

# Green Chemistry and Sustainable Innovation

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Procter & Gamble  
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*P&G*

# *Procter & Gamble*



## **Statement of Purpose**

“Provide products of superior quality and value that improve the lives of the world’s consumers, now and for generations to come”

# The Consumer is Boss



**For the Boss,  
safety is a vital “ingredient”  
in product performance and value**

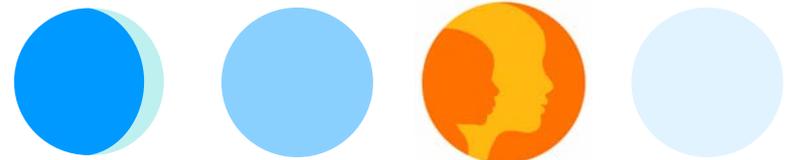


# Product Safety — A Business Must

## *Company Policy*

“Ensure that our products, packaging and operations are safe for our employees, consumers and the environment and comply with all applicable regulations.”

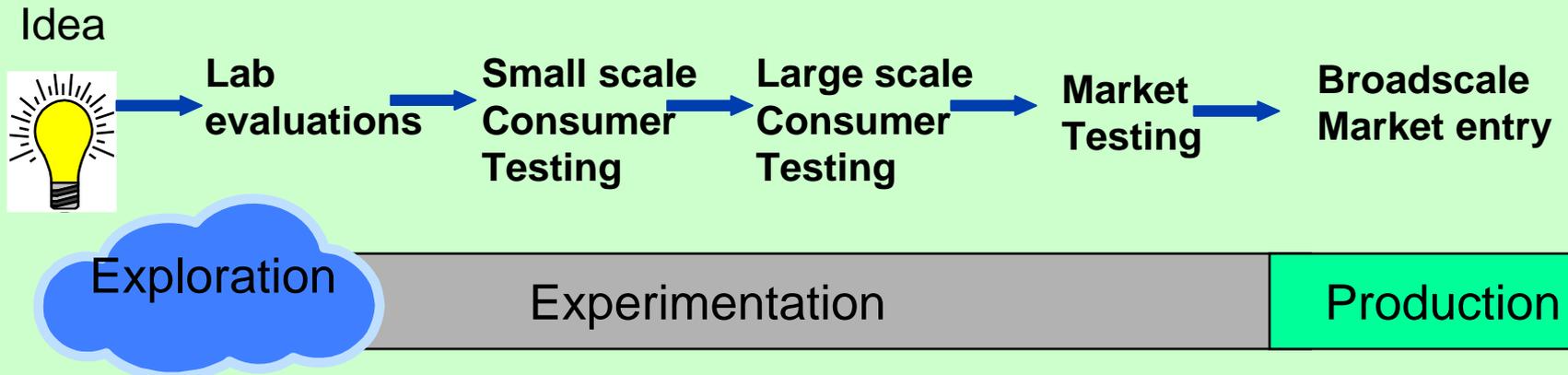
*- P&G Worldwide Business Conduct Manual*





# Designing Safety In—*Right from the Start*

## Product Development



## Safety Evaluation



**> 500 Human, Environmental, Regulatory Scientists**

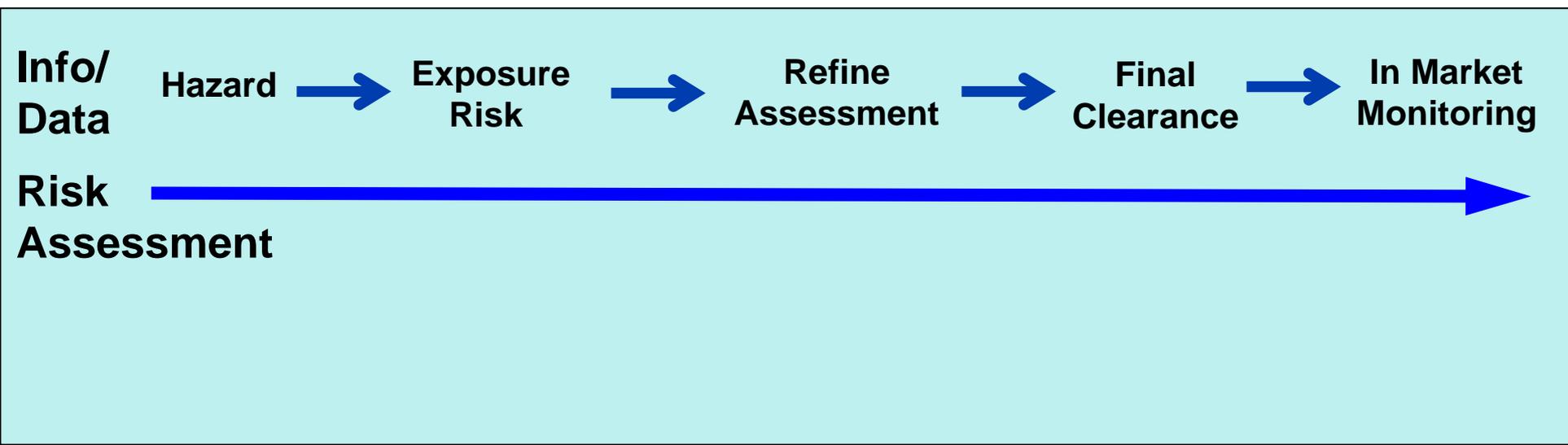
***Every Ingredient, Every Package, Every Product***

