



STYRON[™]

Trends in resin markets and growth opportunities for Polystyrene

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Fast Facts



- Styron is a leading global materials company focused on Plastics, Rubber and Latex.
- Leader in our key products:
 - Among the largest producers of polystyrene globally.
 - #1 producer of styrene-butadiene latex globally. Supplier to more than 75% of new paper machine start-ups in the past 15 years.
 - A leading supplier of synthetic rubber in Europe.
- Part of Dow Chemical until 2010, Styron is now owned by Bain Capital
- 67 manufacturing plants at 20 manufacturing sites around the world
- 2,100 employees, based in 25 countries

Plastics Overview

Styron Plastics

	Polystyrene	ABS/SAN	PC / Compounds / Blends
Key Products	<ul style="list-style-type: none"> Polystyrene ("PS") Expandable Polystyrene ("EPS") 	<ul style="list-style-type: none"> Acrylonitrile -butadiene -styrene resins ("ABS") Styrene -acrylonitrile ("SAN") 	<ul style="list-style-type: none"> Polycarbonate resins ("PC") Compounds and blends ("C&B") Polypropylene ("PP") Ignition resistant polystyrene ("IRPS")
Brands	<ul style="list-style-type: none"> STYRON™ STYRON A -TECH™ SCONAPOR™ CO₂RE 	<ul style="list-style-type: none"> MAGNUM™ TYRIL™ 	<ul style="list-style-type: none"> CALIBRE™ INSPIRE™ EMERGE™ PULSE™ CELEX™ VELVEX™
Markets	<ul style="list-style-type: none"> Appliances Consumer electronics Packaging Building and construction 	<ul style="list-style-type: none"> Appliances Consumer goods Furniture Automotive and RV  	<ul style="list-style-type: none"> Appliances Consumer electronics Consumer goods Automotive Optical media Glazing and sheet 

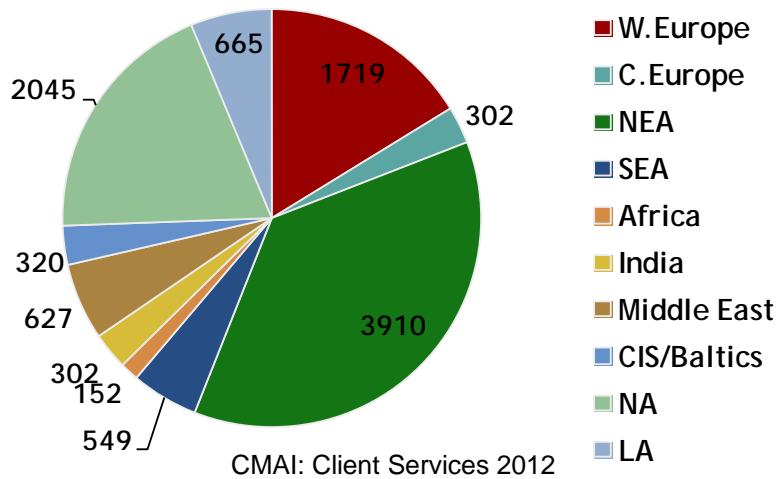
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Polystyrene history snapshot

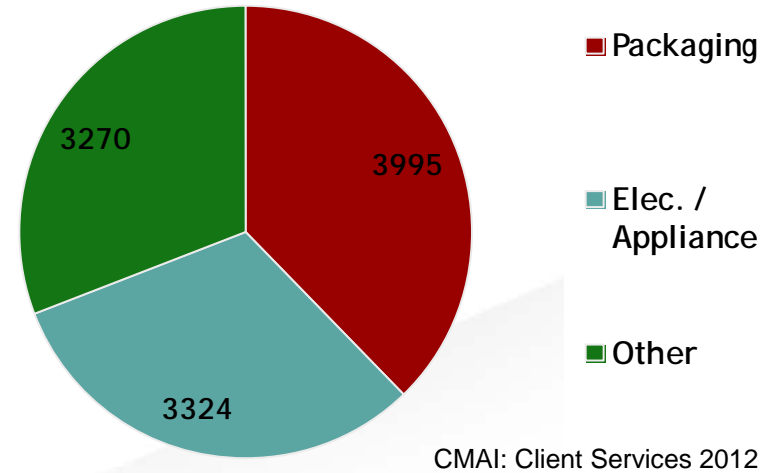
- First produced in 1930's by Dow and BASF
- Enjoyed huge growth from 1960-2000
- Supply grew in line with historical trend line
- Slow down in demand as of 2001 due to cost push and technology changes
- Supply reduced in line with demand
 - Asset closures in 2006 and 2009
- **New trends in plastics resins :**
 - **Will they create new opportunities and boost the demand for Polystyrene?**

