

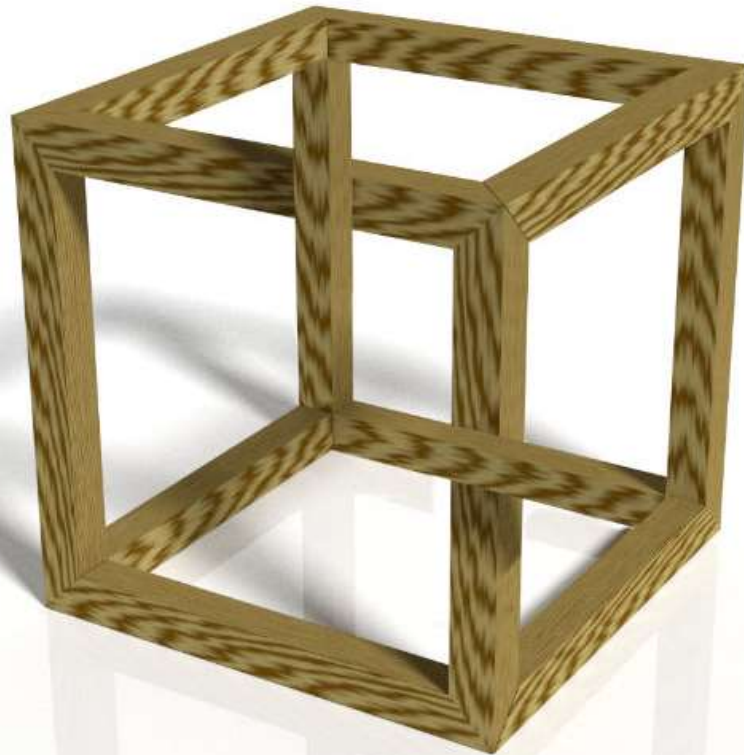
Forces Shaping Industry: *Shale and Sustainability Are Creating Change*



Mark Jones

*Executive External Strategy and Communications Fellow
The Dow Chemical Company*

3 November 2016







I Waste Time and Money At Home





I Waste Time and Money At Home

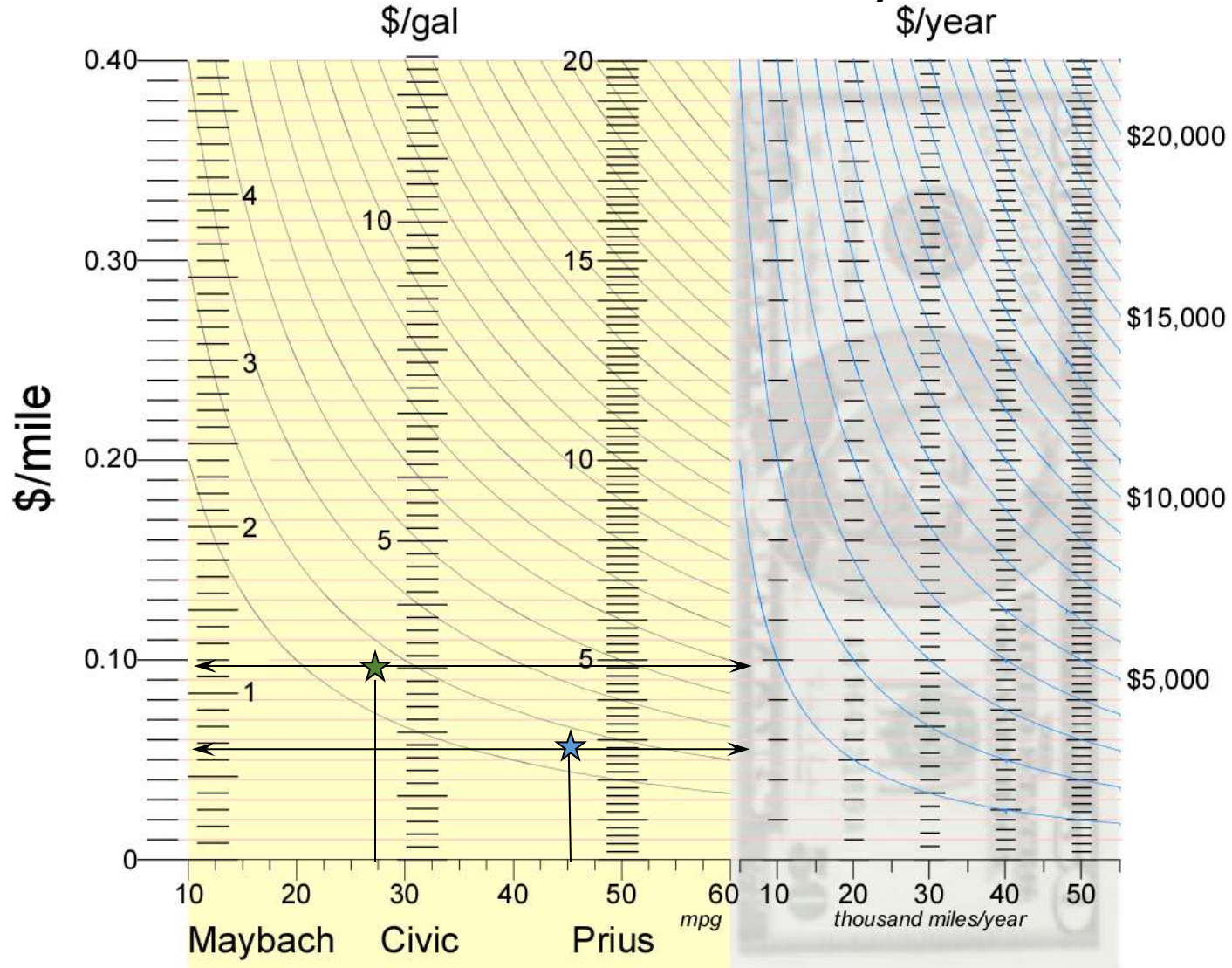


Energy
CERTIFIED

I Waste Time and Money At Home



I Waste Time and Money At Home



I AM DESTROYING THE
PLANET SLOWER
THAN YOU ARE.

BUT NOT AS
SLOWLY AS I
THOUGHT









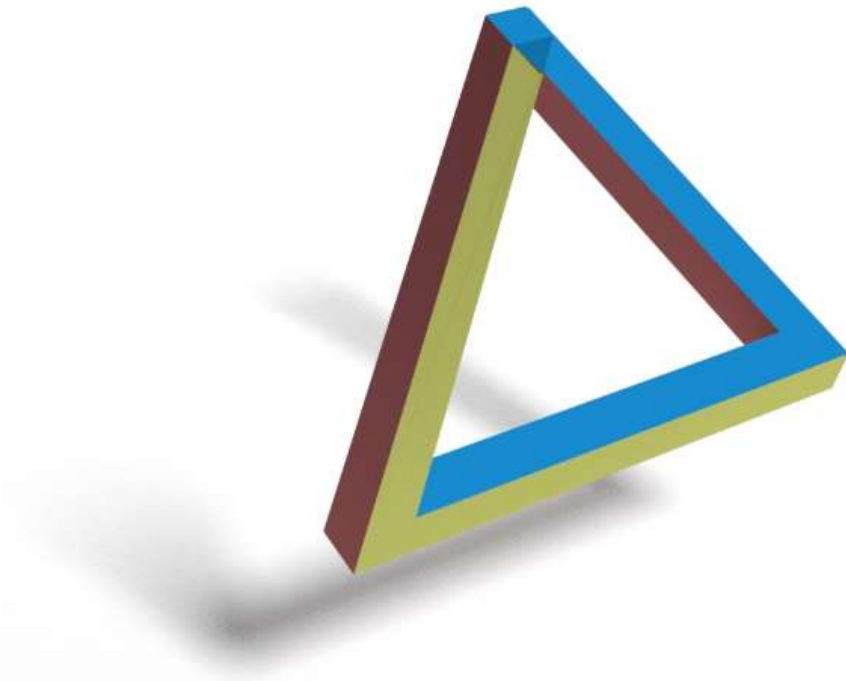












Which is more sustainable?

plastic



paper

Which is more sustainable?

streaming



physical media

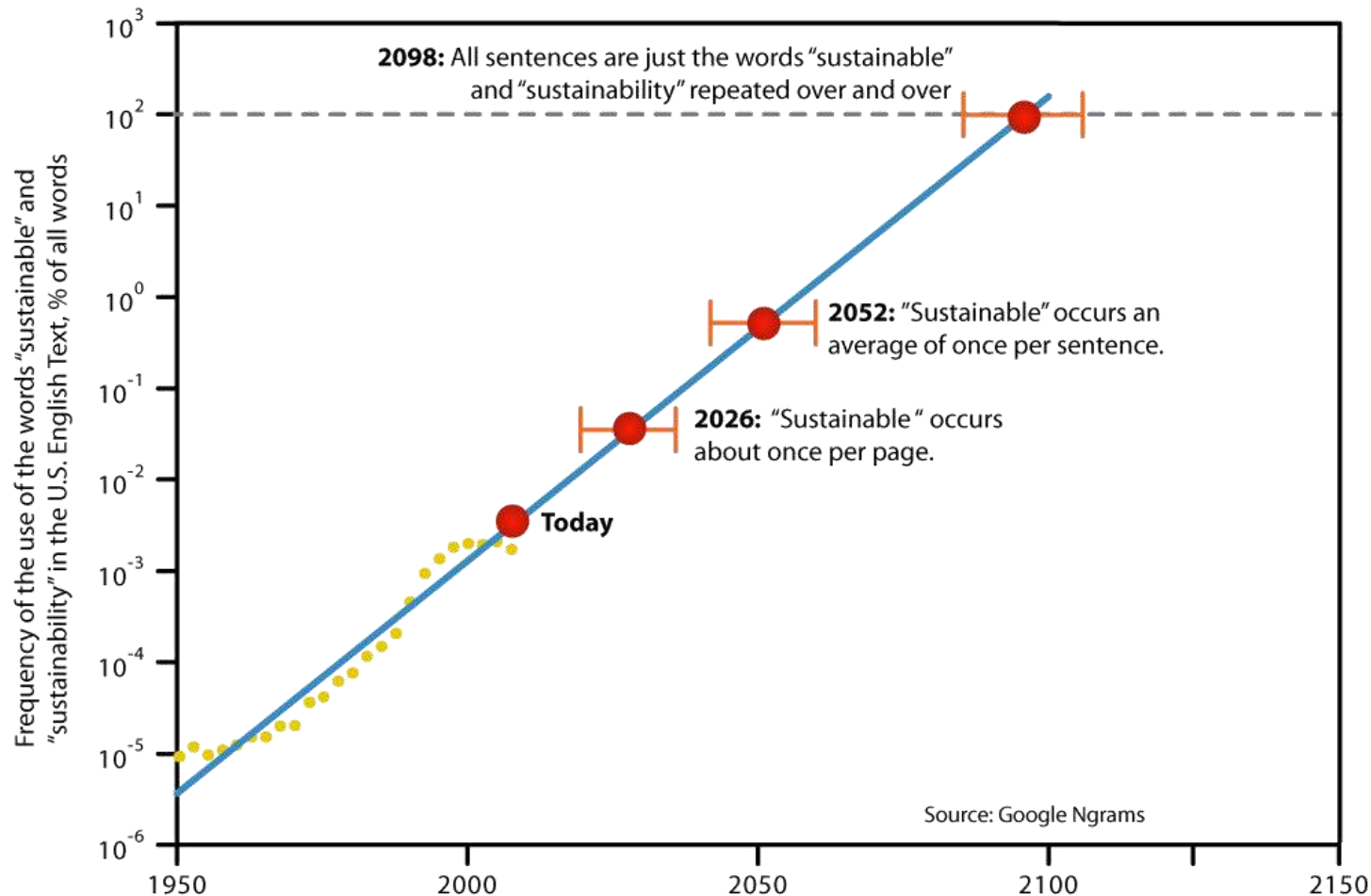
Which is more sustainable?

A meat-eater in a Prius



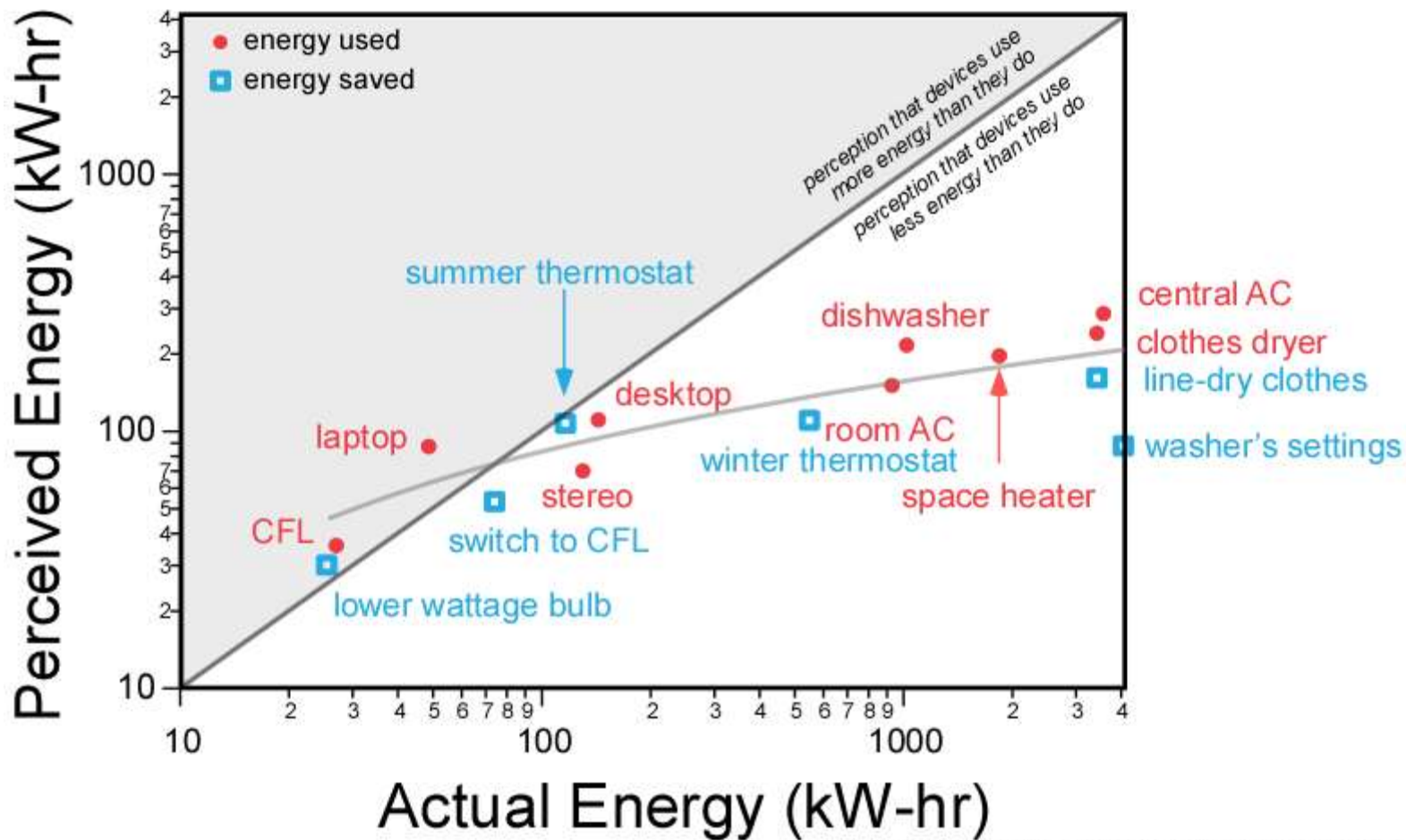
A vegan in a Hummer

Sustainability is Unsustainable?



