



Bioproducts and biofuels – growing together!

Bioproducts: Enabling Fuels and Growing the Bioeconomy
DOE Biomass 2014

Washington, D.C.

Andrew Held Virent, Inc.



Virent at a glance

The global leader in catalytic biorefinery research, development, and commercialization.

Technology



Catalytically converting plant-based feedstocks to fuels and chemicals

Infrastructure



**25x Development Pilot Plants
2x Larger Demo Plants**

Partners & Investors

Cargill



The Coca-Cola Company

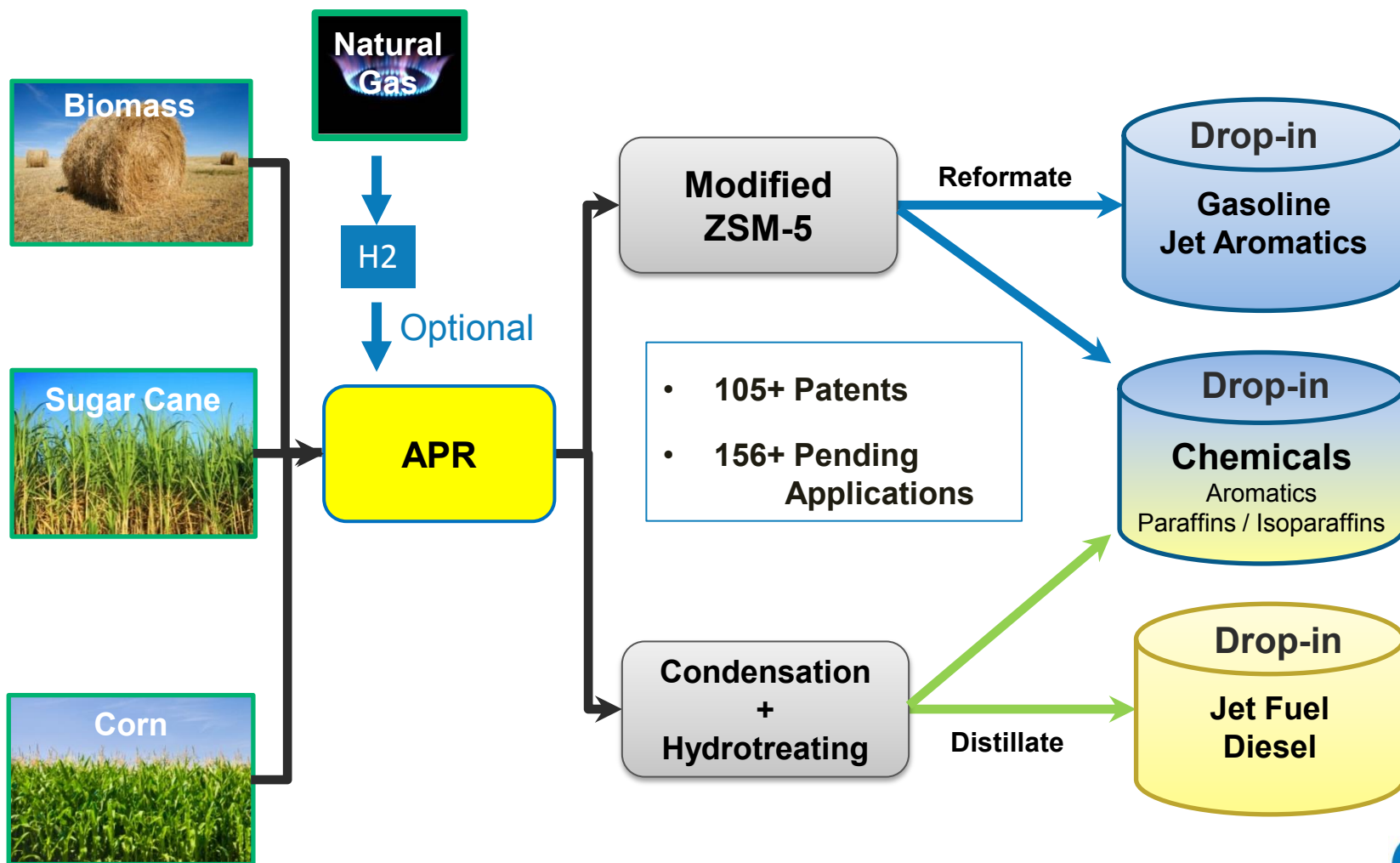
HONDA
The Power of Dreams

**> \$77 MM in Equity Funding
> \$79 MM in Gov & Industry**



The BioForming Concept

Biobased feedstocks to direct replacement products via modified, conventional processing.

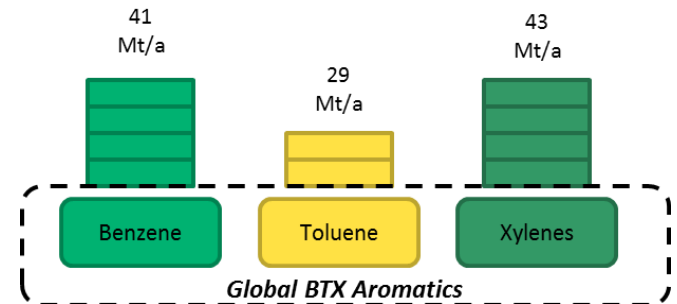
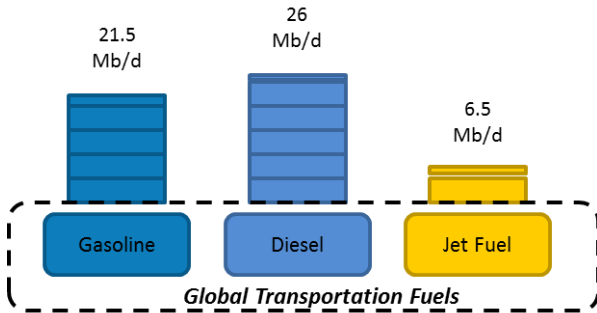