Polystyrene - Market Overview

2011 Global Demand By Region: 10,589KT



2011 Polystyrene By Application: 10,589KT



Trends in Resin Markets

- 1 Energy Efficiency
- 2 Convenience
- 3 Material Substitution
- 4 Sustainability & Environmental Concerns



Trends in Resin Markets

1

Energy Efficiency

Opportunity for PS?

- For converters and Brand Owners:
 - Lightweight
 - Maximum efficiency in processing
 - Down gauging
 - Cost efficiency
- For Brand Owners:
 - Reduction of waste disposal tax

Styron offer

- Technology development

CORE[™]
FOAMING TECHNOLOGY

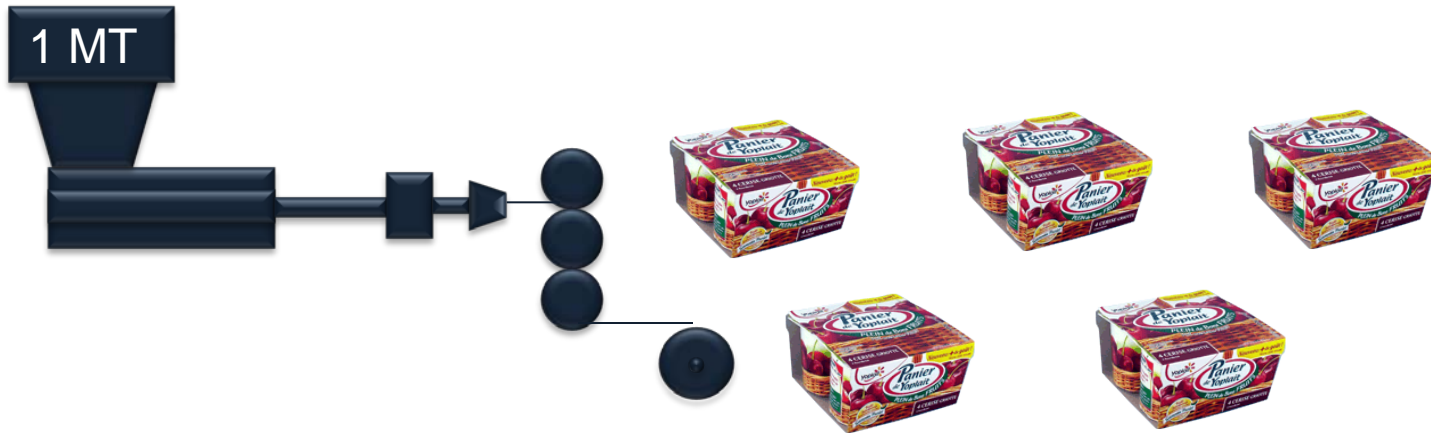
- New product innovations using Styron's leading rubber technology
- Change the end-consumer perception of Polystyrene

