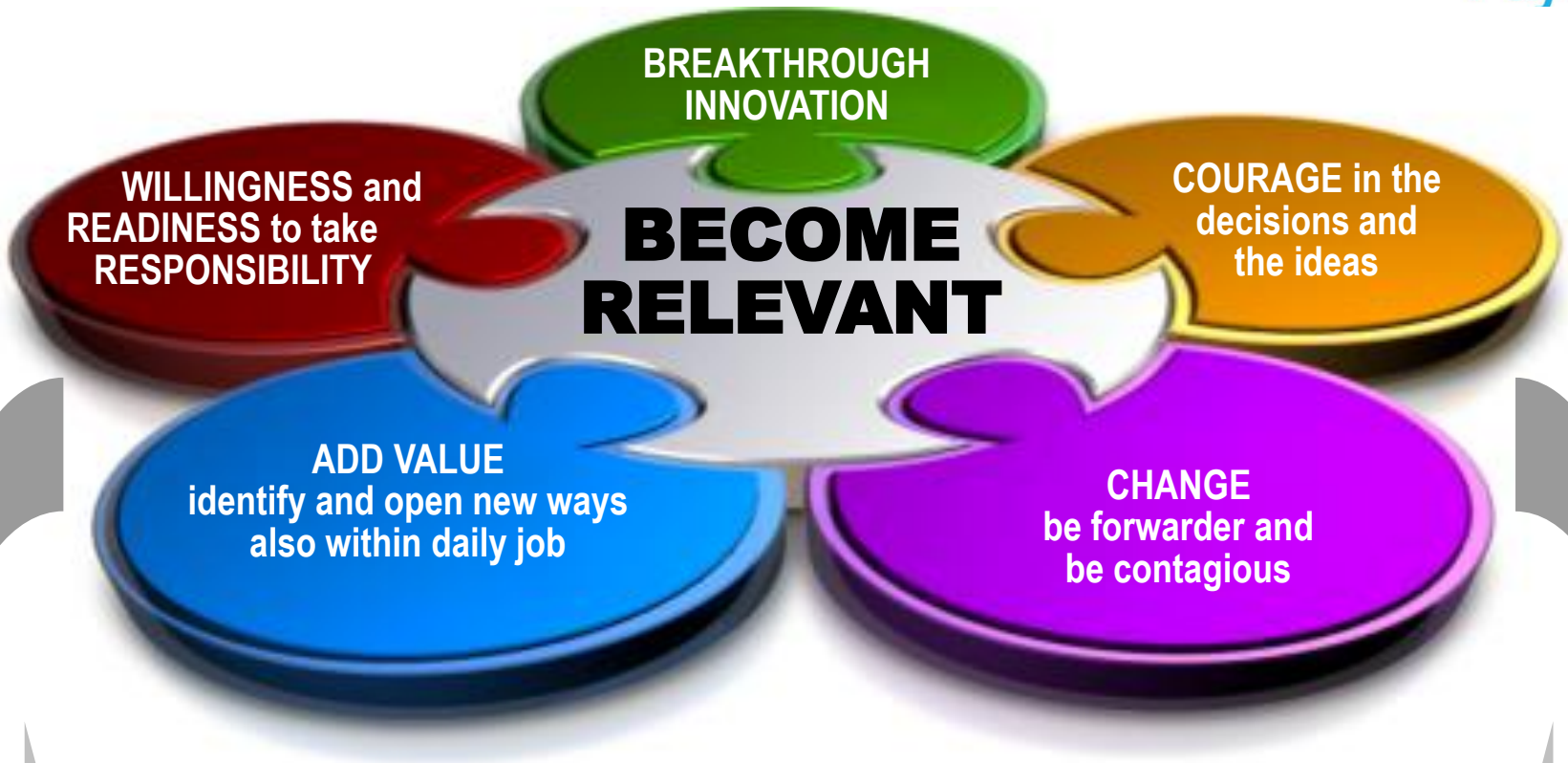
Pollution Prevention Pays

HOW

is achievable

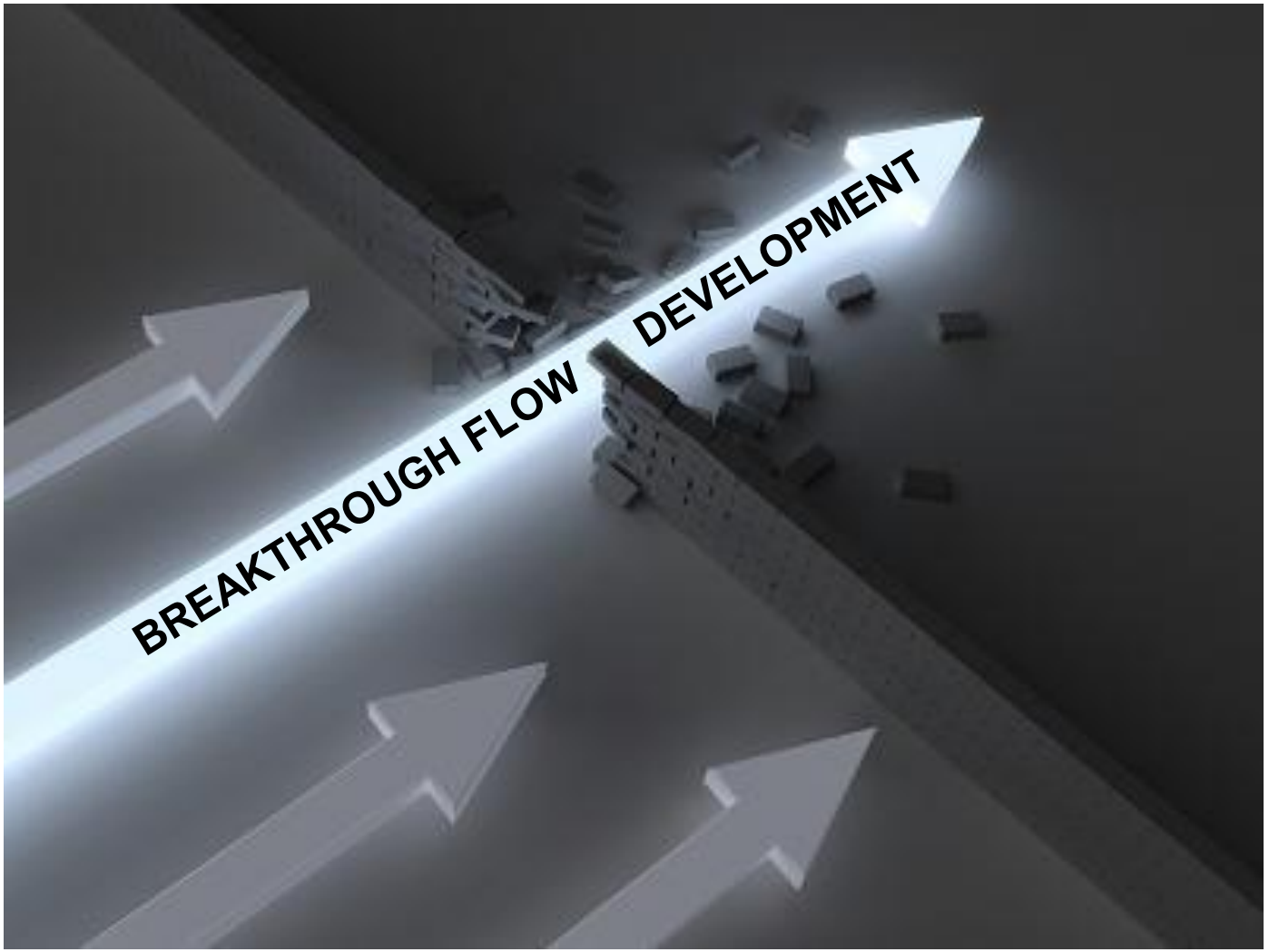
pollution prevention **PAYS**: HOW…

Pollution Prevention Pays