# Risk Assessment

## Principle

- A chemical is not safe or unsafe
- It's the use and exposure of a chemical that can be judged as safe or unsafe

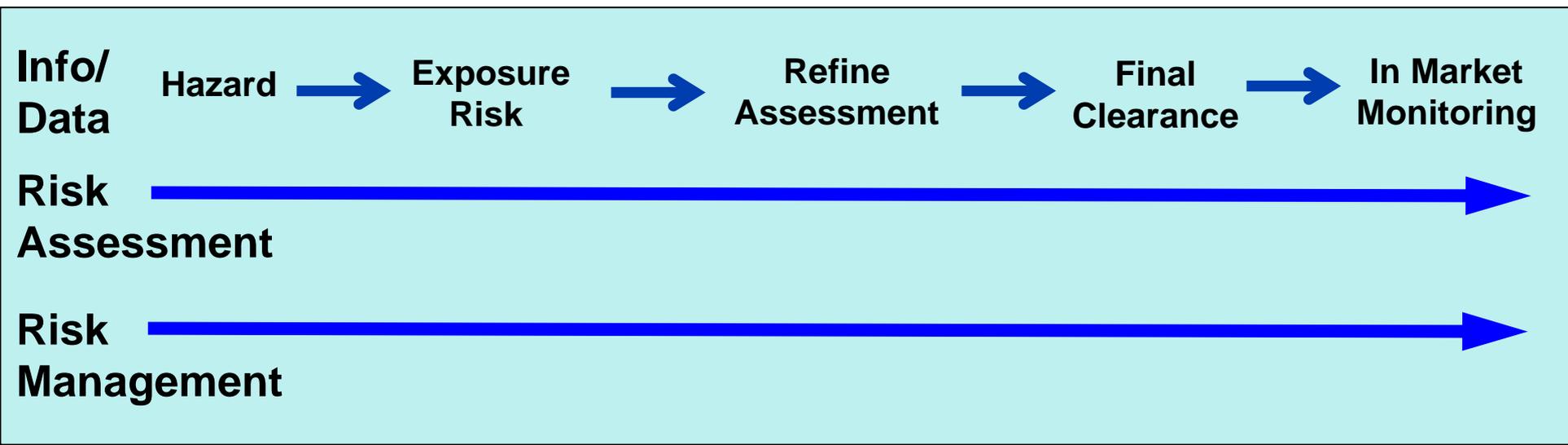
## Safety Evaluation



# Risk Management

- reduce uncertainty (e.g. generate more data)
- reduce exposure
  - lower product concentration
  - special packaging
  - use instructions/precautionary labeling
- substitute for substance
- abandon substance company-wide
- re-evaluate and take action based on new information

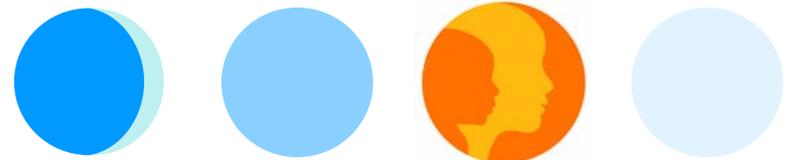
## Safety Evaluation



# Avoidance and Vigilance— Reducing Risks

**Examples: Avoiding, eliminating or reducing uses  
of:**

- Nonylphenol ethoxylates
- Nitromusks
- Cyclotetrasiloxane
- Geranyl nitrile
- Diethanolamine
- Dibutyl, Diethylhexyl phthalate
- DTDMAC / non-biodegradable quaternary amines
- .....



# Importance of “Informed Substitution”

Informed substitution – considered transition from a chemical of particular concern to safer chemicals or non-chemical alternatives when it:

- Is technically feasible
- Improves health and environmental safety profile
- Maintains or improves cost, performance, economic/social considerations, and
- Has the potential for lasting change.