<http://imgs.xkcd.com/comics/sustainable.png>

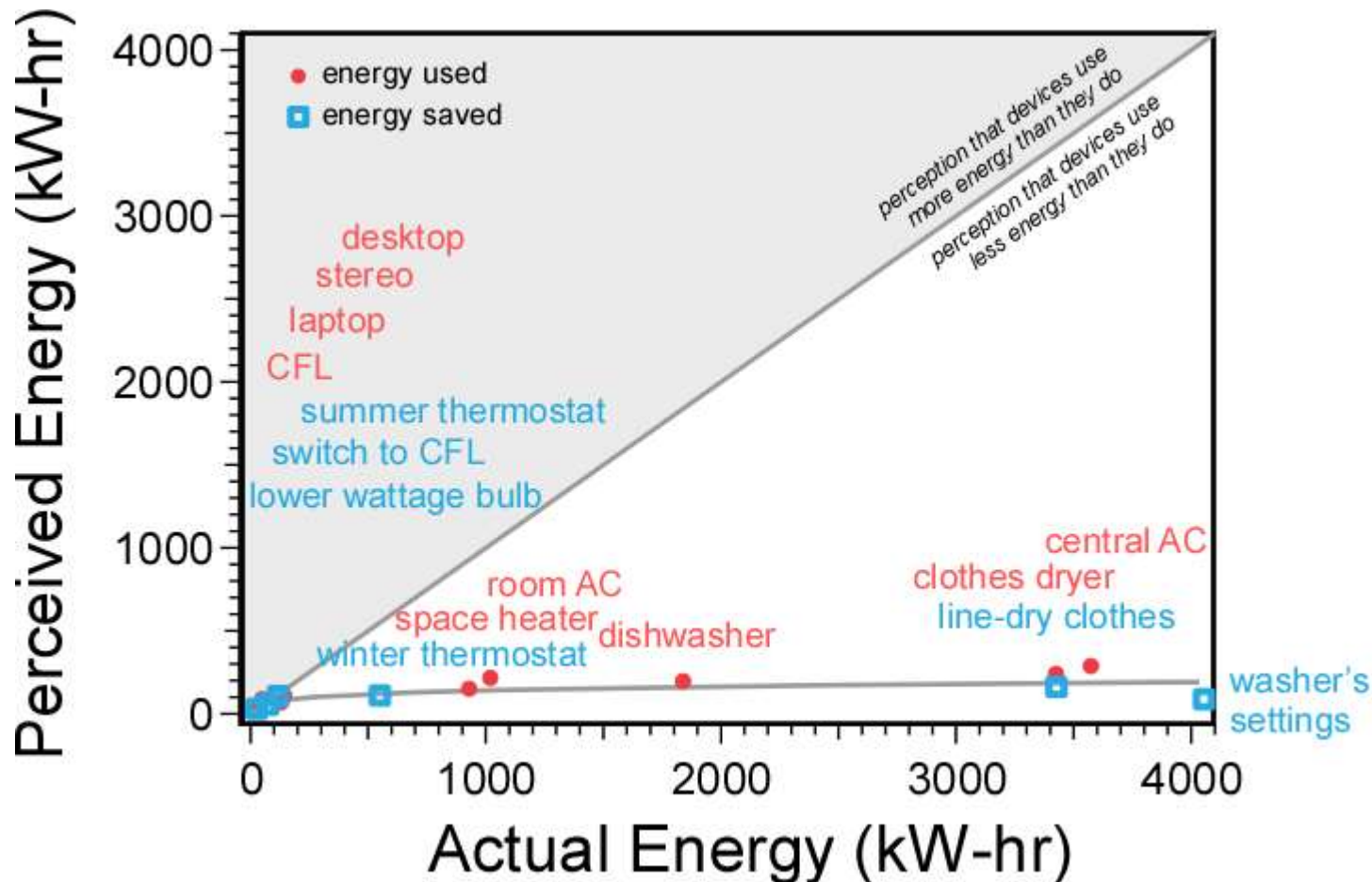
Perception vs Reality



Atari, Shahzeen; DeKay, Michael L.; Davidson, Cliff L.; de Bruin, Wandi Bruine; "Public perceptions of energy consumption", PNAS, www.pnas.org/cgi/doi/10.1073/pnas.1001509107.



Perception vs Reality



Altari, Shaltzreen; DeKay, Michael L.; Davidson, Cliff J.; de Bruin, Wandi Bruine; "Public perceptions of energy consumption", PNAS, www.pnas.org/cgi/doi/10.1073/pnas.1001509107.

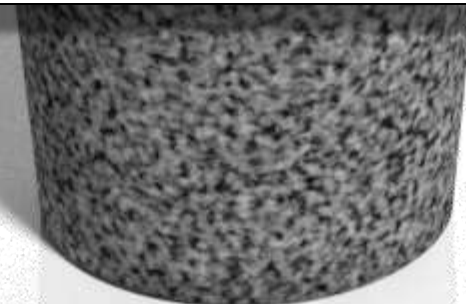




Is this Cup Sustainable?

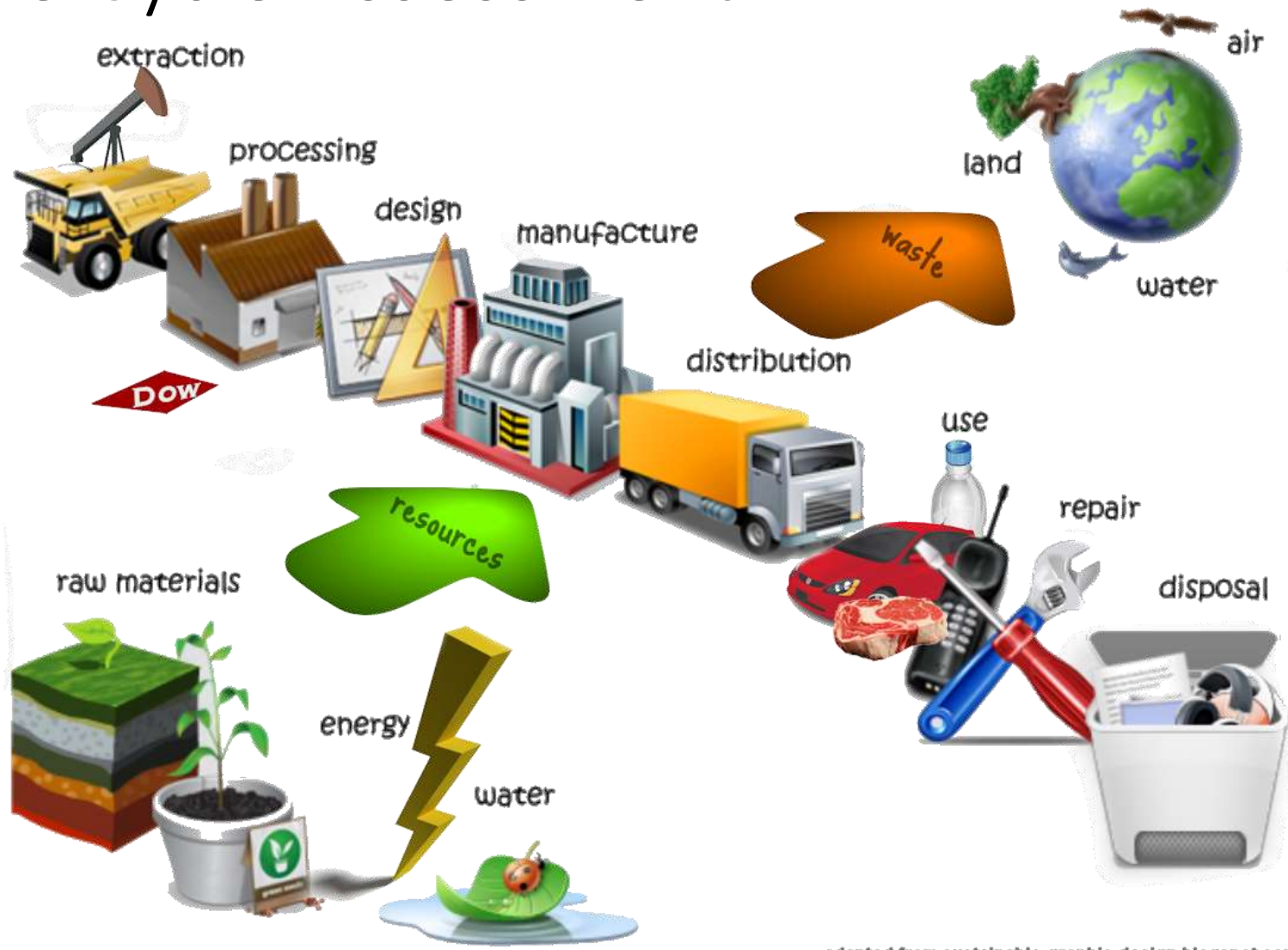


*Sustainable is not an intrinsic property of a material!
You can't know by just looking.*



How about this one?

Life Cycle Assessment



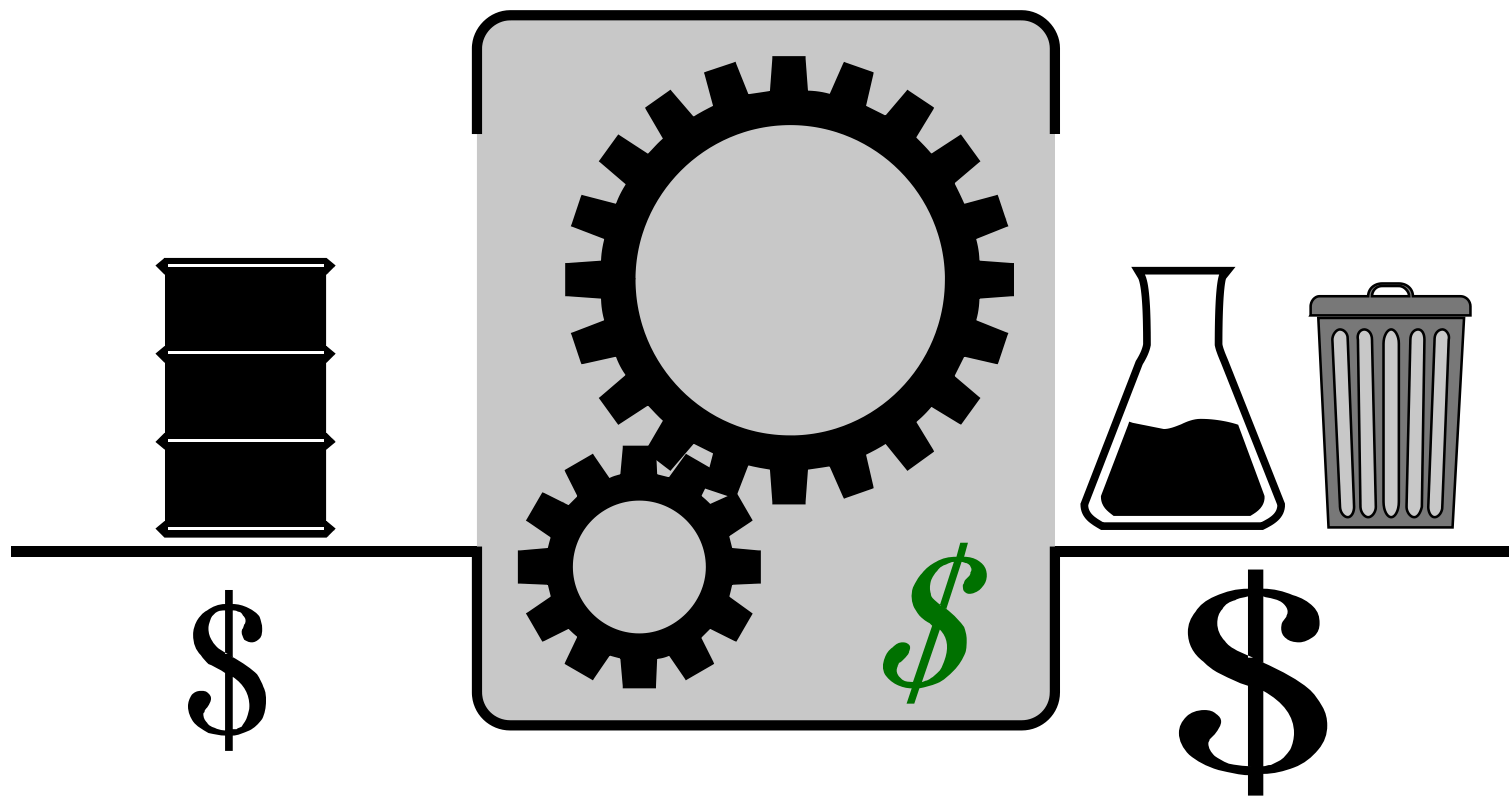
adapted from sustainable-graphic-design.blogspot.com