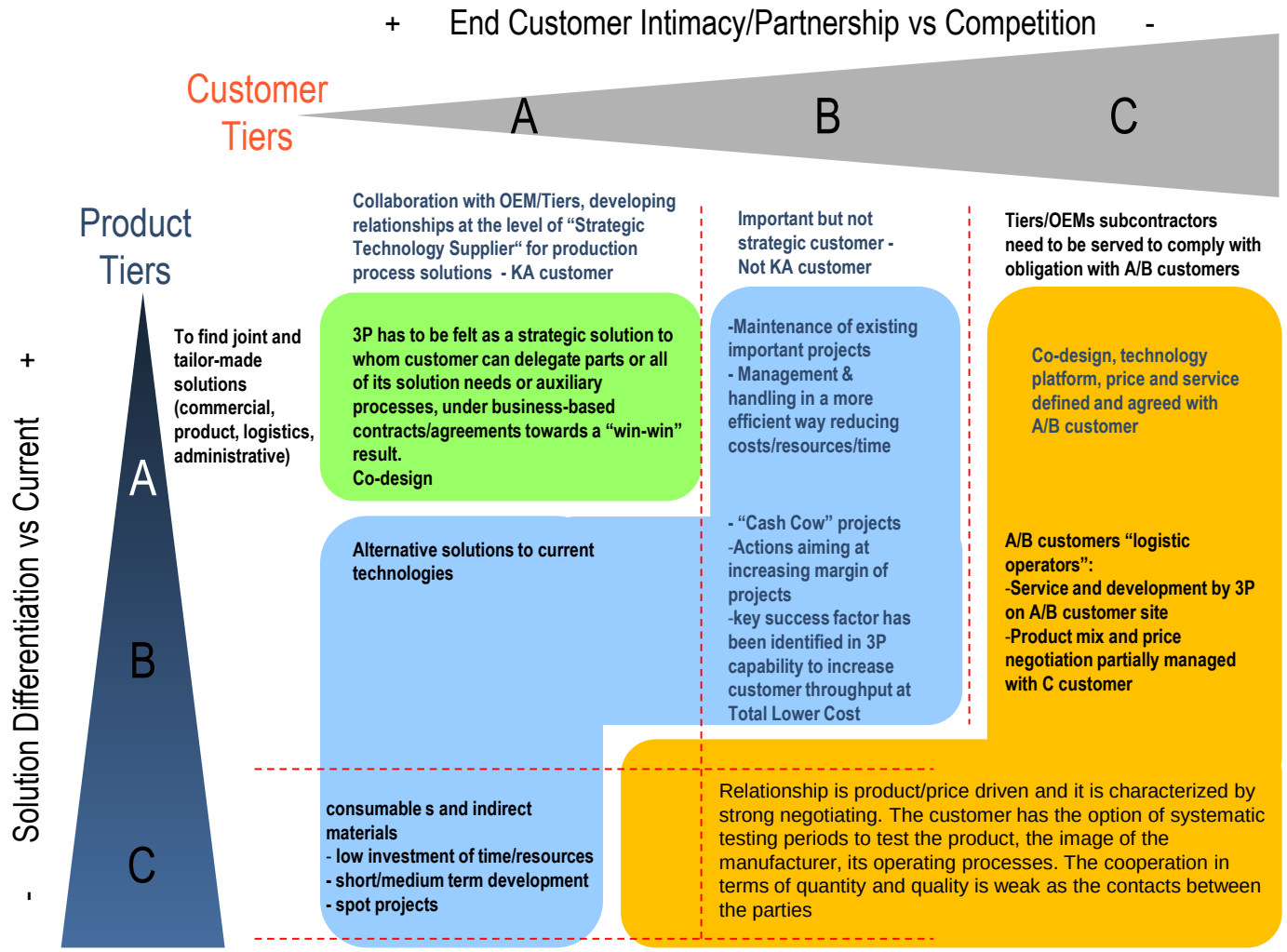


1. *Scout enterprise within role and rules*
2. *Set*
3. *Cluster variables*

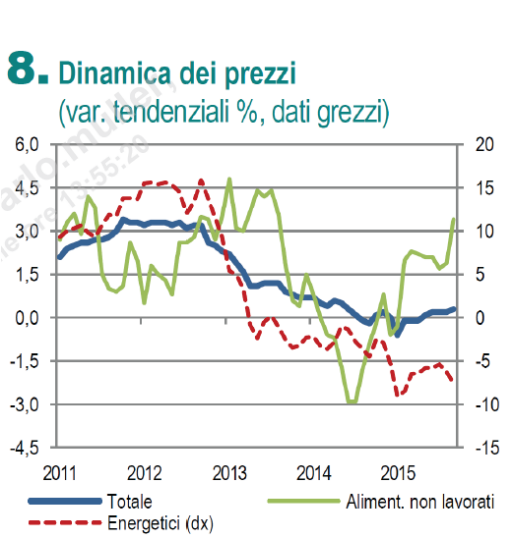
Kill dogma