# Increasing Transparency—Sharing P&G Science and Safety Information

- Our Commitment - Product Safety

- Corporate Portal

[www.pg.com/product\\_safety](http://www.pg.com/product_safety)

- Science in the Box

- Laundry and cleaning products
- 20,000 visitors/month
- Working to add North American brands

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

- Science of Beauty

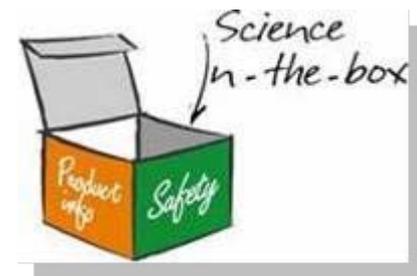
- Pilot launched 12/04
- Pantene, Olay; 5,000 visitors/month
- Working to add additional brands

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

- P&G Perspectives

- Editorial views on policy & emerging issues
- Target audiences: authorities, activist groups, scientists, other influencers

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



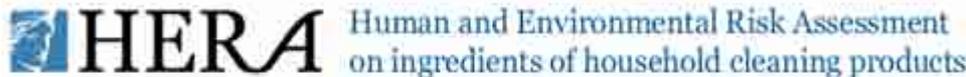
# Collaboration

## Work with suppliers, competitors and retailers via trade associations

- Share best safety practices
- Develop/share risk assessments
- Work with stakeholders
- Engage in local, regional and global chemical policy discussions

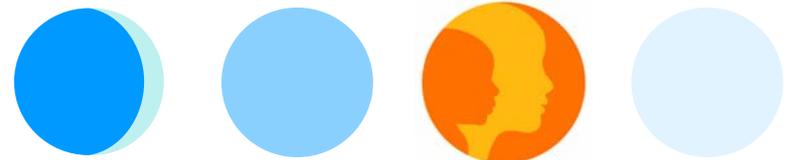


The Association of Food, Beverage and Consumer Products Companies



# Key Elements—P&G Product Safety and Sustainability

- Company-wide policies on product safety and sustainability
- Pre-market, science-based assessment of product safety
- **Innovation: product performance, value, environmental quality**
- Rigorous control of production from raw material specifications, to formulation management, to process and quality control.
- Safe operations that protect the health and environment of employees and the surrounding community
- Compliance with all applicable product safety, labeling regulatory requirements, including transportation, waste mgt., product disposal.
- Transparency in communicating safety and sustainability information
- Constant vigilance: post market surveillance and rapid response
- Industry involvement and leadership in safety and sustainability
- Ongoing assessment and improvement of systems performance





# Sustainable Innovation

Green Chemistry Innovation for Sustainability

# Sustainability

Ensuring a better quality of life for everyone, now and for generations to come



# Sustainability

## Environmental Protection

- Investing in the environment

## Social Responsibility

- Investing in people

## Economic Development

- Investing in communities





# Sustainable Innovation

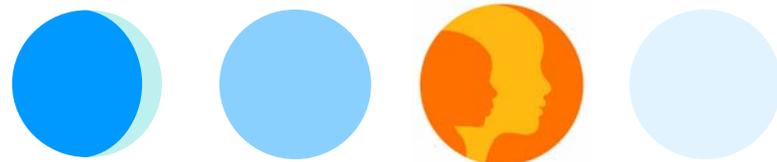
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## Green Chemistry

- Improve safety profile
- Perform better
- Conserve resources
- Lower cost to consumers

# Sustainable Innovation: Inventing Technologies that Improve Environmental Quality

<b>Old Technology</b>	<b>Replacement Technology</b>	<b>Why change?</b>
ABS	LAS	Anionic surfactant Foaming in rivers/improved biodeg profile
DTDMAC	DEEDMAC	Fabric softener active Non-biodegradable to biodegradable
APE	AE	Nonionic surfactant Marginal to complete biodeg/tox/ED issues
Anionic surfactants	HSAS	Anionic surfactants with superb environmental pedigree replaced; cold water wash need
EDTA	EDDS	Non biodegradable to biodegradable chelator



# Sustainable Innovation: Inventing Technologies that Improve Environmental Quality

**Old Technology**      **Replacement Technology**

ABS

LAS

DTDMAC

DEEDMAC

APE

AE

Anionic surfactants

HSAS

EDTA

EDDS

**Outcomes**

Improved environmental profiles based on fate and effects properties led to commercialization or enlightened technology guidance (use/don't use)

In all cases, environmental risk assessment processes were key to the decision

All these technologies were P&G developed or directed by us thru suppliers



Sustainable Innovation...