Signs of Hope



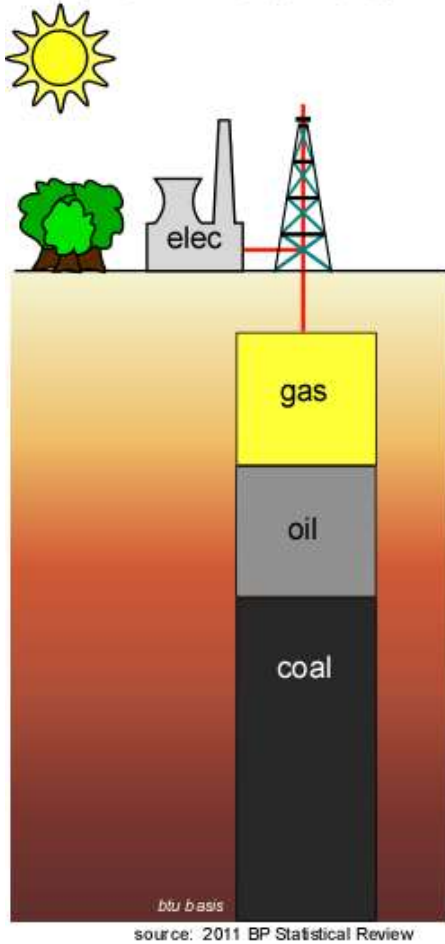
Chemical Industry - *simplified*



Birth of the Modern Industry



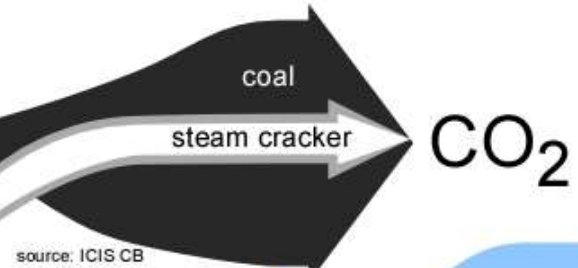
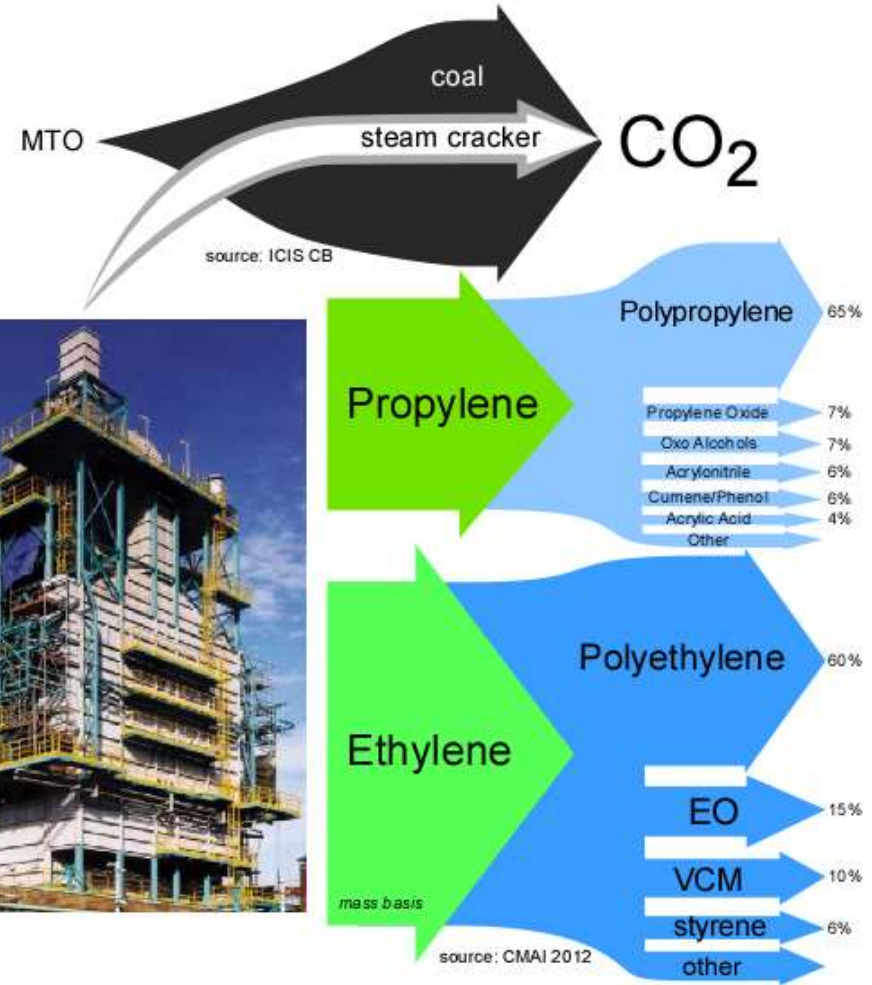
Raw Materials



Cracker



Products



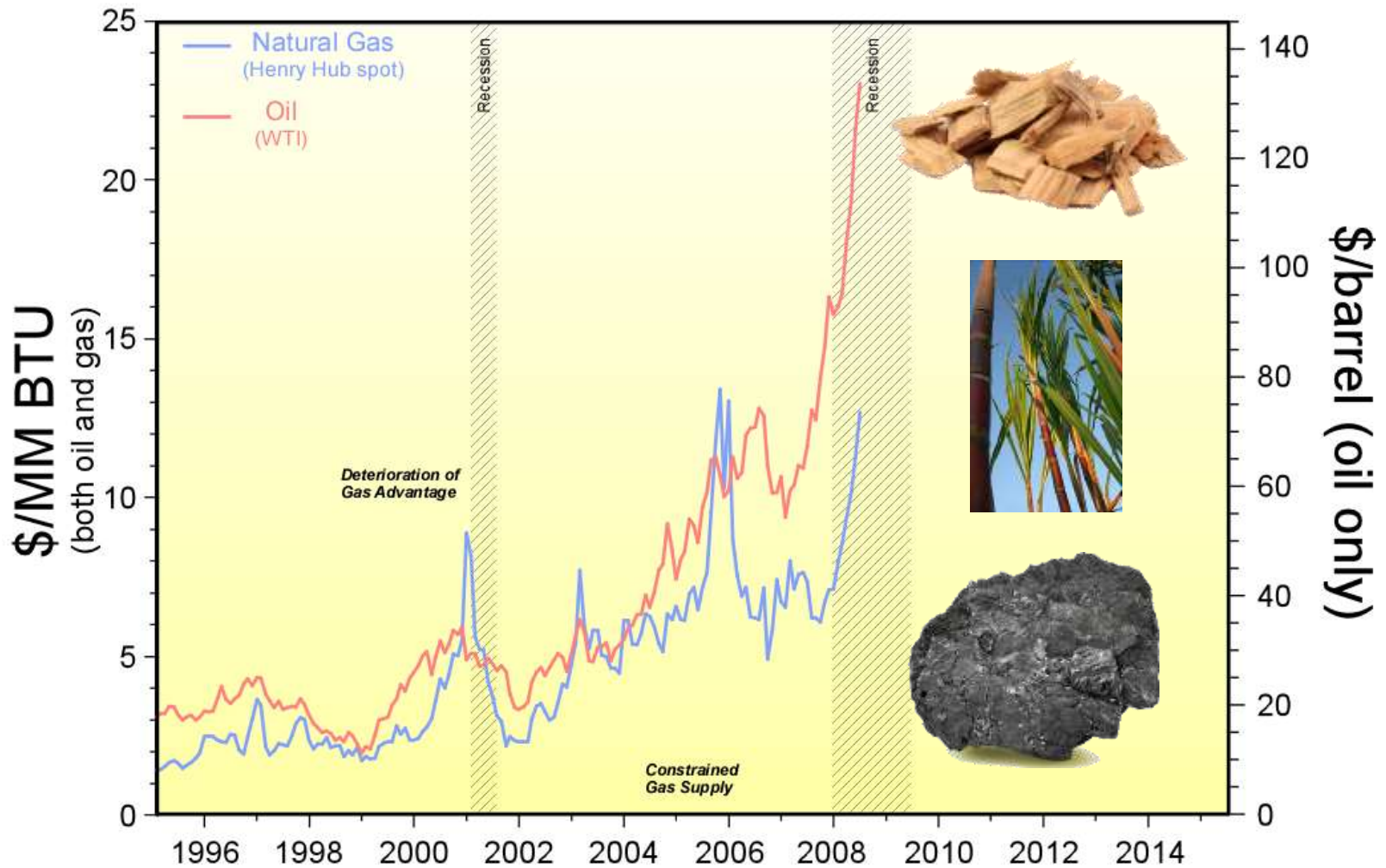
Polyolefin Growth



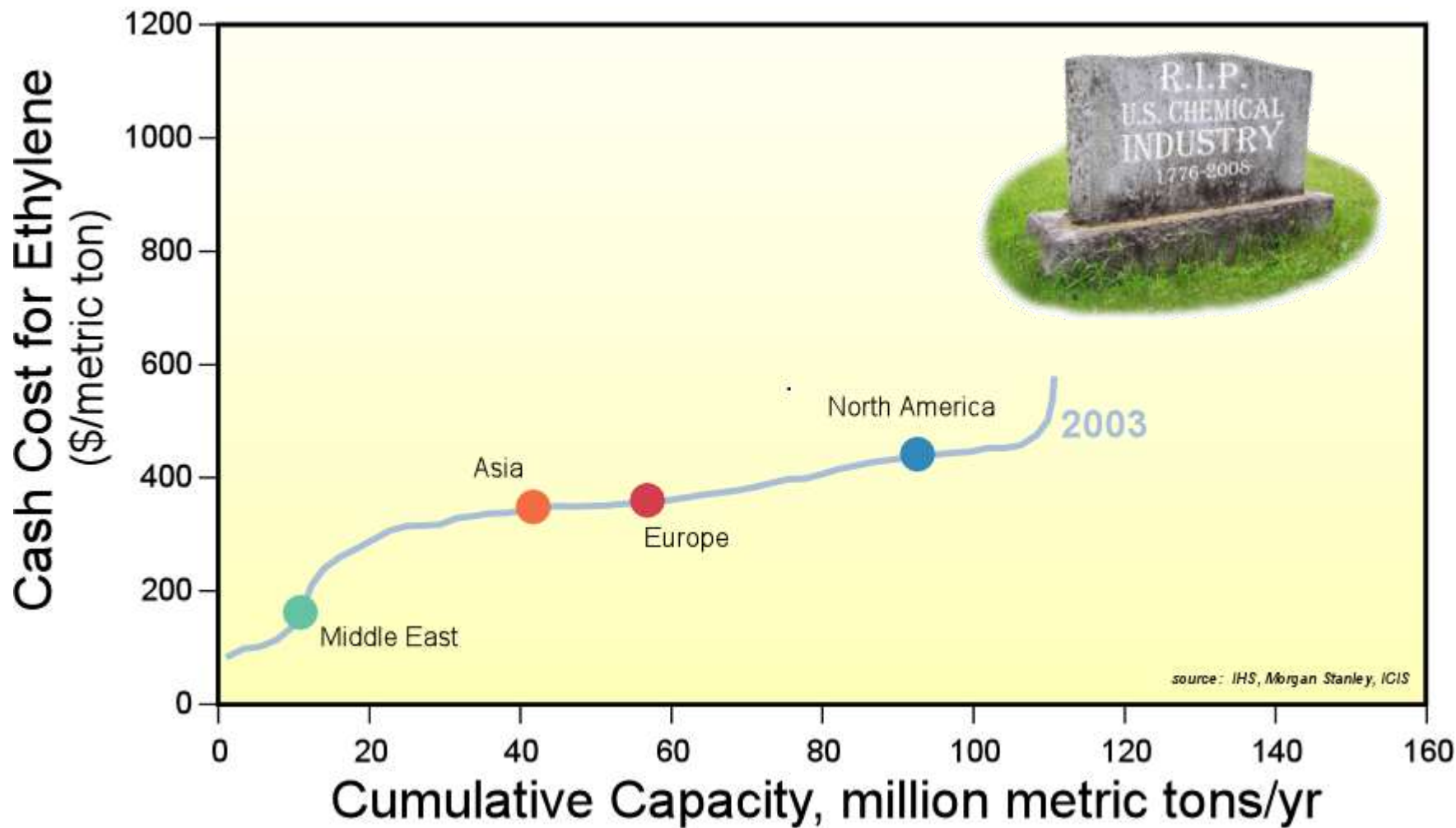
Healthy

Unhealthy

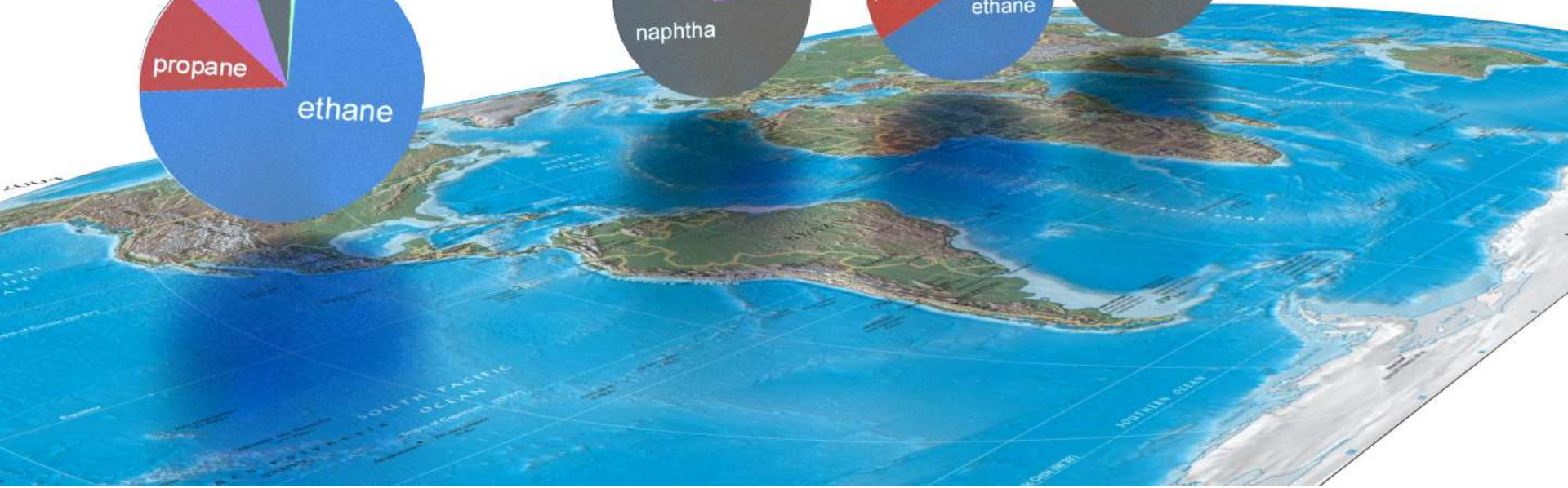
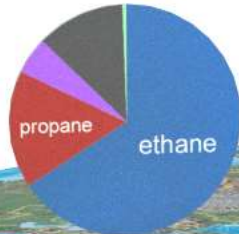
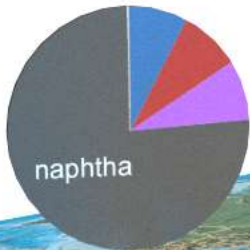
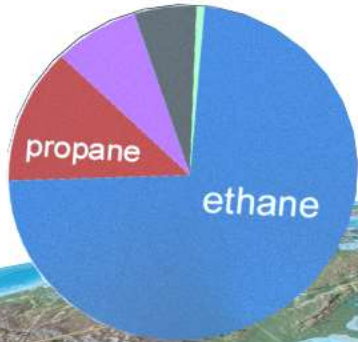