BIOFORMING



**Total Addressable Markets of
Over \$2,500 Billion and
growing.**



\$2,400+ Billion Global Market*

**Fuel growth rates of
0 – 2% year.**

*Estimates of world demand, 2011
Sources: IHS Chemical, ICIS, EIA, OPEC.*

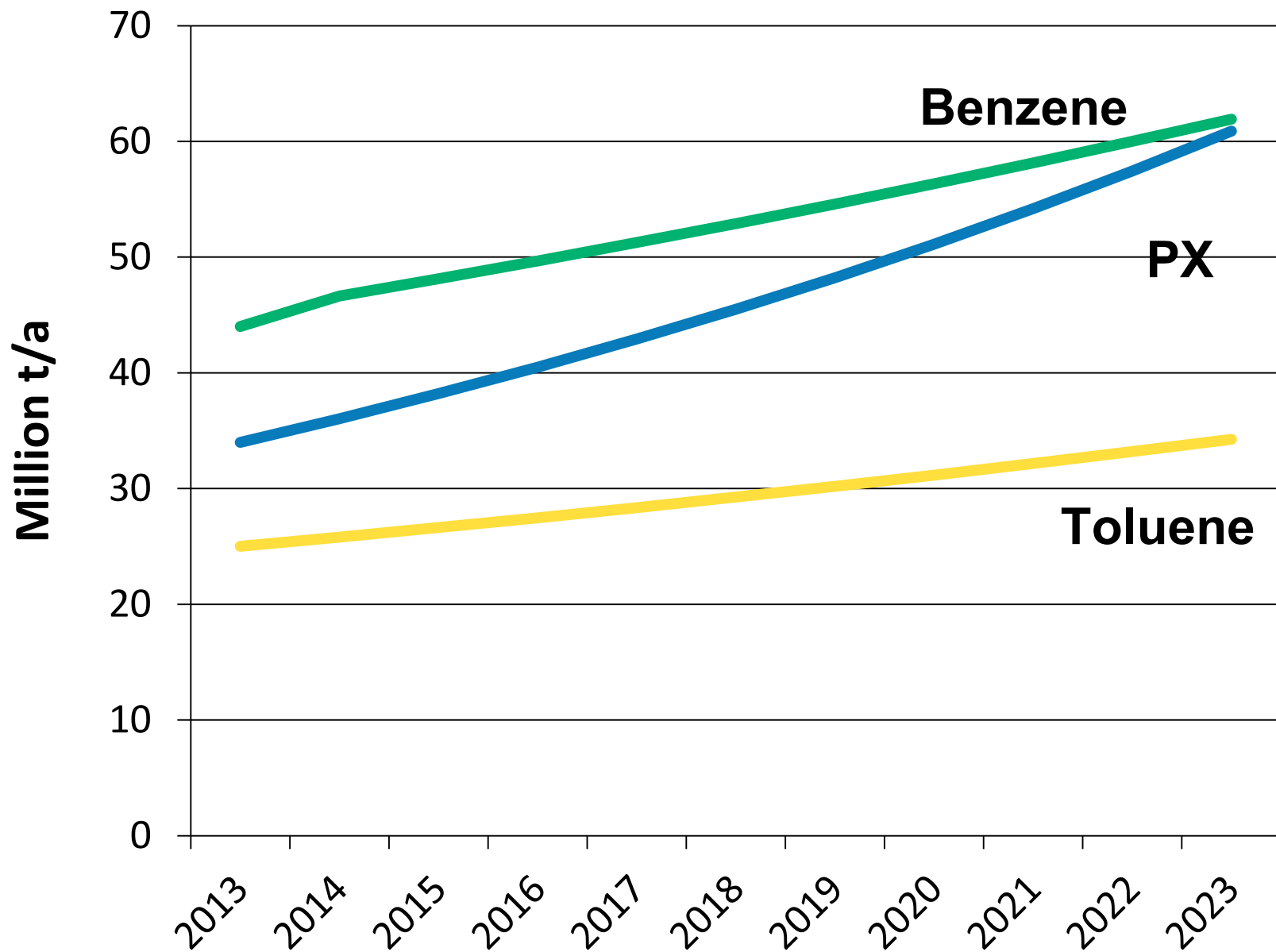
\$125 Billion Global Market*

**Aromatics growth rates of
3 – 6% year.**

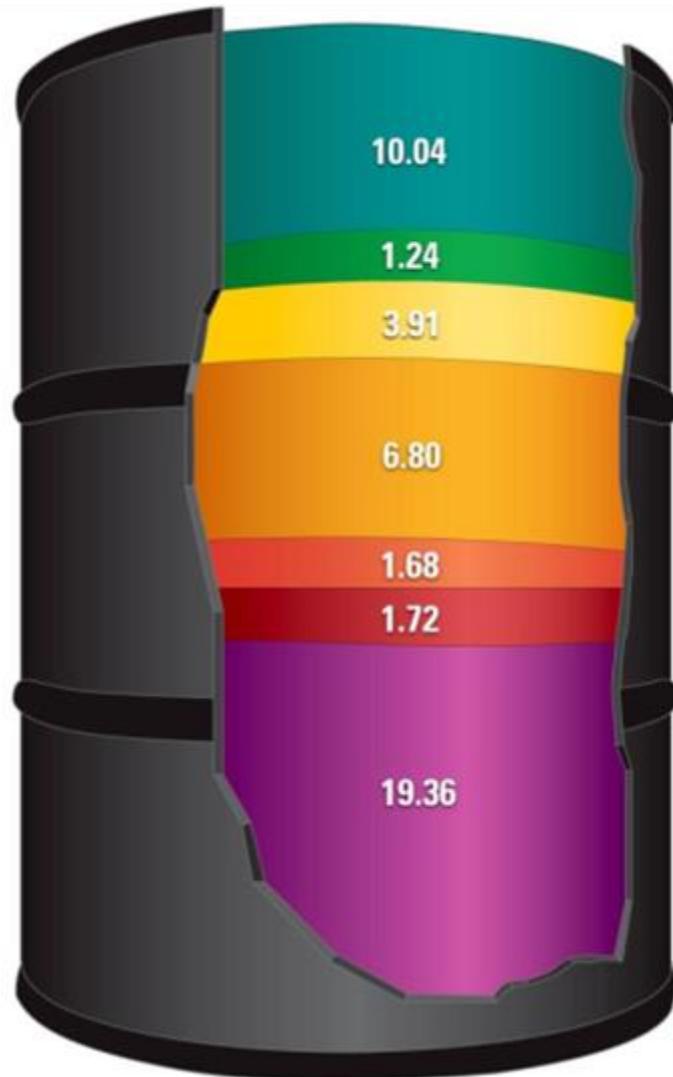
** Market sizes calculated based
on 2011 US market prices.*