Green Chemistry

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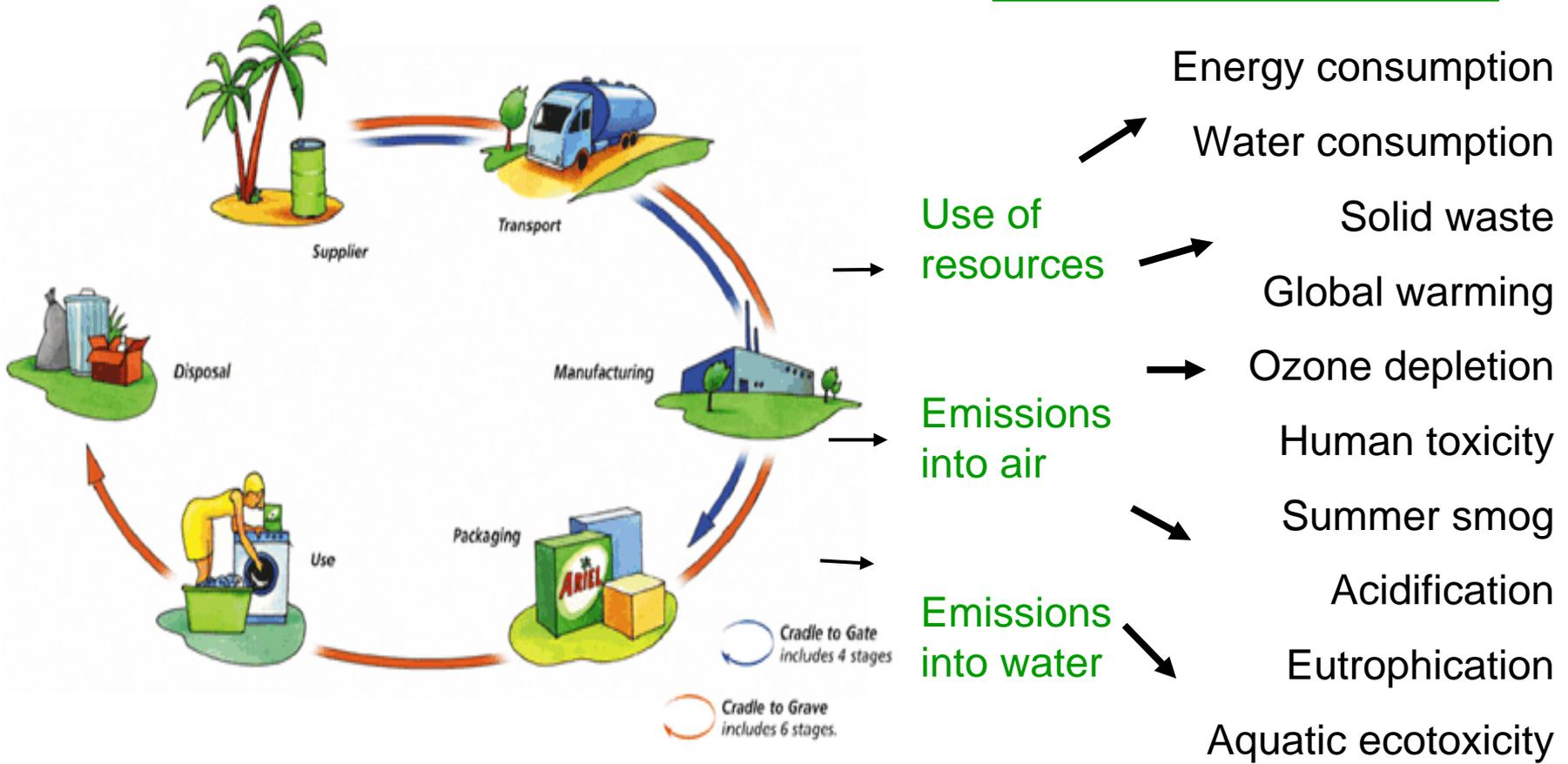
is more than