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Benefits for the Converter

Traditional FFS sheet



With CO2RE foaming technology



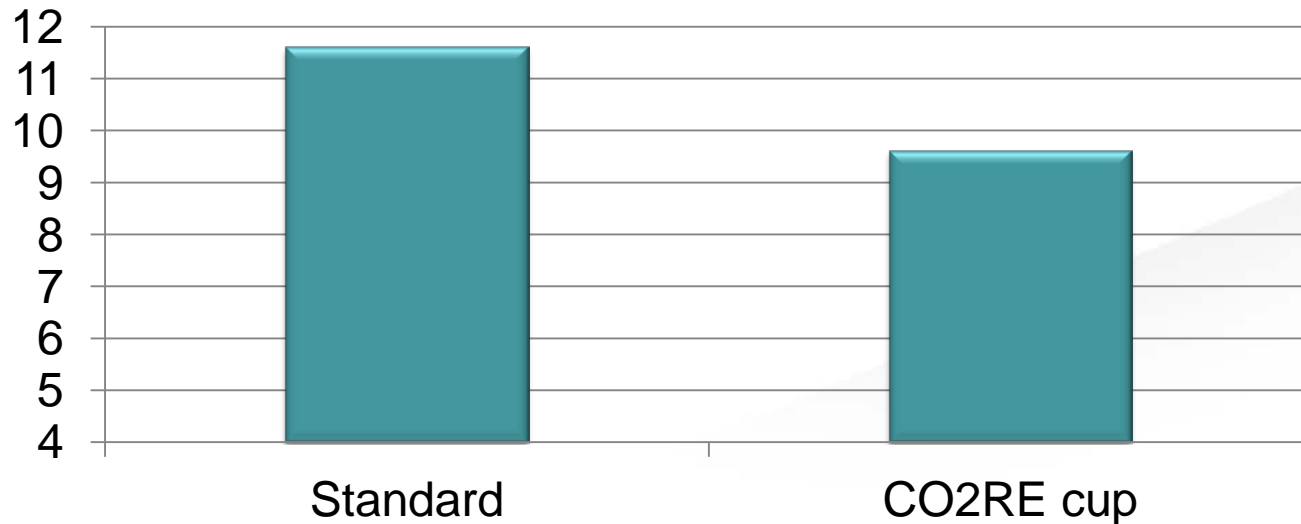
20% More!


STYRON™

Benefits for the Brand Owner

- Lower packaging waste disposal tax
- Reducing your CO₂ footprint for yoghurt containers by 17 %

CO₂ footprint for 1000 Form Fill Seal cups



Source: LCA Study by David Russell, Life Cycle Assessment expert, Dow Europe

Trends in Resin Markets

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Trends in Resin Markets

2 Convenience

Opportunity for PS?

- Supporting consumer trends

- Transparency
- O₂ permeability
- Stiffness
- Form Fill Seal

- Commercial issues

- How to reduce volatility in polymer prices and improve visibility?
- Is the PS pricing system in WE efficient?

Styron
offer

- Product innovations

- C-Tech for transparency
- Styron leading rubber technology

- Advocating change for Polystyrene Contract Pricing Settlement in Europe

- To bring greater transparency/clarity to the process
- To facilitate decision making for both buyers and sellers
- To allow for more predictable pricing

STYRON™ C-Tech, for great aesthetics

- A transparent High Impact Polystyrene (HIPS) for rigid food applications that require both toughness and clarity
- Response to growing consumer demand to preview purchases on the shelf
- Desired properties achieved through control of rubber morphology



Advocating change in EU PS pricing

Milestones achieved

- **March 16:** Appeal for improved process at the beginning of the month, effective as of May.
- **Mid-April:** More than 20 of Styron's key customers endorsed the proposal.
- **Mid-May:** Early pricing settlement of 90% of Styron's PS EMEA monthly business.

Moving forward

- Broader industry support to maintain early settlement process in June
- New process becomes established industry practice
- European Polystyrene pricing process in line with other regions and polymers

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Trends in Resin Markets

3

Material substitution

PET or PS for food pckg?

Comparing both materials

Features	PET	PS
Processing	290-330°C	200 – 240°C
Global Warming Potential	3.3- 2.2	3.2 (new EU data point is exp. near 2.0)
Intrinsic Value	22 MJ	42MJ
Typical output	32 cycles/min	40 cycles/min
Sustainability	Very recyclable	
thermoforming	sensitivities	easy

PS offer

PS good alternative

- Lower processing cost vs PET (extr.temp, cooling, drying...)
- GWP PS shows higher but new LCA study underway
- PS calorific value is 2X of PET
- Easier and faster processing of PS vs PET
- PET better reputation in sustainability.