Future demand - BTX



What's in a barrel of oil?

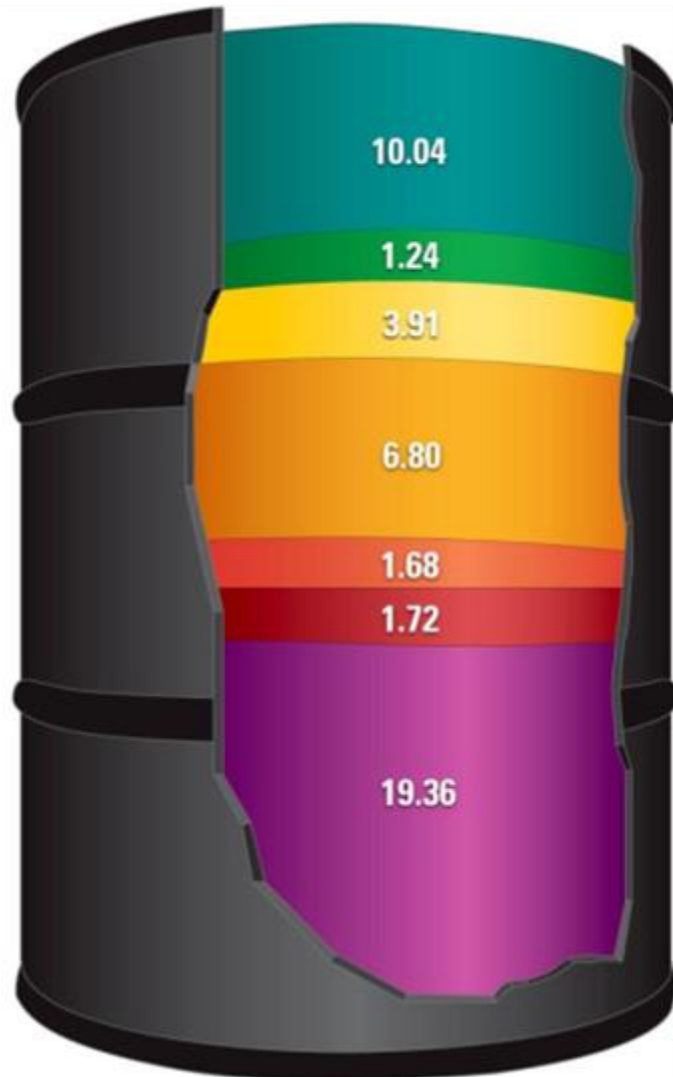









-  Diesel
-  Other Distillates
-  Jet Fuel
-  Other Products
-  Heavy Fuel Oil (Residual)
-  Liquefied Petroleum Gases (LPG)
-  Gasoline

Products Made from a Barrel of Crude Oil (Gallons)
(2009)