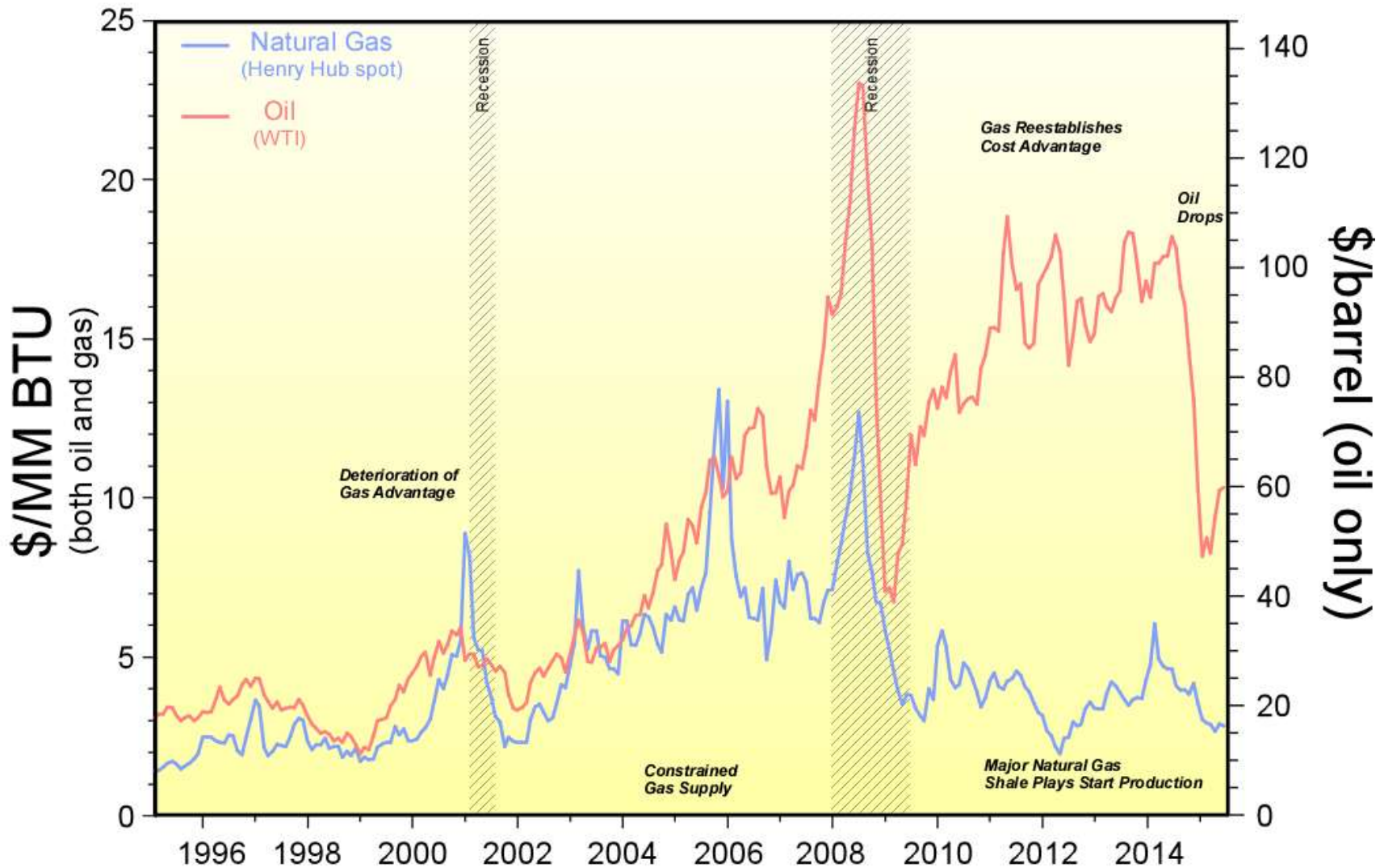




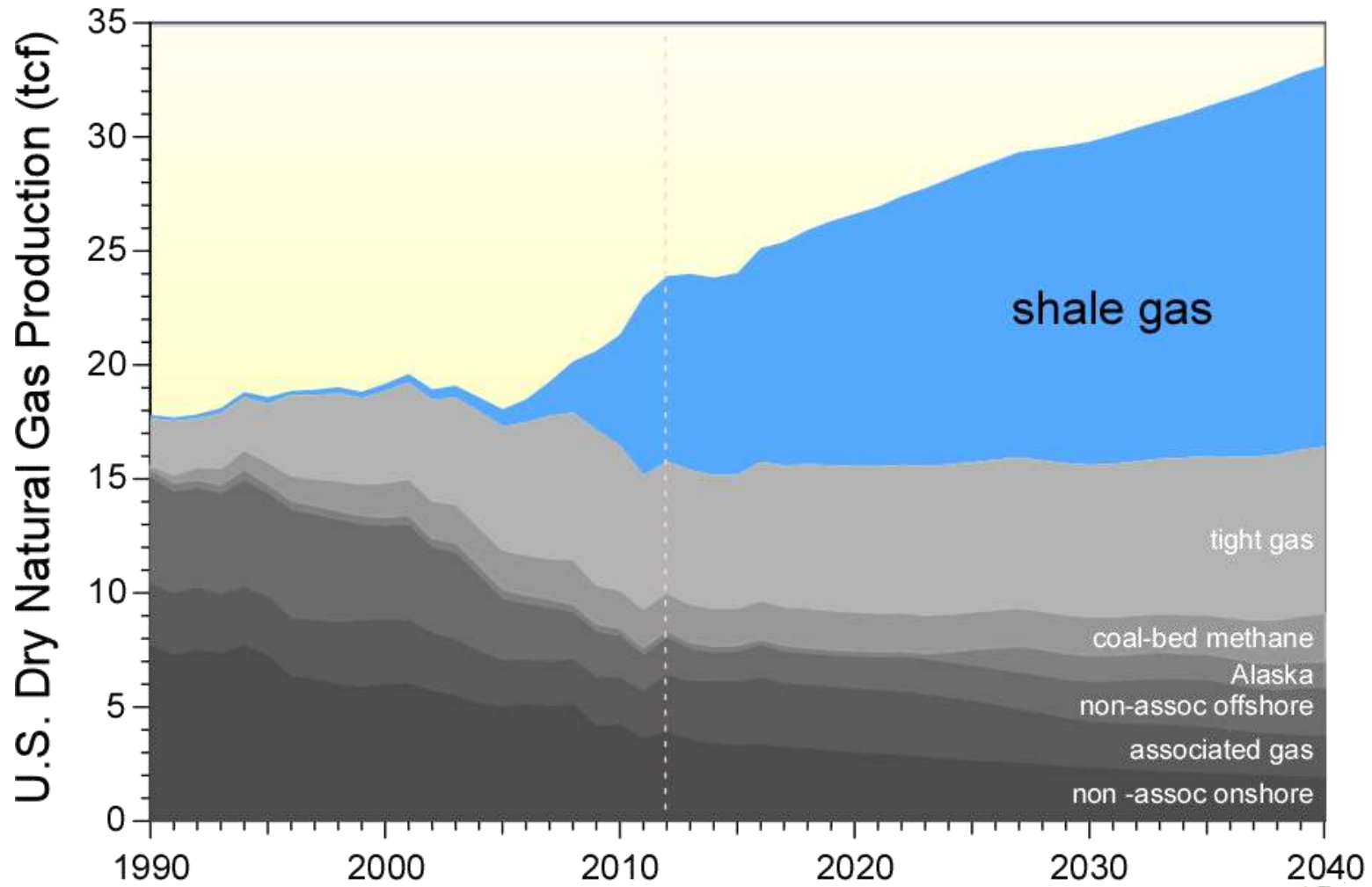


■ ethane ■ propane ■ butane ■ naphtha ■ MTO/CTO ■ other



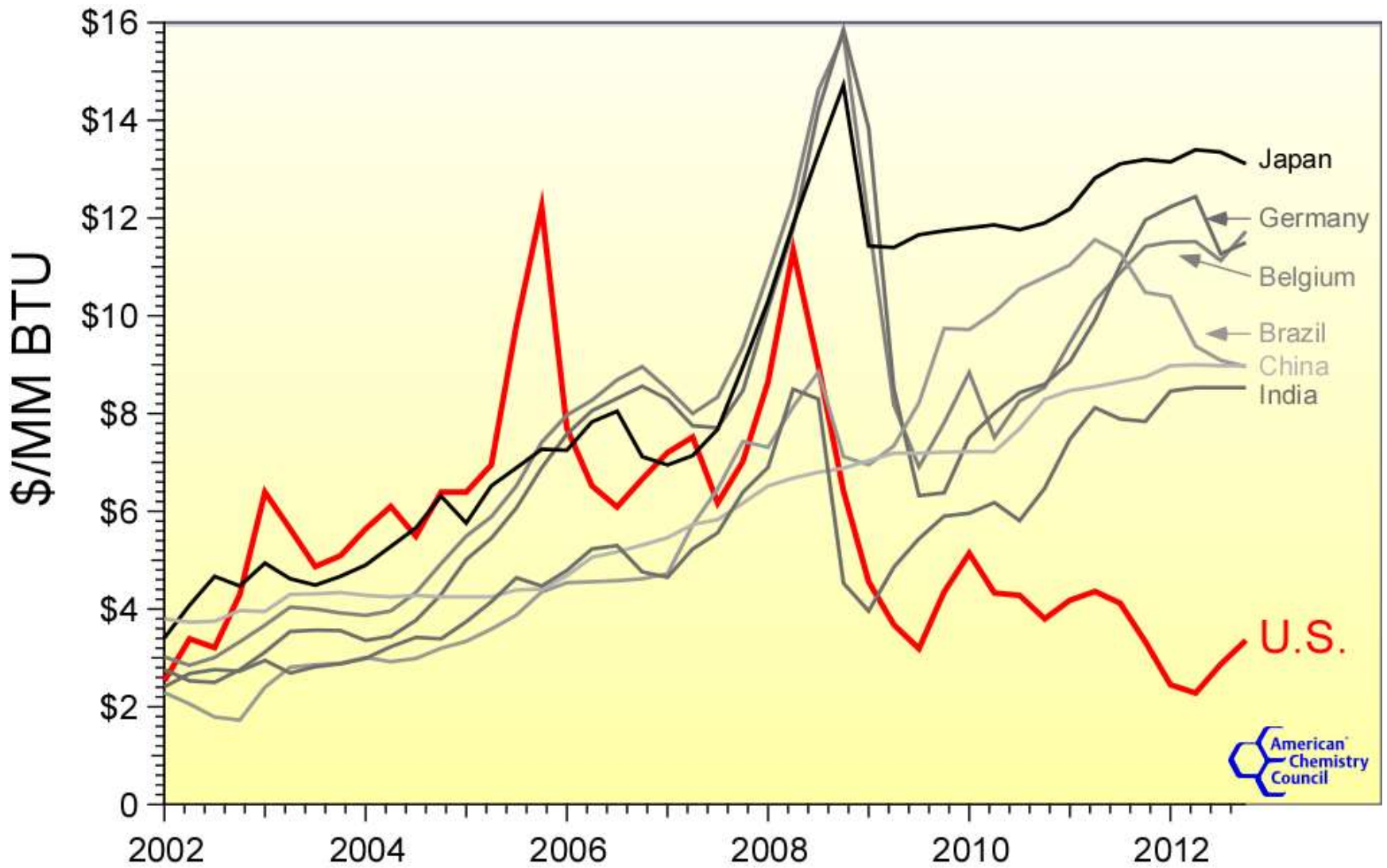


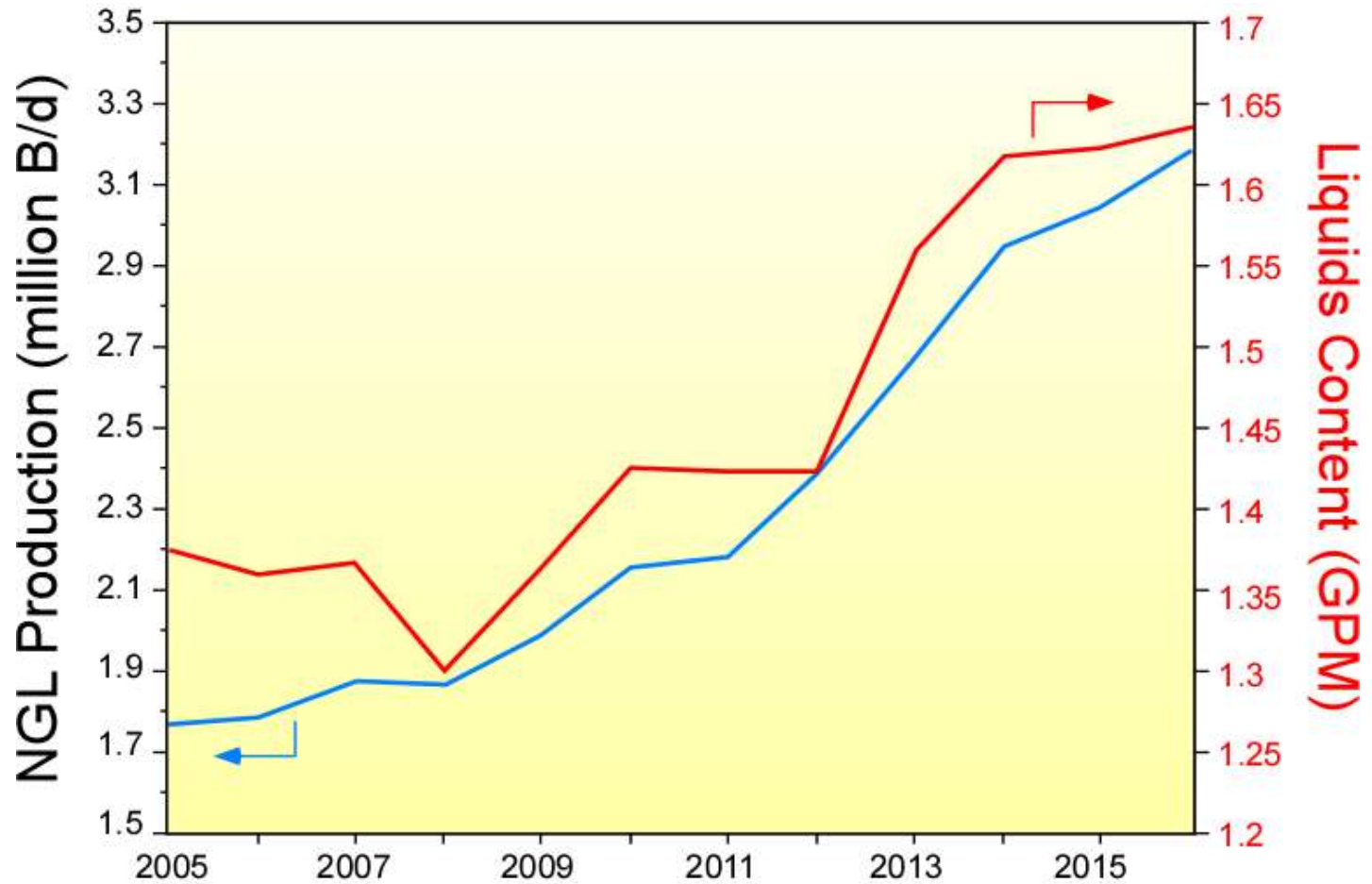


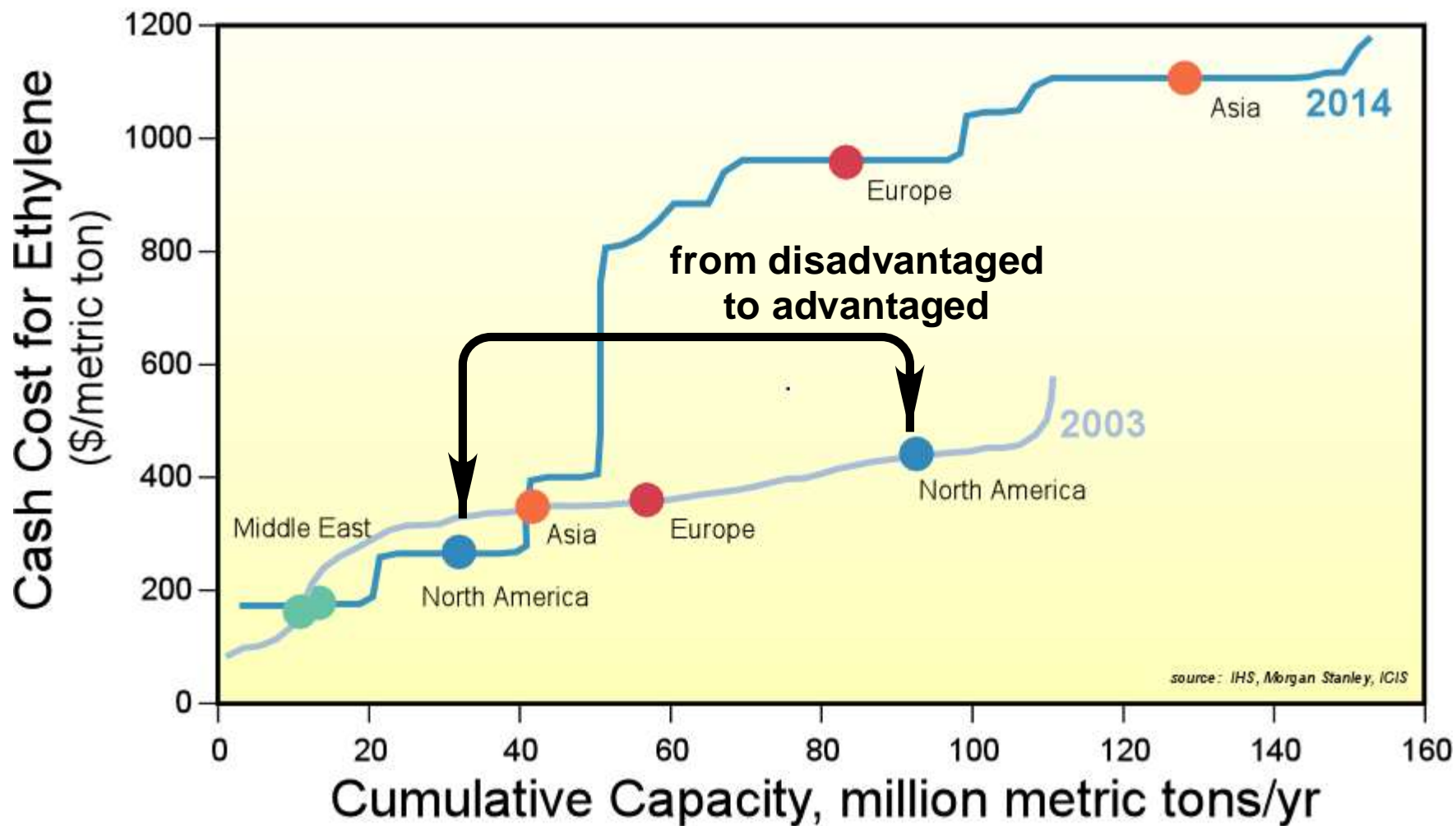


eia











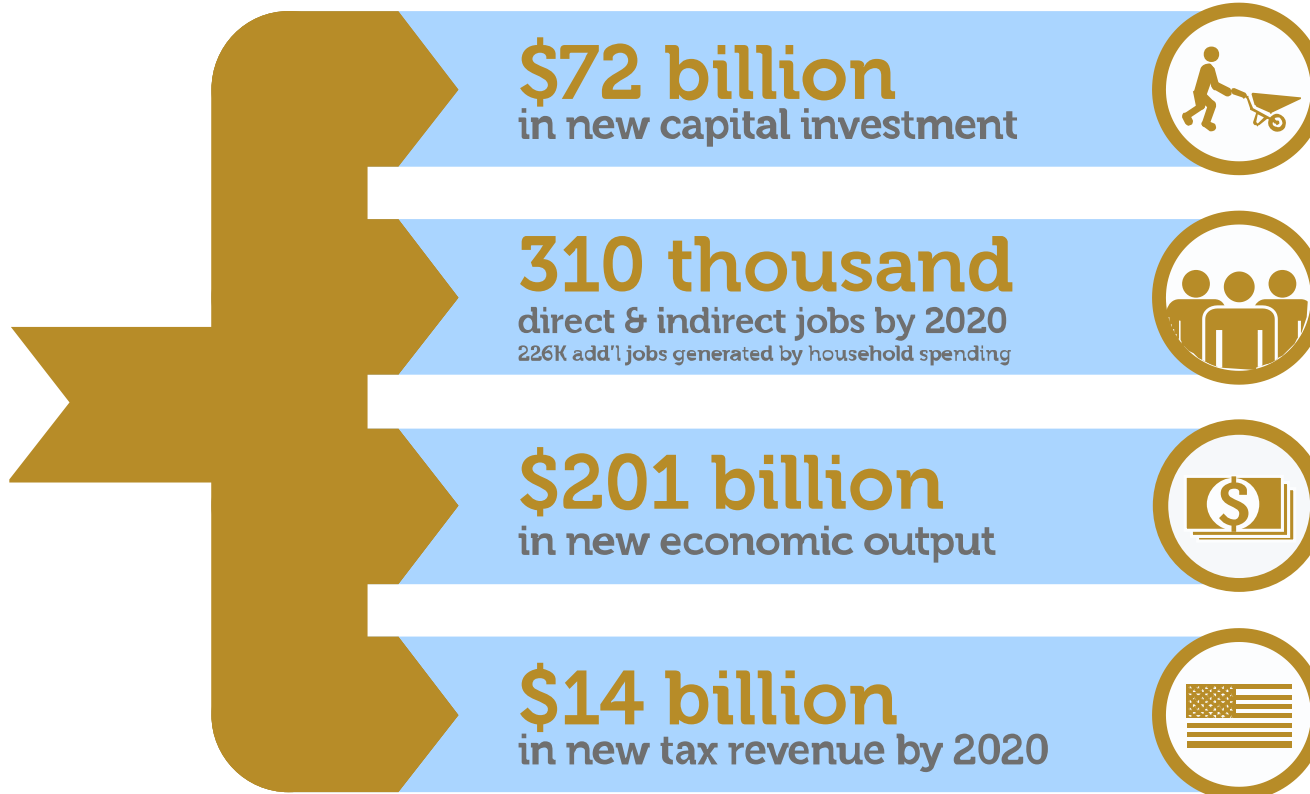
2016 **R&D100**
CONFERENCE

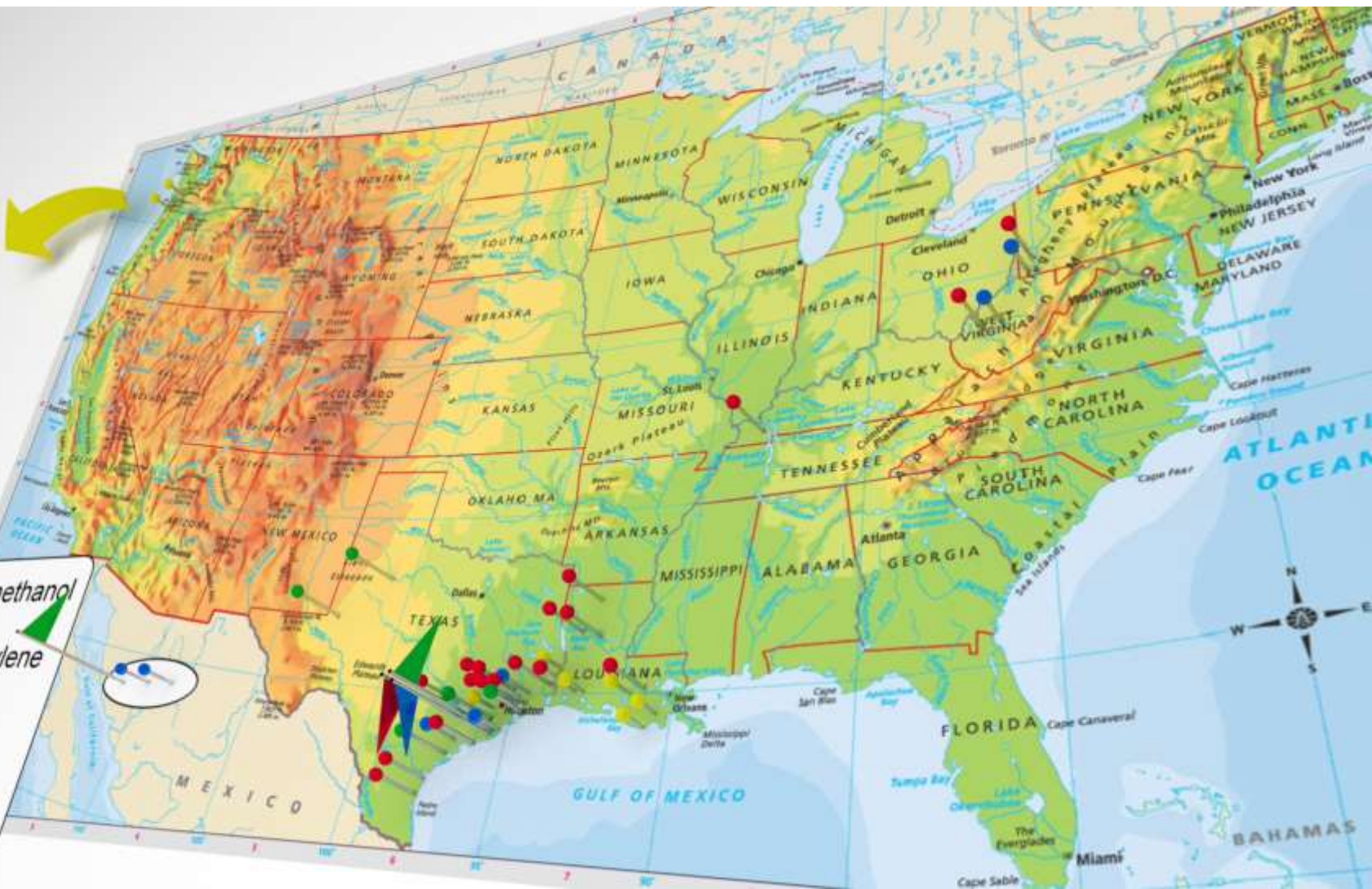


November 2 - 4, 2016