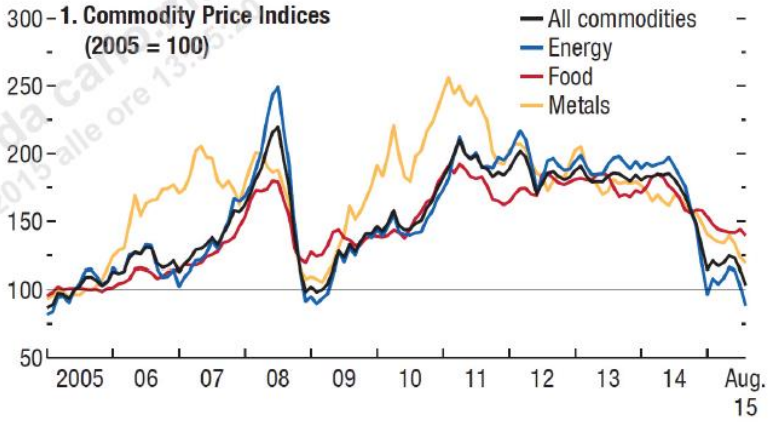


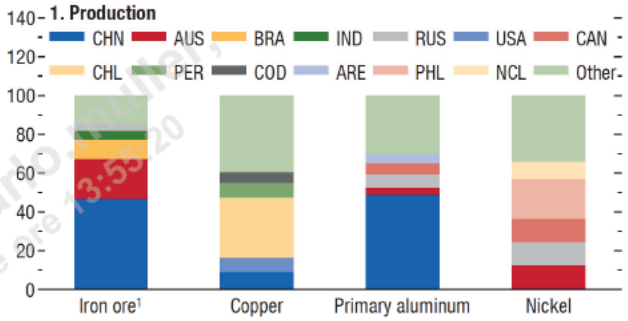
3P - 2 Dimensional Pyramid

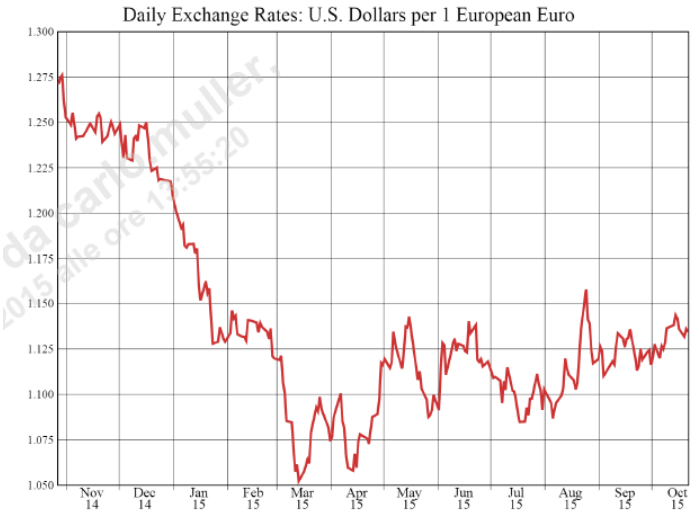


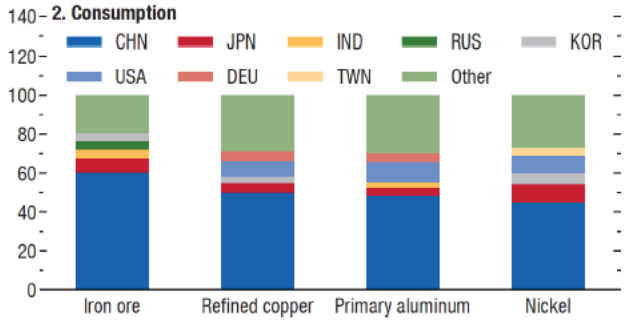
Set & Cluster











3M Environmental, Health, Safety and Sustainability Operations

Pollution Prevention Pays (3P)

Moving 3M Toward Sustainability

2015

3P Award Measurement Criteria

What Qualifies?