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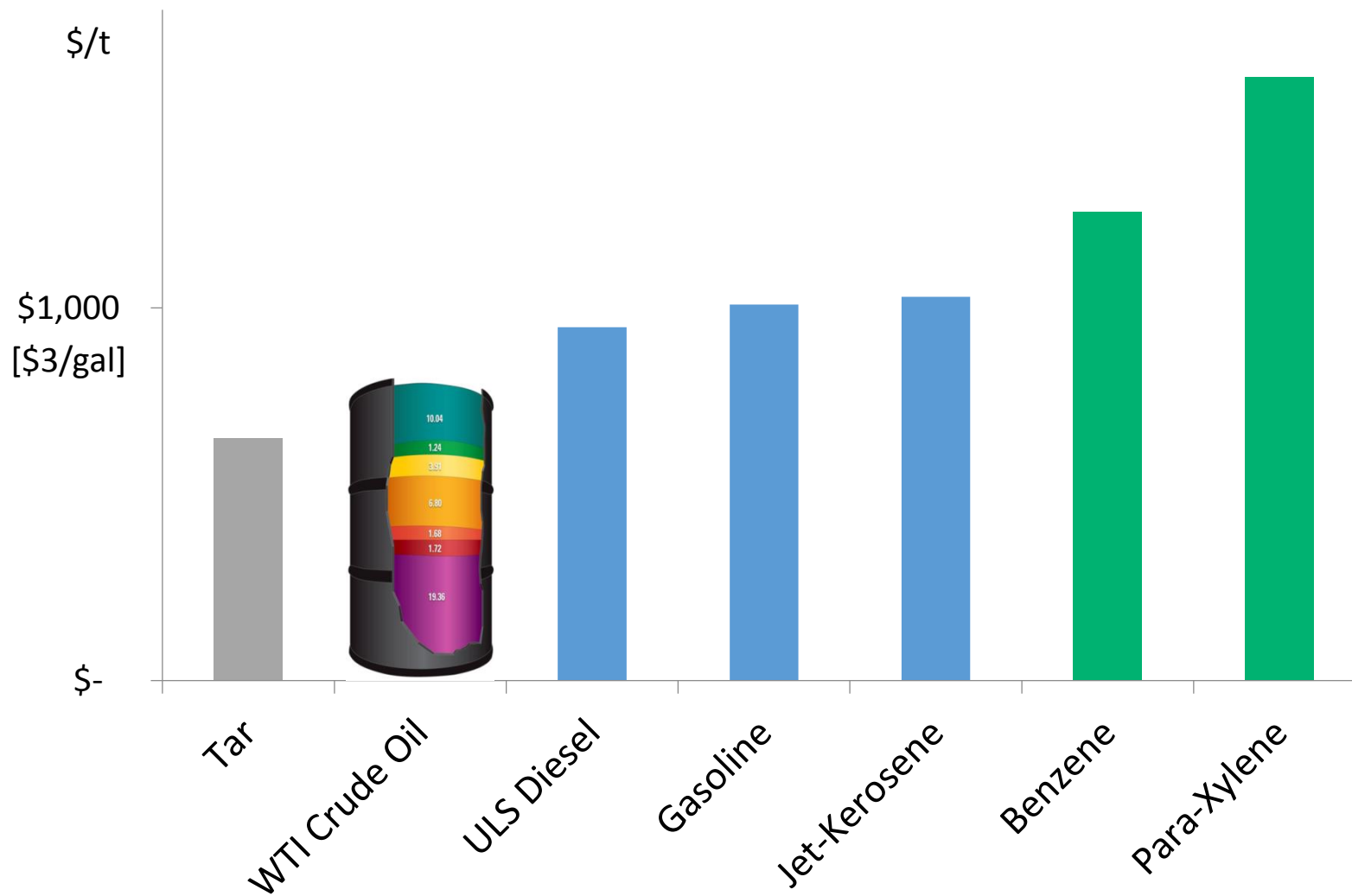