Trends in Resin Markets

4

Sustainability & Environmental Concerns

- Negative perception about Plastics in general, but mainly Polystyrene
- Growing waste management concern

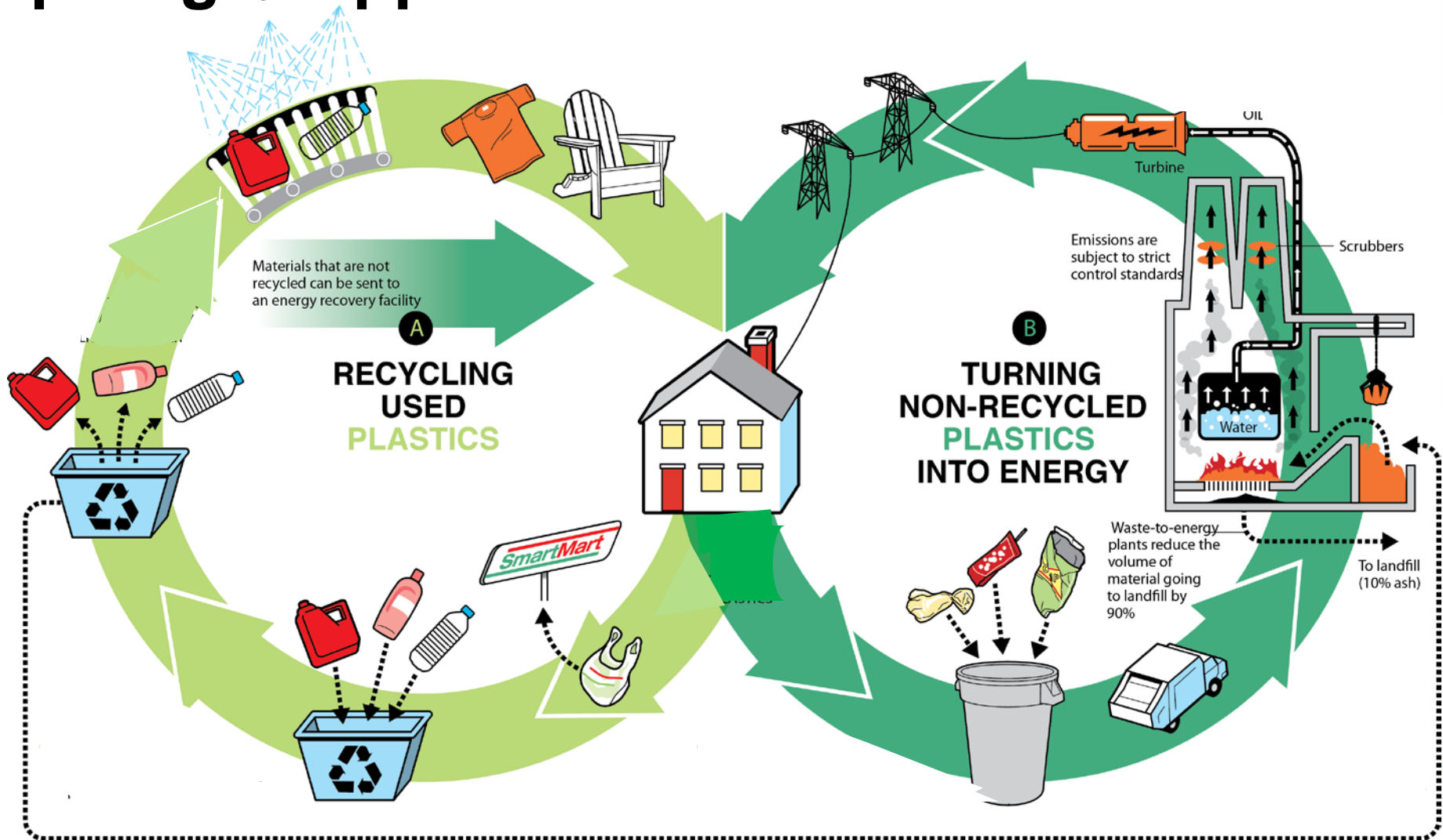
Opportunity for PS?