Standard Fundamental Project Awards

Meets Basic 1st yr. Requirements

≥ $1000 USD Saved
≥ 1000 Lbs Prevented
AND/OR
Any Energy Savings

Exceptional Special Criteria Project Awards

- Excellence
- Green Step
- Guardian
- Low Carbon Solution
- Mobius
- Mover

Exceptional Project Category Criteria

Unique/Original Design And/Or Significant Technical Accomplishment

Excellence
(Process Innovation)

- Large Waste Reduction/Reuse
- Significant Yield Improvement (Quality, Process change)
- New Process/Design/Replicated in Other Aspects

Green Step
(R&D/Product Innovation)

- Reduction in emissions per unit of product (Lower Solvent Content/Reformulation)
- Working with customer to reduce waste (e.g. returns recycled)

Guardian
(Toxic Reduction)

- Reformulate to reduce Hazardous Air Pollutant (HAP) or Toxic Chemical content in product
- Substitute product component with Non- HAP or Toxic Chemical

Receive Special Recognition

Exceptional Project Category Criteria

Unique/Original Design And/Or Significant Technical Accomplishment

Low Carbon Solution
(Greenhouse Gas Reduction)

- Raw material substitution-Replace high Global Warming Potential (GWP)Material with lower greenhouse gas emitting GWP material
- Produce made with reduced energy related greenhouse gas emissions in manufacturing process and/or for a customer
- Life Cycle Management (LCM) Review completed

Mobius
(Packaging Reduction)

- Incorporate recycle/reuse benefits in product packaging
- Use waste materials from existing or other product in process
- Re-design/New design/New process of packaging to achieve reduction

Mover
(Transportation /Distribution Reduction)

- Significant improvement in product distribution/transportation
- Process consolidation to reduce/elimination transportation steps
- Local sourcing to reduce transportation to manufacturing and/or customer

Receive Special Recognition

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 (Meet one of special criteria)
    - Plaque or recycled glass tile coordinated with 3P Administrator
- Annual Special Awards to Division / Country
  - Project of the Year (for each Exceptional Project category) – Plaque
  - Most % Increase in Pollution Prevention (Division and Country) – Plaque
  - Joe Ling Award (Best Project of the Year) – Harvest Plaque Award

Examples - Excellence Project
(Environmental Process Innovation)

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

Examples - Green Step Project
(Environmental R&D/Product Innovation)

Incorporating "Green" in Design

- **PROJECT**: 3M Center, Home Care R&D - Fur Fighter™ Upholstery "Ninja" Project (2011)

- **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.

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

- **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)

Examples - Guardian Project
(Toxicity Reduction)

Solvent and Hazardous Air Pollutant Elimination

- **PROJECT**: 3M Perth, Canada - Filament Tape Solvent Usage Reduction (2010)

- **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

Examples - Low Carbon Solution Project
(Greenhouse Gas Reduction)

Significant Reduction in Greenhouse Gases

- **PROJECT**: 3M Cordova, Illinois - Improved Novec™ 1230 Cell Run Yield (2011)

- **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 CO_2^e)

Examples - Mobius Project
(Packaging Reduction)

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

Examples - Mover Project
(Distribution/Transportation Reduction)

Increase Storage Capacity/Reduce Needed Transportation

- **PROJECT**: 3M Sumare, Brazil - Storage Capacity Increase in Warehouse 22 (Year 2010)

- **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:
21,853 Metric Tons
(greenhouse gases)

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

Thank you!

Carlo Müller
Supply Chain Leader
Head of Engineering Manufacturing Logistics & Sourcing