Toxicity Reduction

# Life Cycle Assessment (LCA)

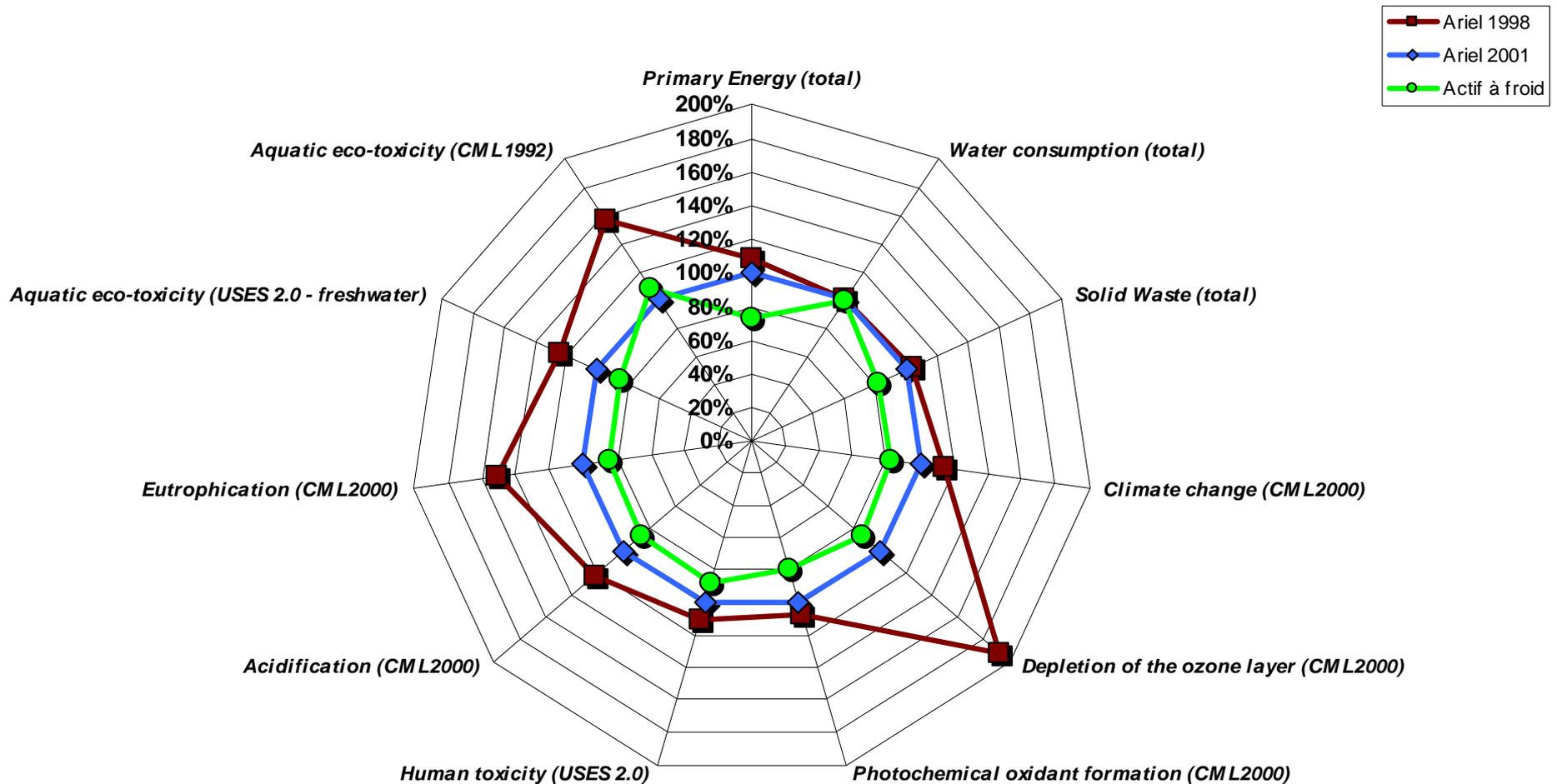
Tool to assess env. impact of technologies and products through their entire life cycle