- Opportunity to change perceptions by sharing facts
- Highlight calorific value of PS as a resource for energy production
- Highlight recyclability of PS

New polystyrene-based (PS) bottle for popular product

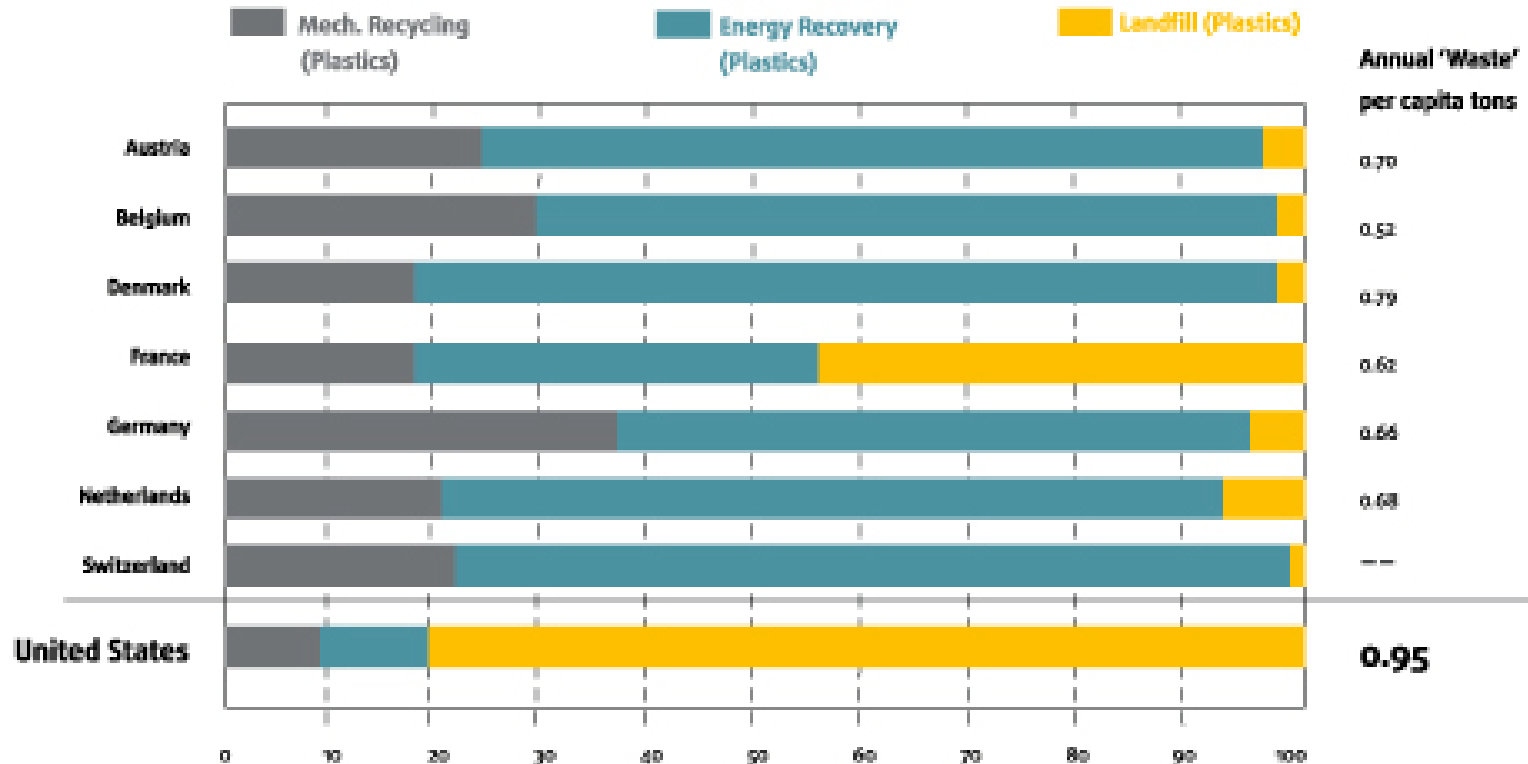
- Typical PET and HDPE-based bottle solutions were also considered by customer
- Styron's bottle technology suited both the foodstuff and production process far better than established product technologies
- Styron A-Tech 1200 is the preferred material and is used in the same bottle equipment