Gaylord National Resort & Convention Center

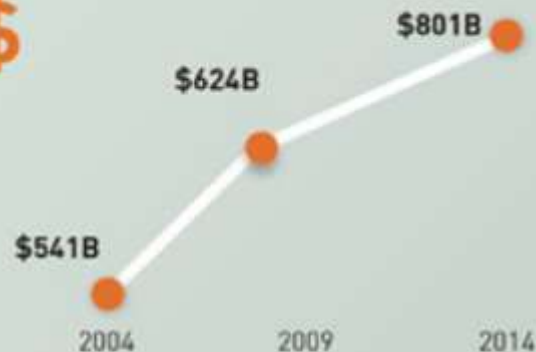


97
new
chemical
industry
projects due
to shale gas*





Value of chemical shipments



+48%

Chemical exports



x2

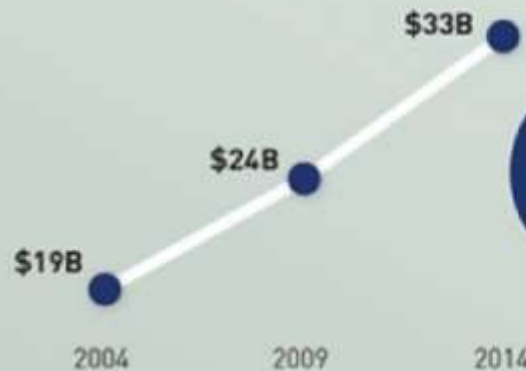
OVER THE PAST DECADE

Research and development funding from the chemical industry



+50%

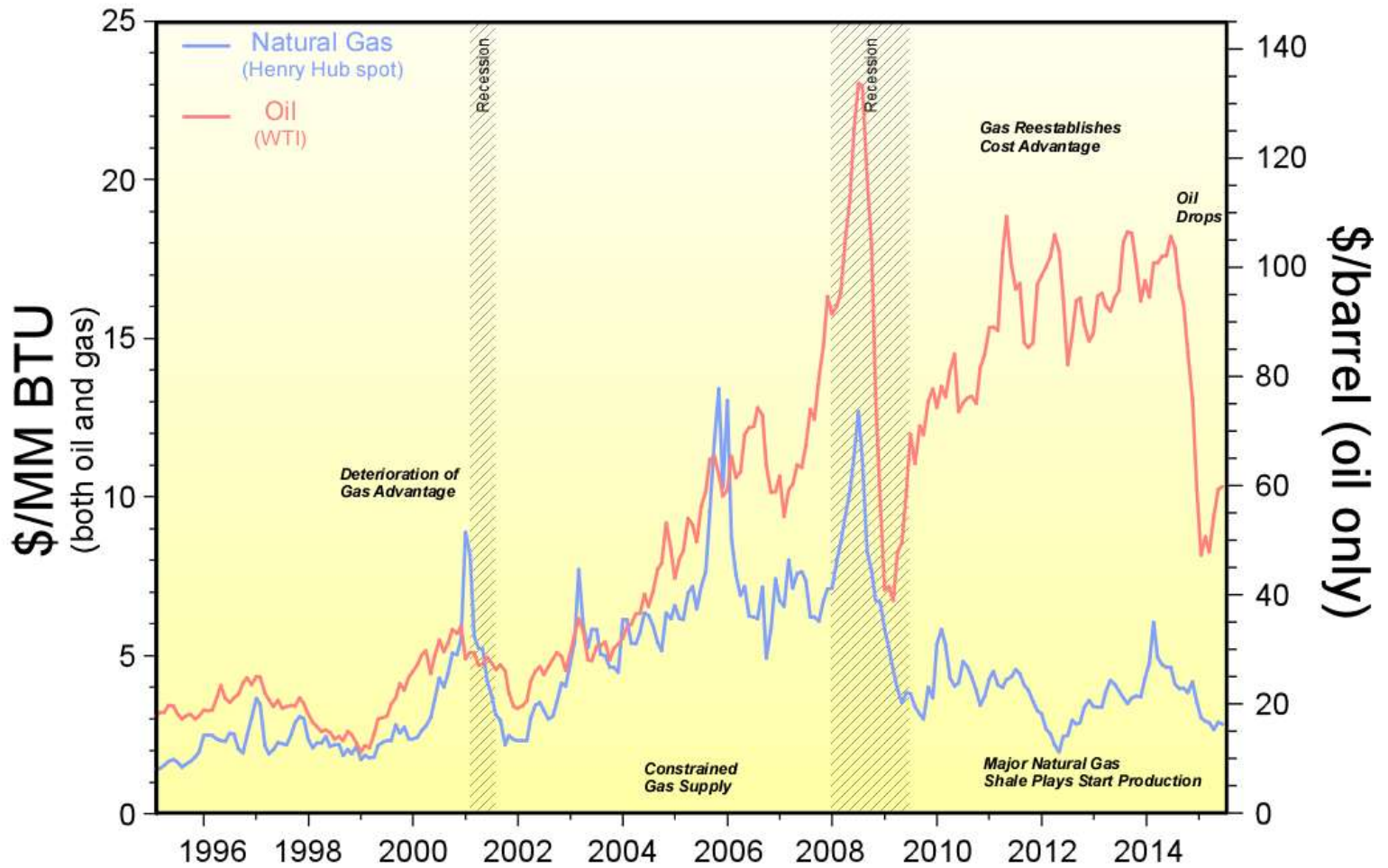
Capital expenditure from the chemical industry