Covers a variety of environmental indicators



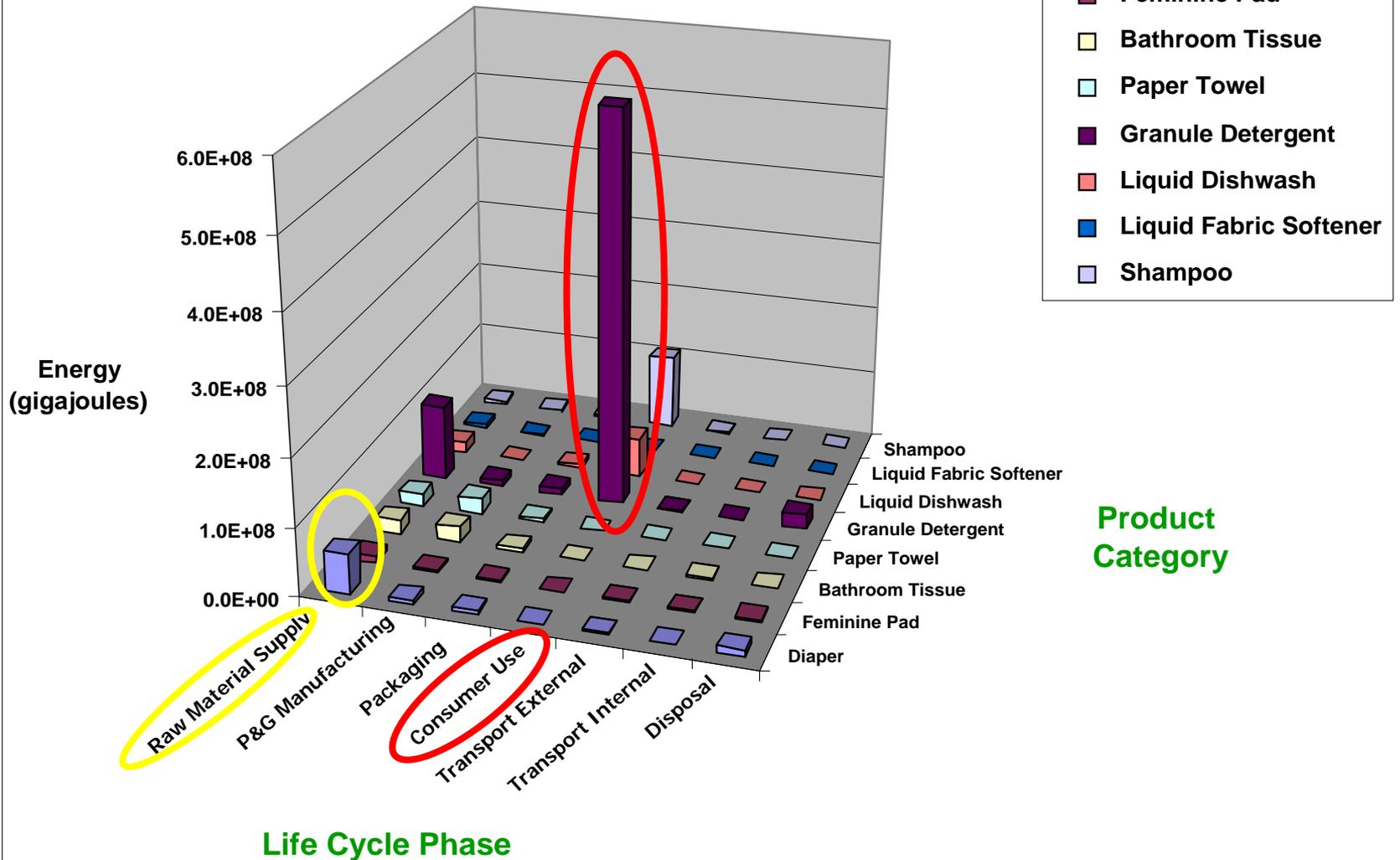
# Comparative LCA Footprint of Laundry Detergents

Laundry detergent - France - Environmental fingerprint



# Energy Use across Life Cycle Phases

Overview of Energy Footprint For Selected Products



# Sustainable Innovation

## Tide Coldwater

### Results

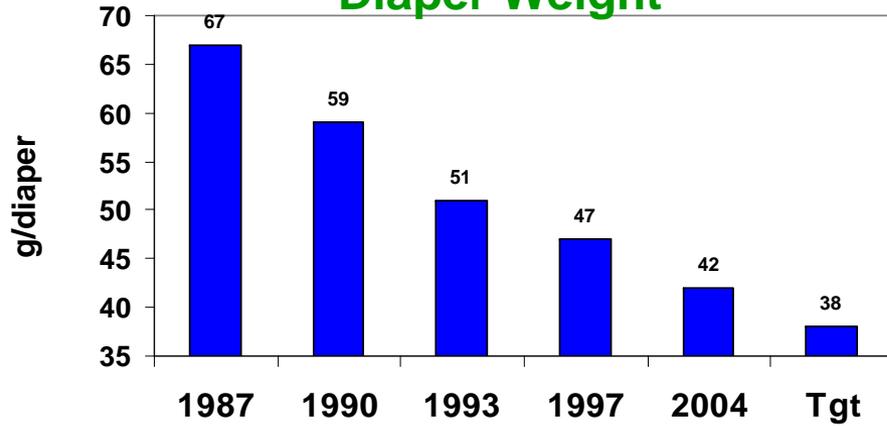
- Invented Tide Coldwater formula, reducing consumer energy use to heat wash water.
- Same great performance as regular Tide
- Up to \$63 / year energy savings for the consumer
- 6% of US Kyoto protocol target if everyone washed in cold water