Diverting plastics from landfills: a two-pronged approach



Each country moving at its own pace

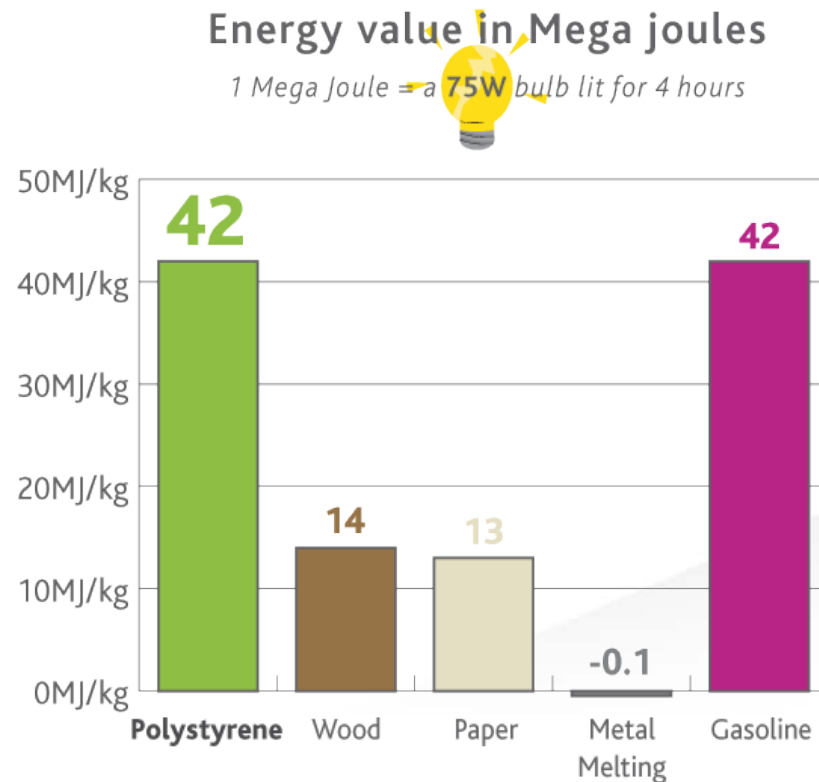
Recycling & Recovery in Europe



Sources: European Environmental Agency / Plastics Europe / U.S. EPA / CPA / Covanta Energy

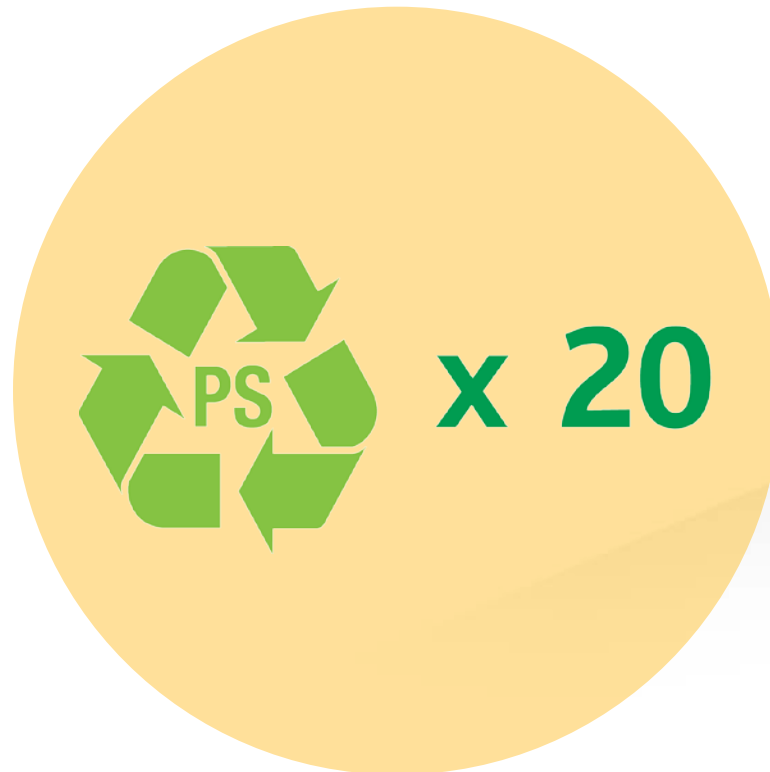
PS Owns an Amazing Energy Value

- PS supplies far greater heat and therefore energy during its combustion than wood, paper, & coal