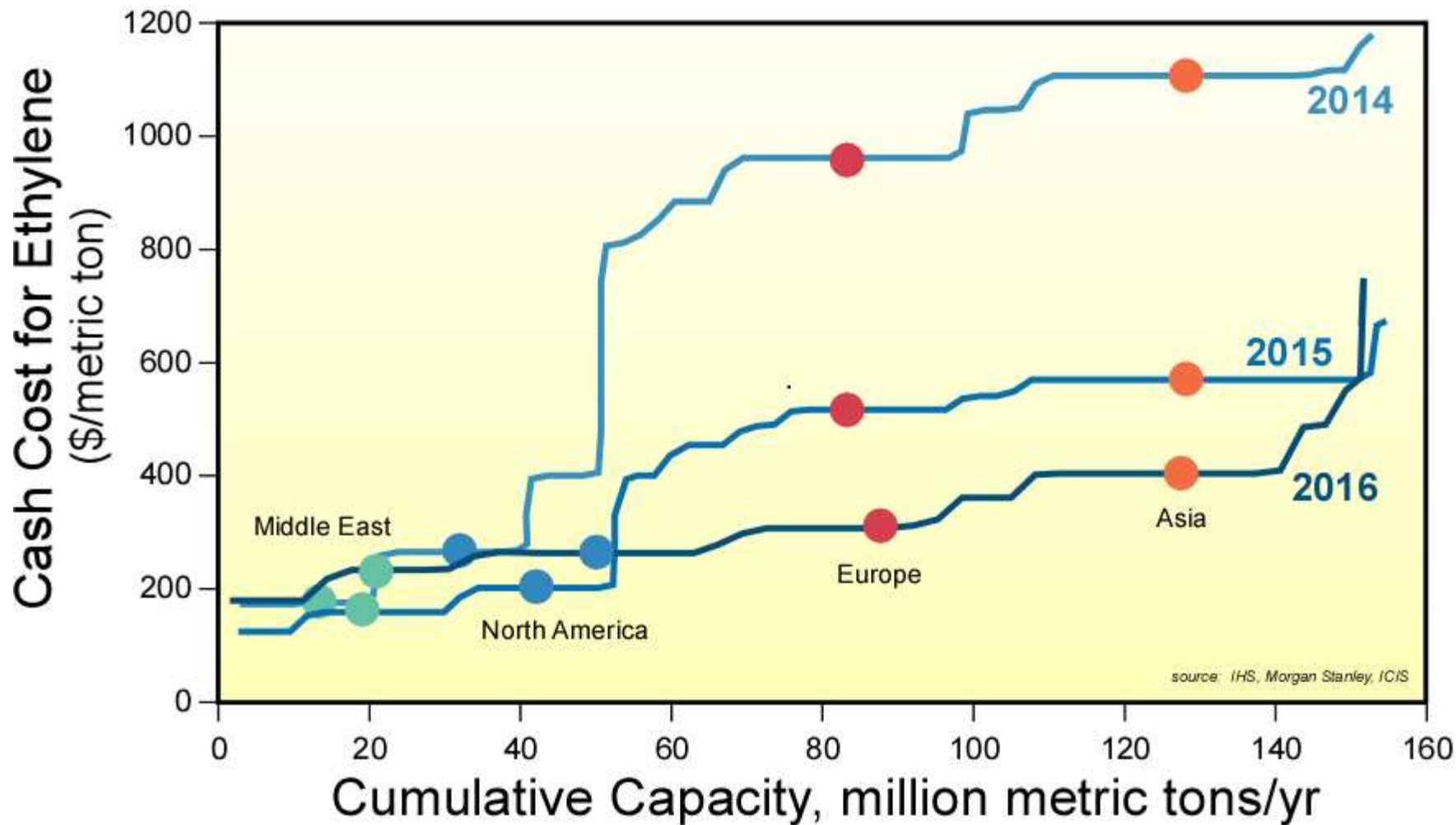


+77%

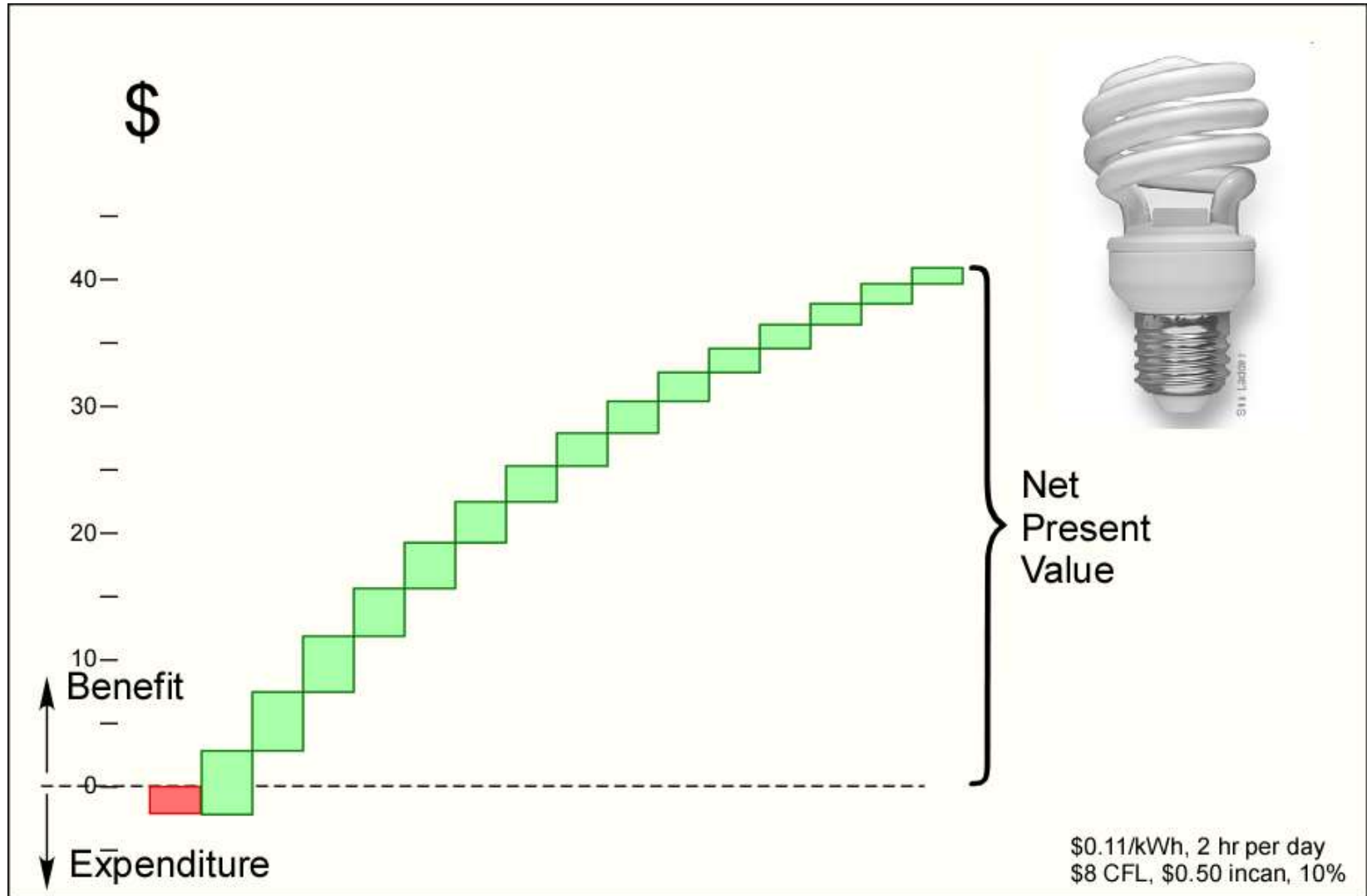


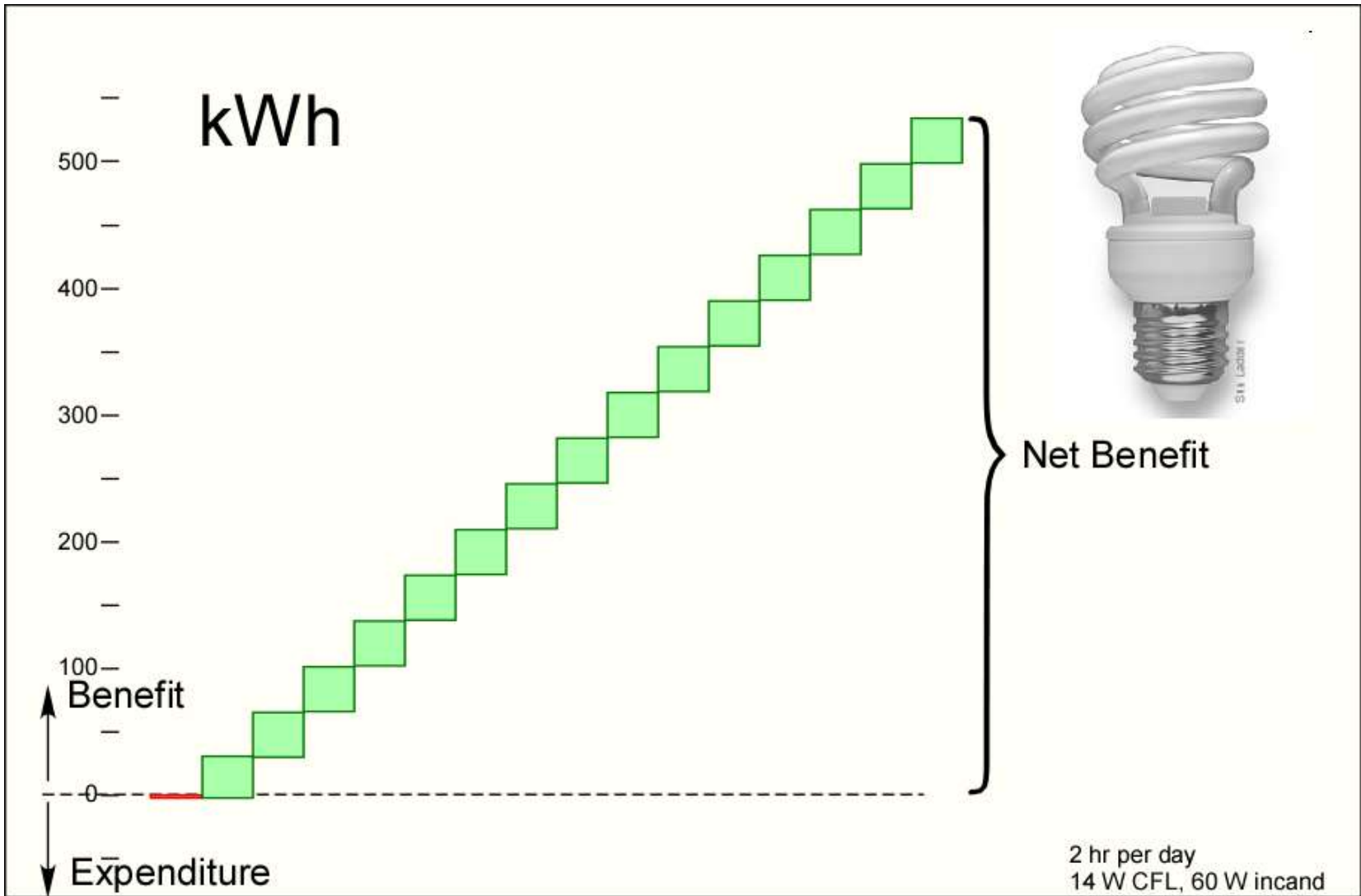












Case Study



K-Cup



K-Cup

Relax...your K-Cups
won't destroy the planet
as soon as we thought...

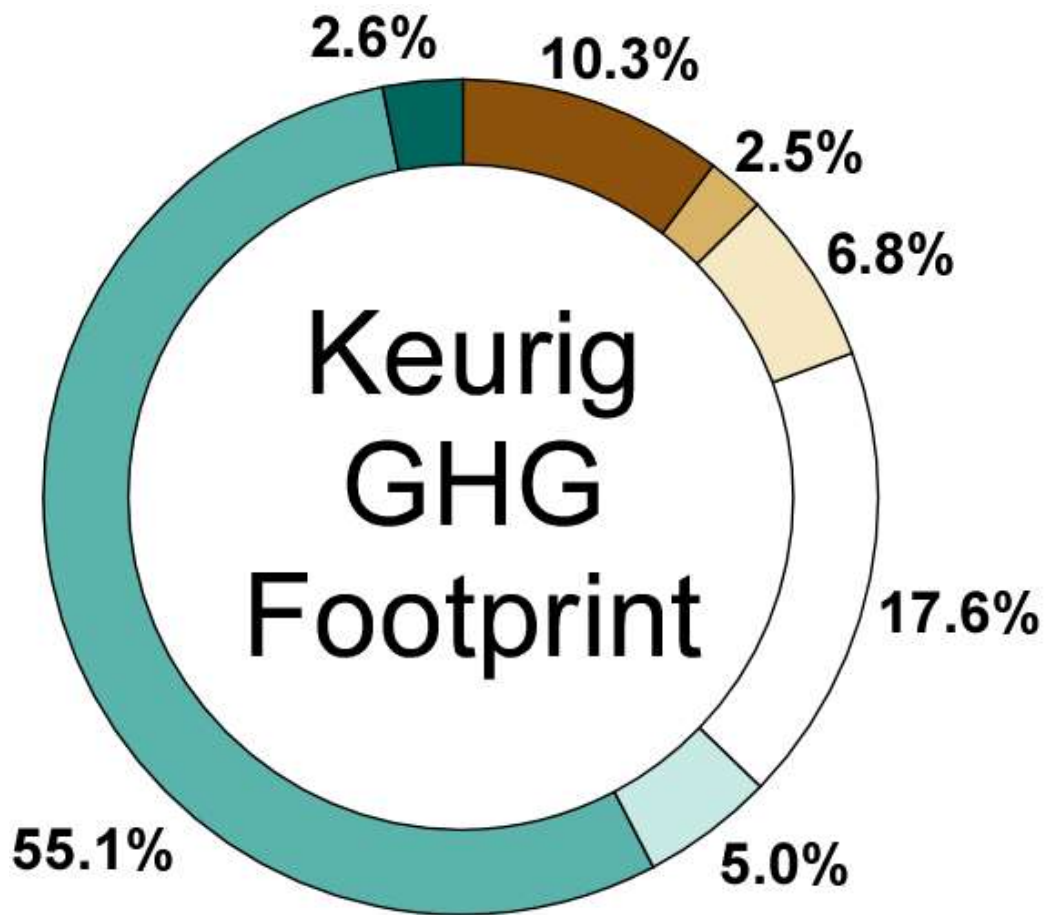
Yet somehow,
I still feel
stressed.