# Sustainable Innovation

## Pampers

### Diaper Weight

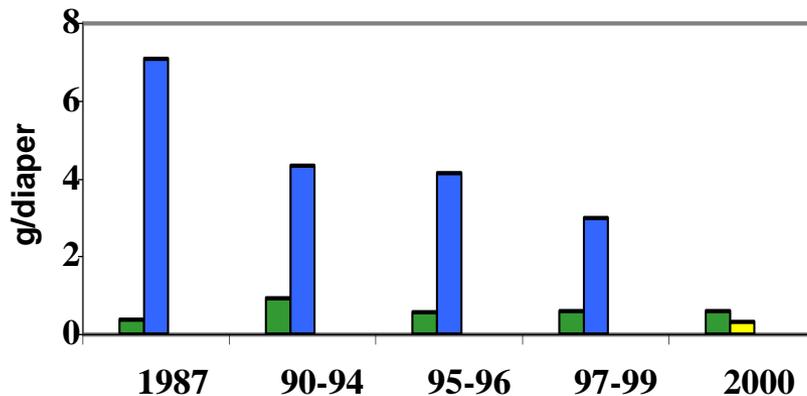


### More from Less

**35% reduction in diaper weight since 1987** due to design and technology improvements



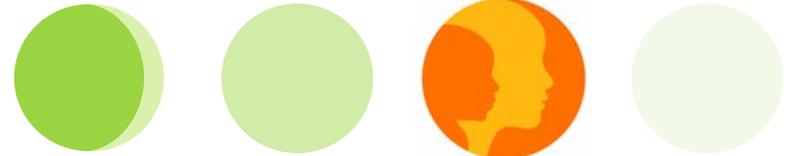
### Packaging Weights



- Cardboard secondary
- PE plastics primary
- PE plastics secondary

### 80% reduction in packaging weight

- Raw Materials - down 33,000 tons
- Energy- down 354,000 GJ
- Water - down 300,000 m<sup>3</sup>



# Sustainable Innovation

## 2X Ultra: Laundry Compaction

### Benefits

- 35% less packaging
- 44% less water in product
- 15% less energy to make, pack & ship

### Annual savings

- Up to 33,000 tonnes of solid waste
- > 800 million kWh
- > 170,000 tonnes of CO<sub>2</sub>
- > 150 million gallons of water



# Sustainable Innovation

## Charmin Mega Roll



144 million fewer cores



85,000 fewer gallons of diesel fuel



501,000 lbs. less film in landfills





# The Consumer





WOULD  
YOU PURCHASE  
GREEN  
PRODUCTS?

YES!

LIAR

# Consumers Do Not Expect to:

- Pay more for environmentally friendly products
- Give up any performance benefits
- Experience any added inconveniences



# Consumers

- Their expectation is our Sustainable Innovation challenge



# Sustainable Innovation

## Social Responsibility

Improve quality of life,  
especially for those  
who need it most

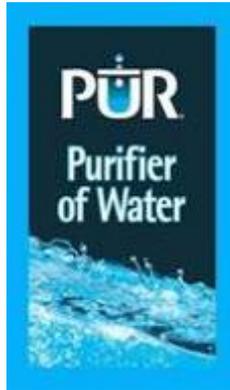


**Children's Safe  
Drinking Water**

*P&G* Live, Learn and Thrive Initiative.

# Sustainable Innovation

## PuR Purifier of Water



Reverse engineers municipal treatment using same ingredients

Robust removal of turbidity, parasites (>99.9%), viruses (>99.99%), and bacteria (>99.99999%)