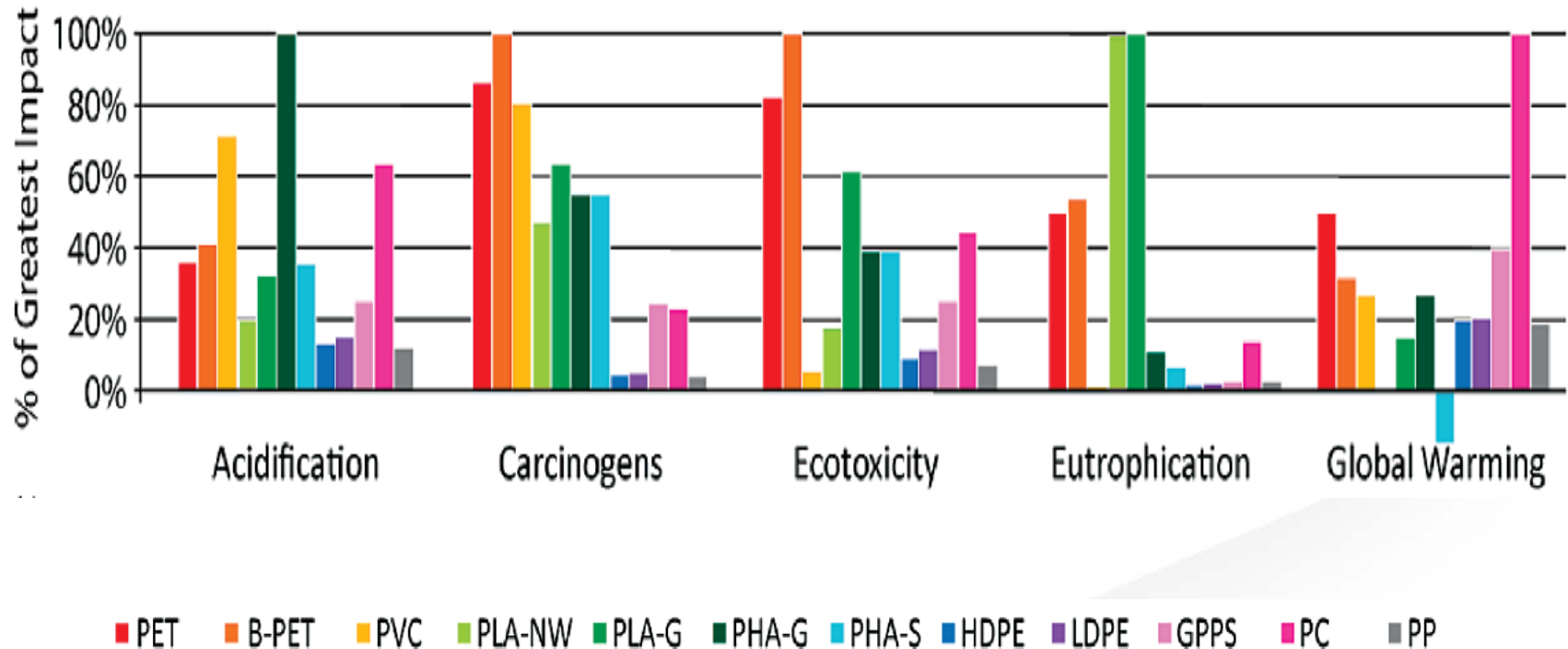


PS is a Very Easy Recyclable Plastic

- Up to 20 times recyclable without any damage of polystyrene physical properties



LCA data putting things into perspective



Mascaro Center for Sustainable Innovation, Department of Chemical Engineering, Department of Chemistry, Department of Civil and Environmental Engineering, University of Pittsburgh, Pittsburgh, Pennsylvania 15261 Received



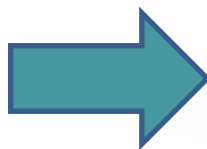
WHAT'S COMING

Polystyrene's future

Globally Polystyrene is a 10.5 MM MT market:

- Best in Class - Processing
- Best in Class - Foaming
- High Energy Recovery
- Oxygen Permeability = Food Freshness
- GPPS, HIPS, ESCR, Density,
- Rigid Thin Wall Applications
- Easily recycled > x 20
- Very Low Migration
- Over 50 years of food safety

- 1 Energy Efficiency
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TRENDS CREATE EXCITING OPPORTUNITIES FOR POLYSTYRENE IN BOTH EXISTING AND NEW APPLICATIONS

QUESTIONS?