Rich Williams cartoon accompanying Loepf, Don; "Encouraging progress on K-Cup sustainability through materials.", *Plastics News*, 24 September 2015.



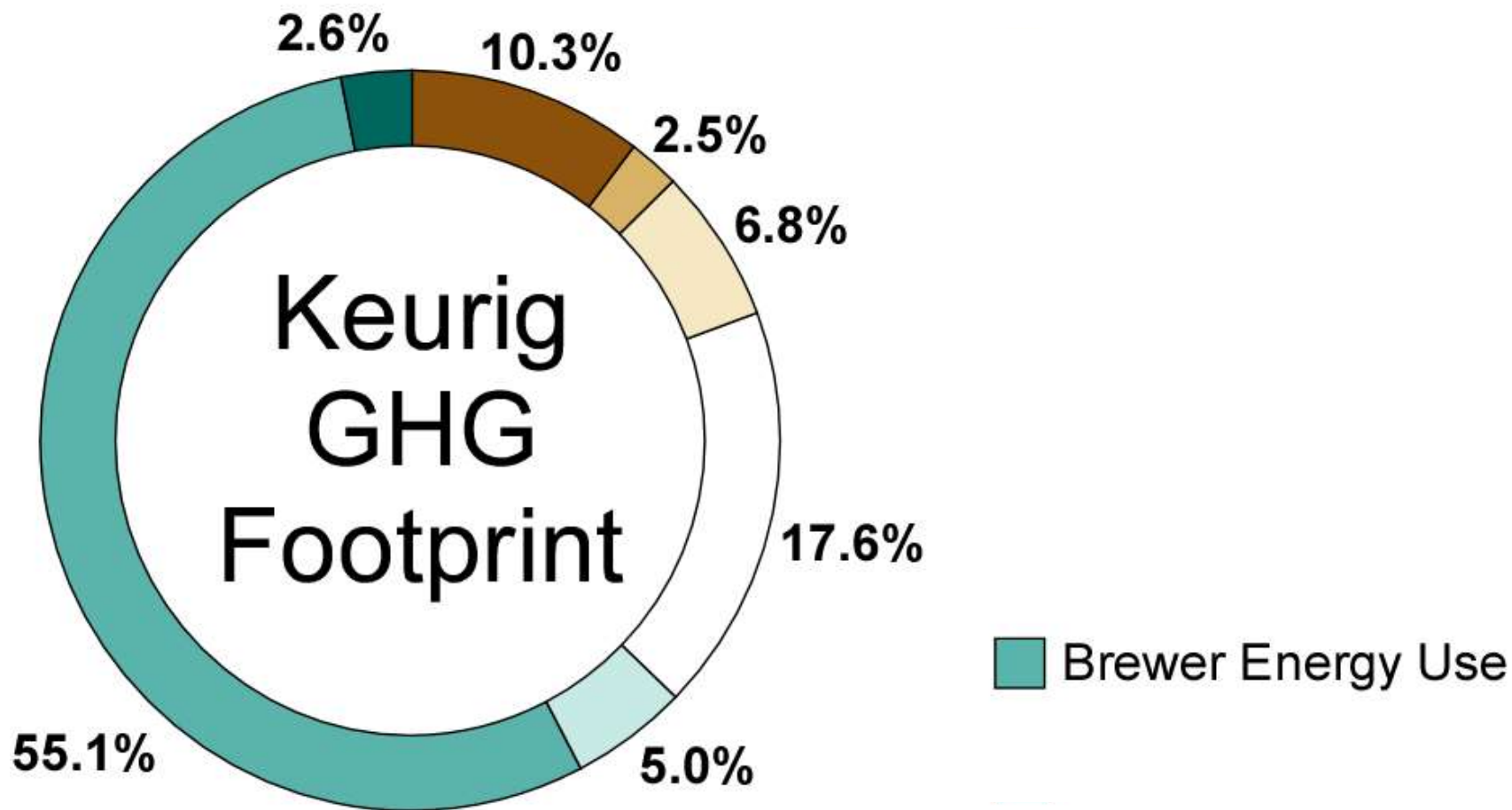
Keurig Corporate Footprint



Keurig Green Mountain; "Beyond the Cup: Sustainability Report Fiscal 2014.

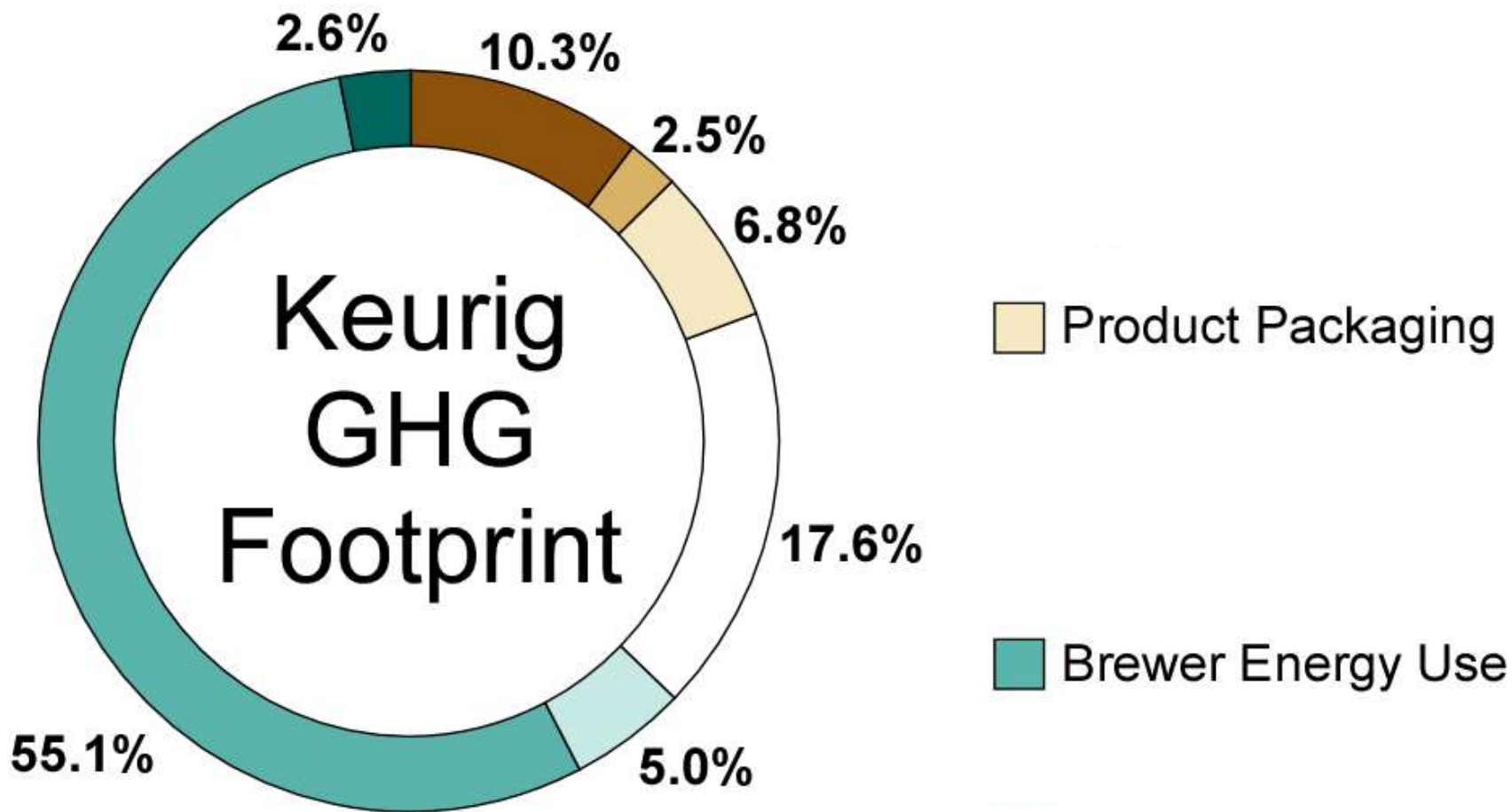


Keurig Corporate Footprint



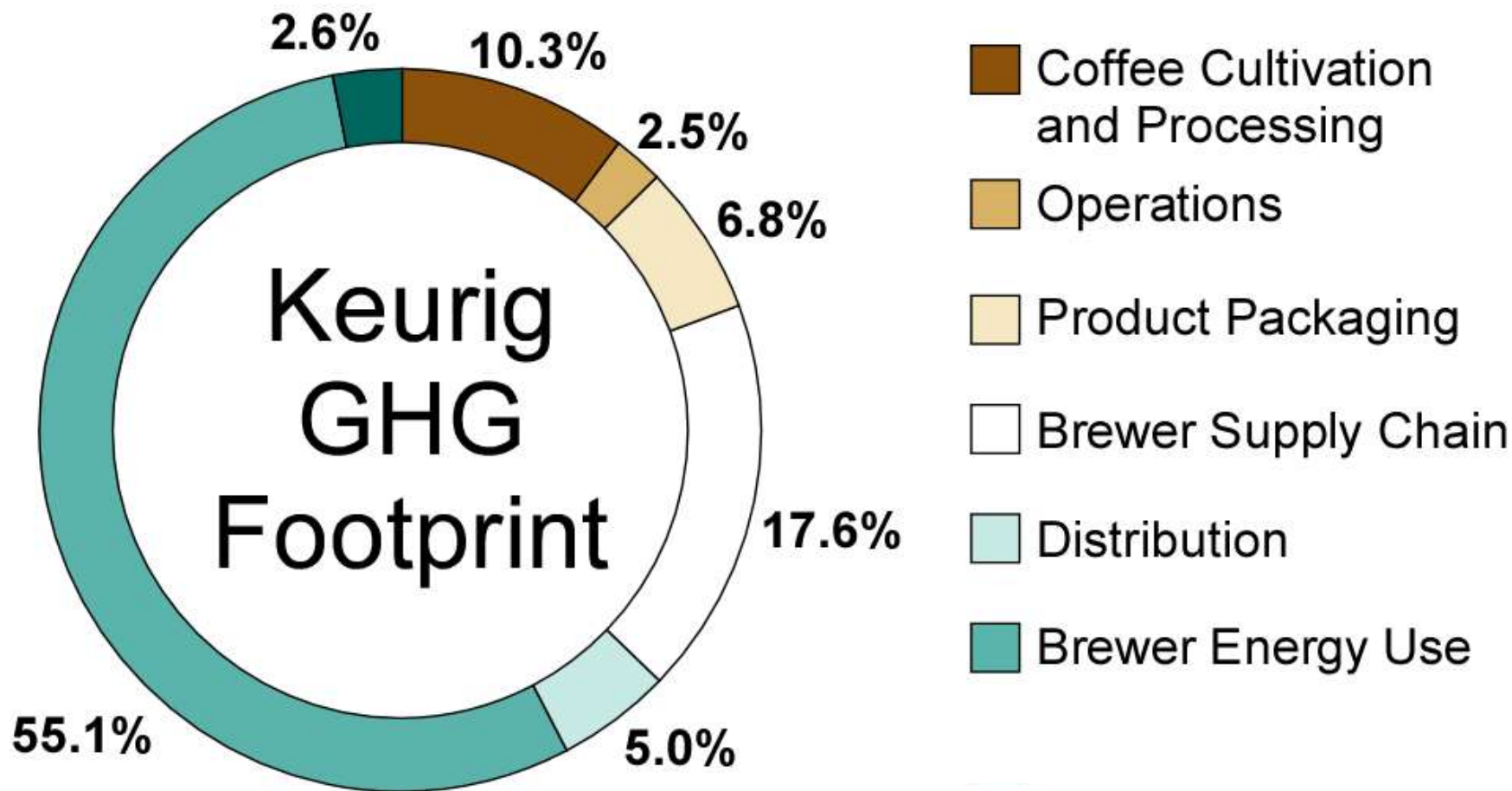
Keurig Green Mountain; "Beyond the Cup: Sustainability Report Fiscal 2014.

Keurig Corporate Footprint

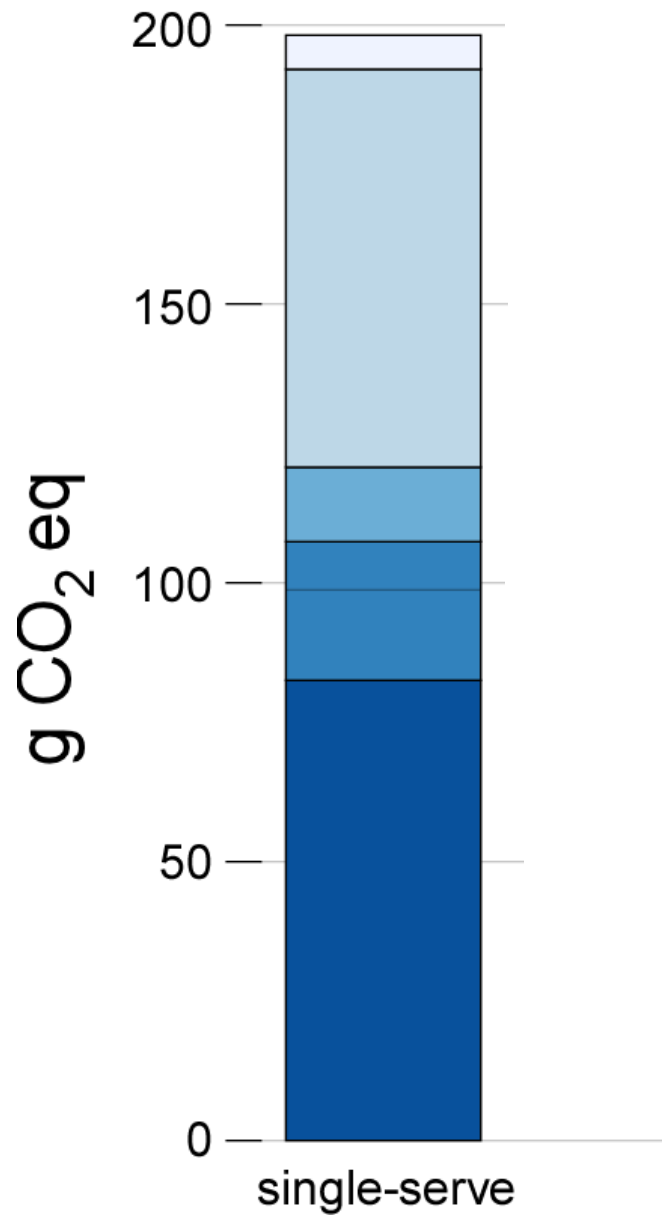


Keurig Green Mountain; "Beyond the Cup: Sustainability Report Fiscal 2014.