Each sachet treats 10 liters

Production cost of \$0.035 per sachet



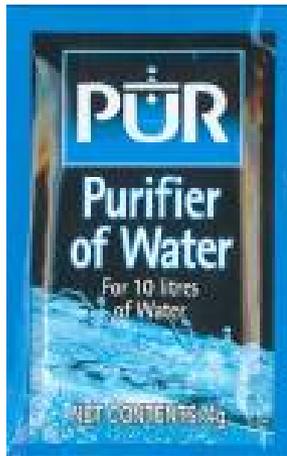
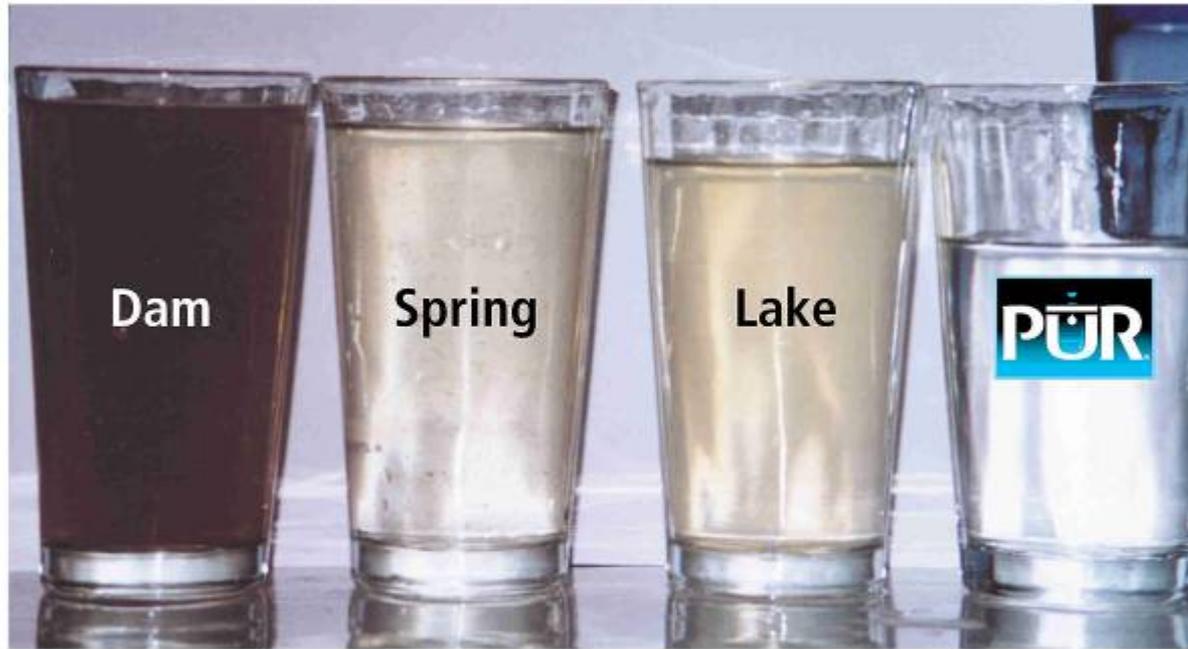
**Children's Safe  
Drinking Water**

PfG Live, Learn and Thrive Initiative.



# Kenyan Drinking Water Samples

Dam      Spring      Lake      Treated



Turbidity (NTU)

1850

55

37

1





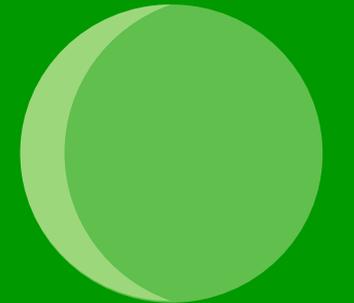
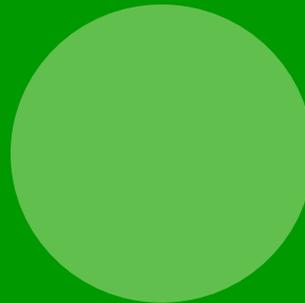
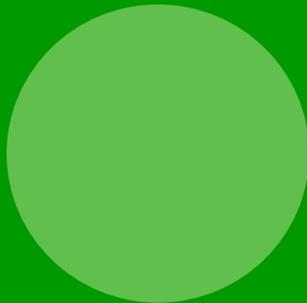
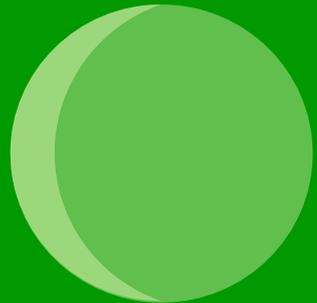
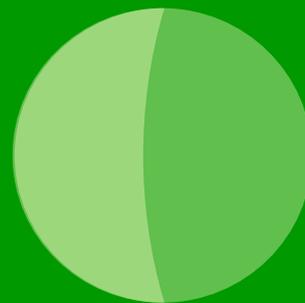
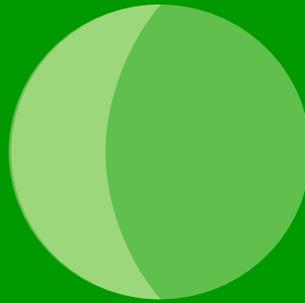
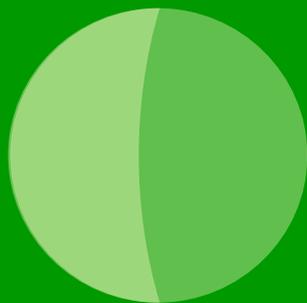
# Children's Safe Drinking Water

*P&G* Live, Learn and Thrive Initiative.

## Results so far:

- >500 million liters of safe water
- Programs in 13 countries
- > 20 partnerships
- Clinton Global Initiative





Touching lives, improving life. *P&G*™