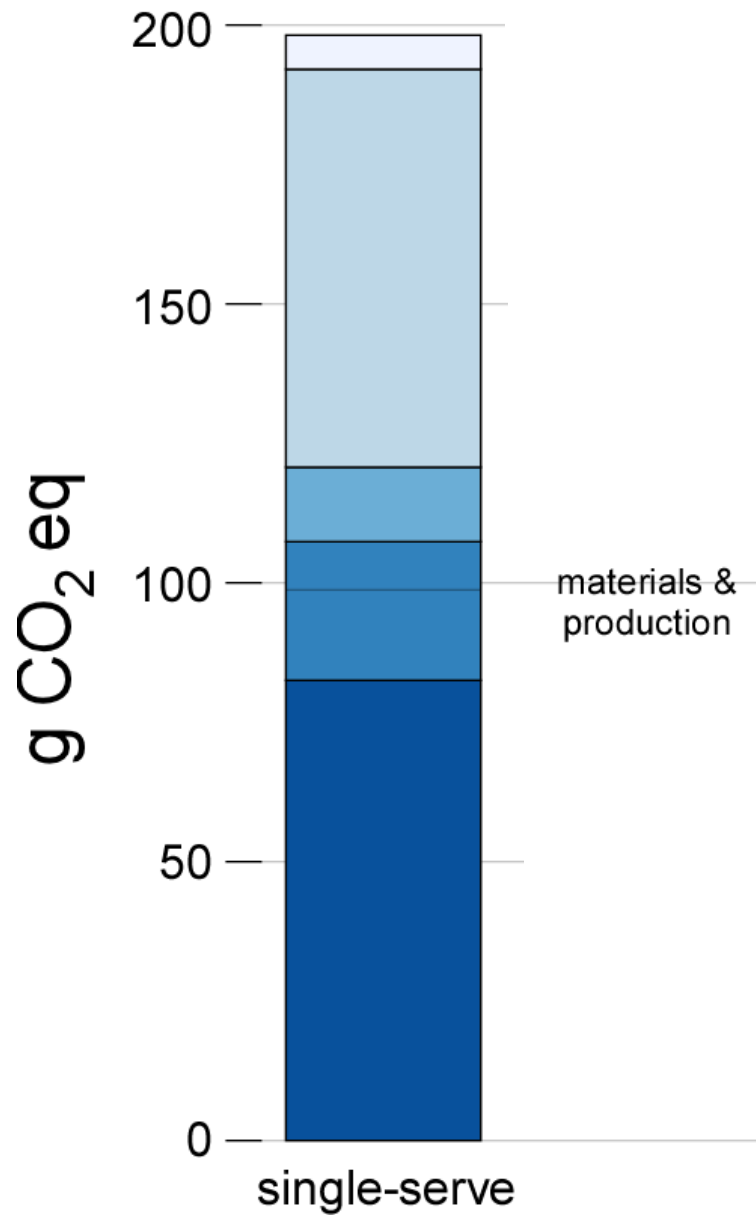
Keurig Corporate Footprint



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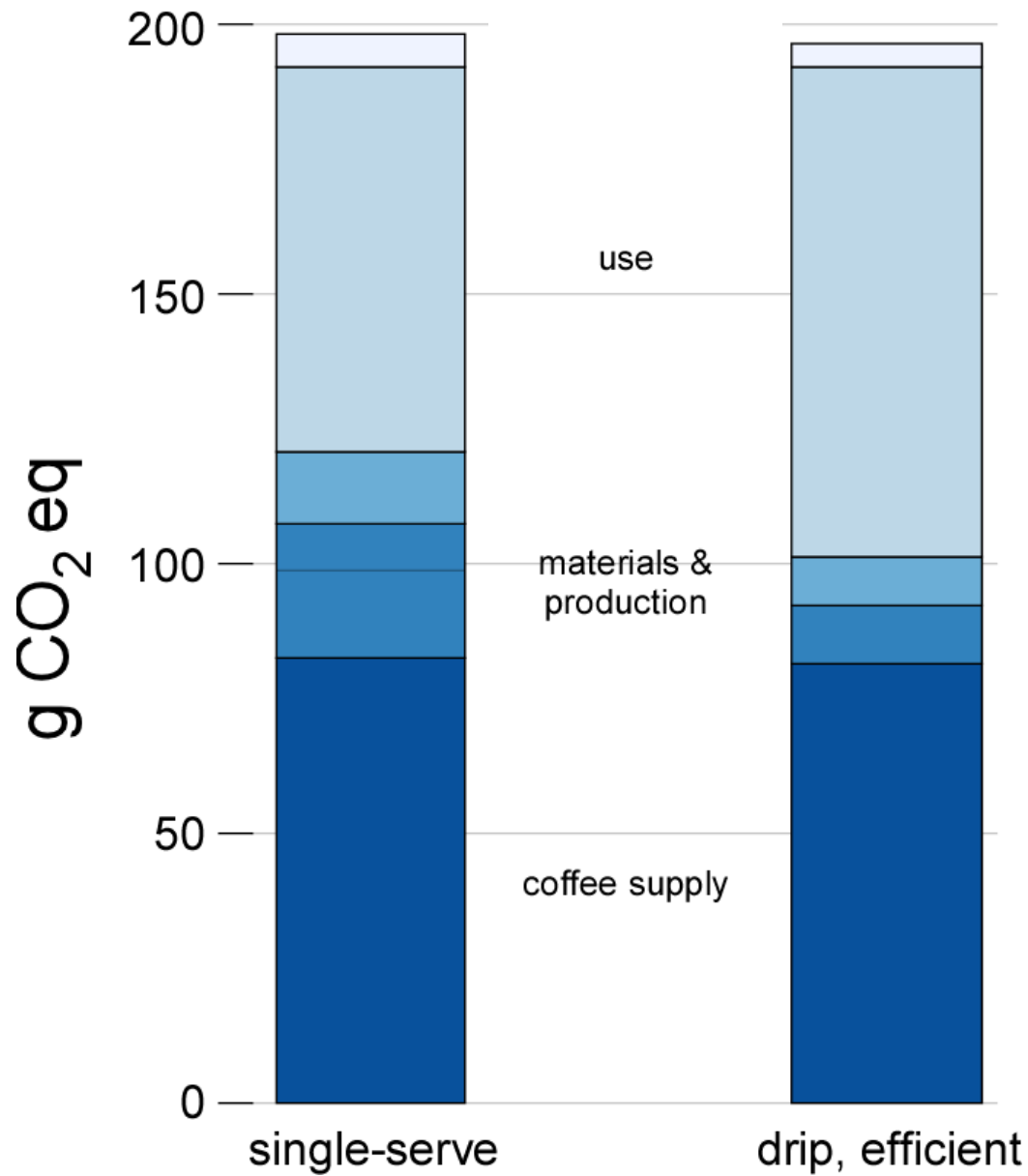


Quantis; Chayer, Julie-Anne; Kicak, Karine; "Life Cycle Assessment of coffee consumption: comparison of single-serve coffee and bulk coffee brewing", Prepared for PAC, 2 June 2015.



Quantis; Chayer, Julie-Anne; Kicak, Karine; "Life Cycle Assessment of coffee consumption: comparison of single-serve coffee and bulk coffee brewing", Prepared for PAC, 2 June 2015.





Quantis; Chayer, Julie-Anne; Kicak, Karine; "Life Cycle Assessment of coffee consumption: comparison of single-serve coffee and bulk coffee brewing", Prepared for PAC, 2 June 2015.

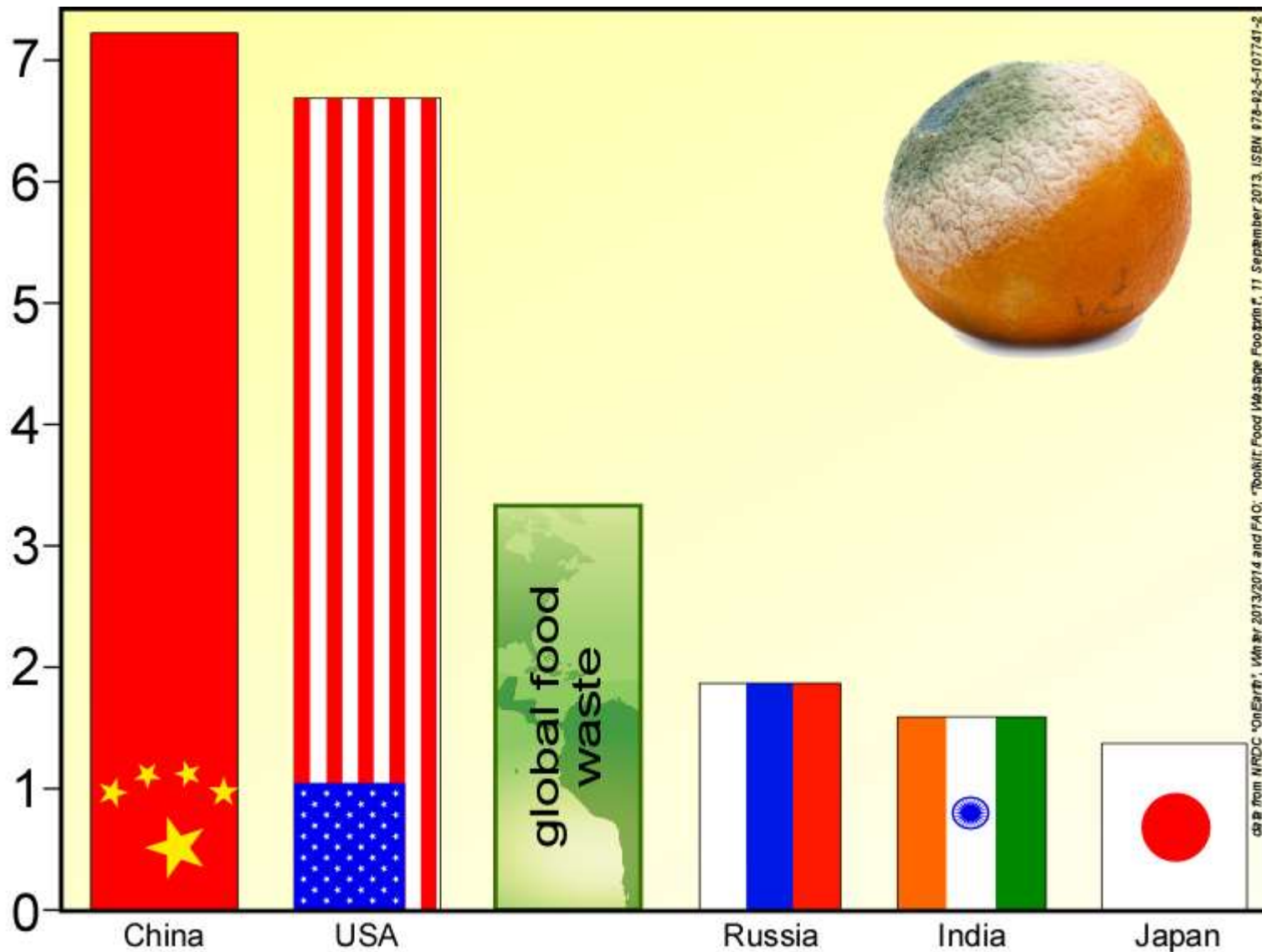




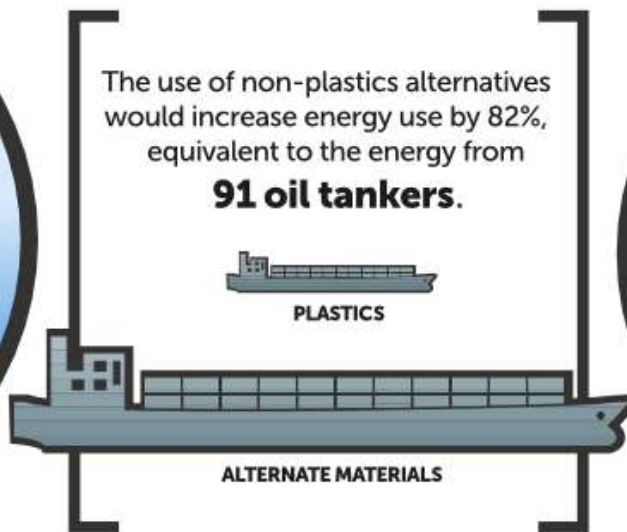
30-40% food grown
is wasted.
Much of it to
spoilage.

GHG Emissions

(billions of metric tons CO₂e)



data from WRI's "On Earth", WRI's 2013/2014 and FAO; "Food Wastage Footprint", 11 September 2013, ISBN 978-92-5-107741-2



Most plastics can be recycled





Package Type	Contents	Impact per 100 oz Cereal		
		Landfill Discards* (g)	Process GHG** (kg CO ₂ Eq)	Total Energy** (MJ)
Paperboard and HDPE Liner	11 oz	380.0	.861	12.1
Stand-Up Pouch	12 oz	117.5	.265	9.25

Reduction vs Box	
Landfill Discards	68%
GHG	69%
Energy	23%

Re-Closable Cap

- Precision pouring
- Maximum filling content utilization

Flexible Design

- Four Print Surfaces
- Superior drop resistance
- Reduce excess head space
- Improved dispensing
- Collapses easily



Top and Bottom Handles

- Easy handling

Cubic Shape

- Shelf Stable & Maximizes Shipping Efficiency

Space Saving

- Ships and Stores Flat when Unfilled

2025 Sustainability Goals



Leading the
Blueprint



Delivering
Breakthrough
Innovations



Advancing a
Circular
Economy



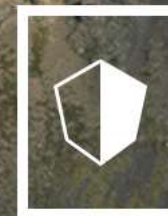
Valuing
Nature



Increasing
Confidence in
Chemical
Technology



Engaging
Employees for
Impact



World-Leading
Operations
Performance