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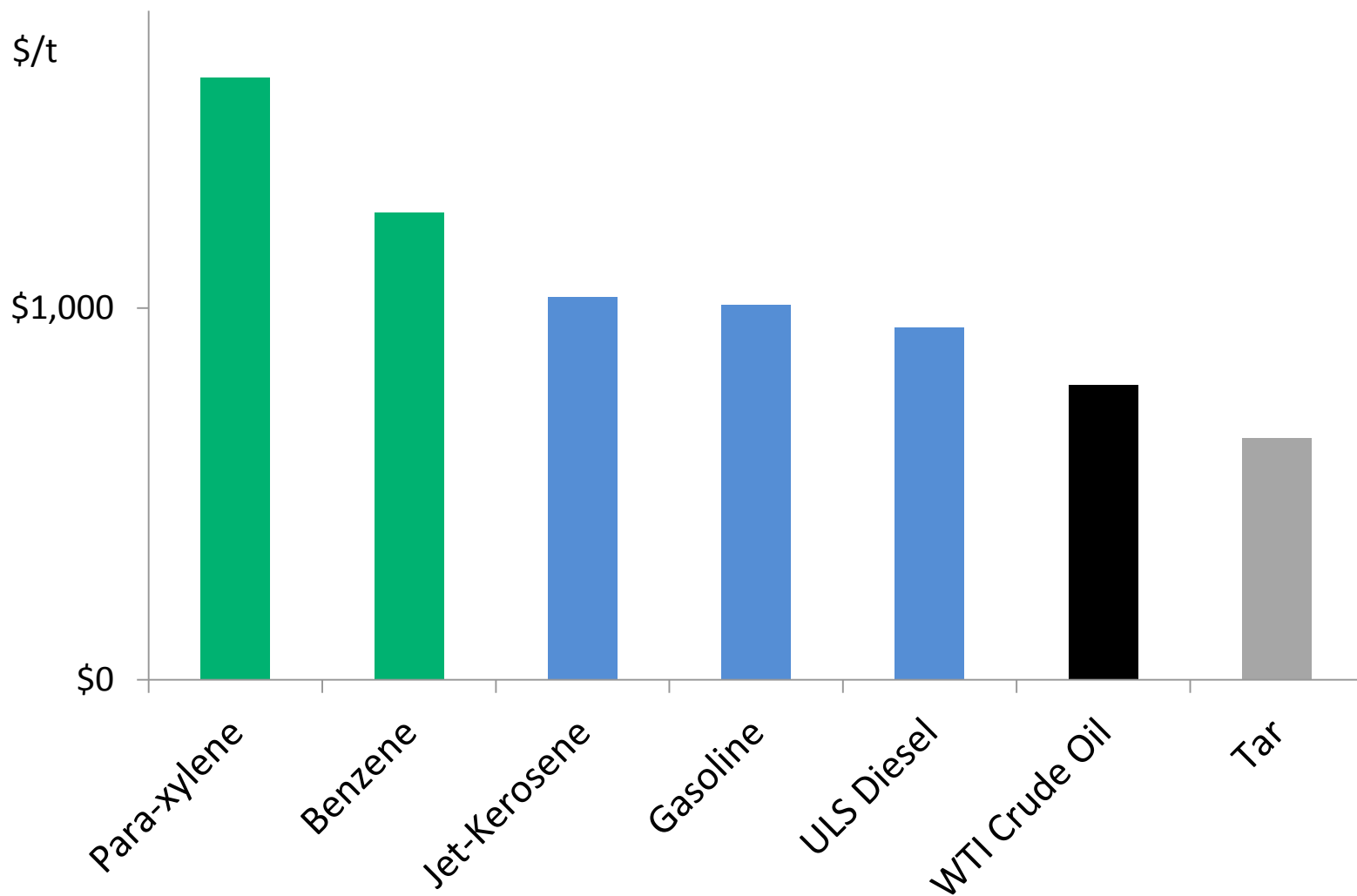
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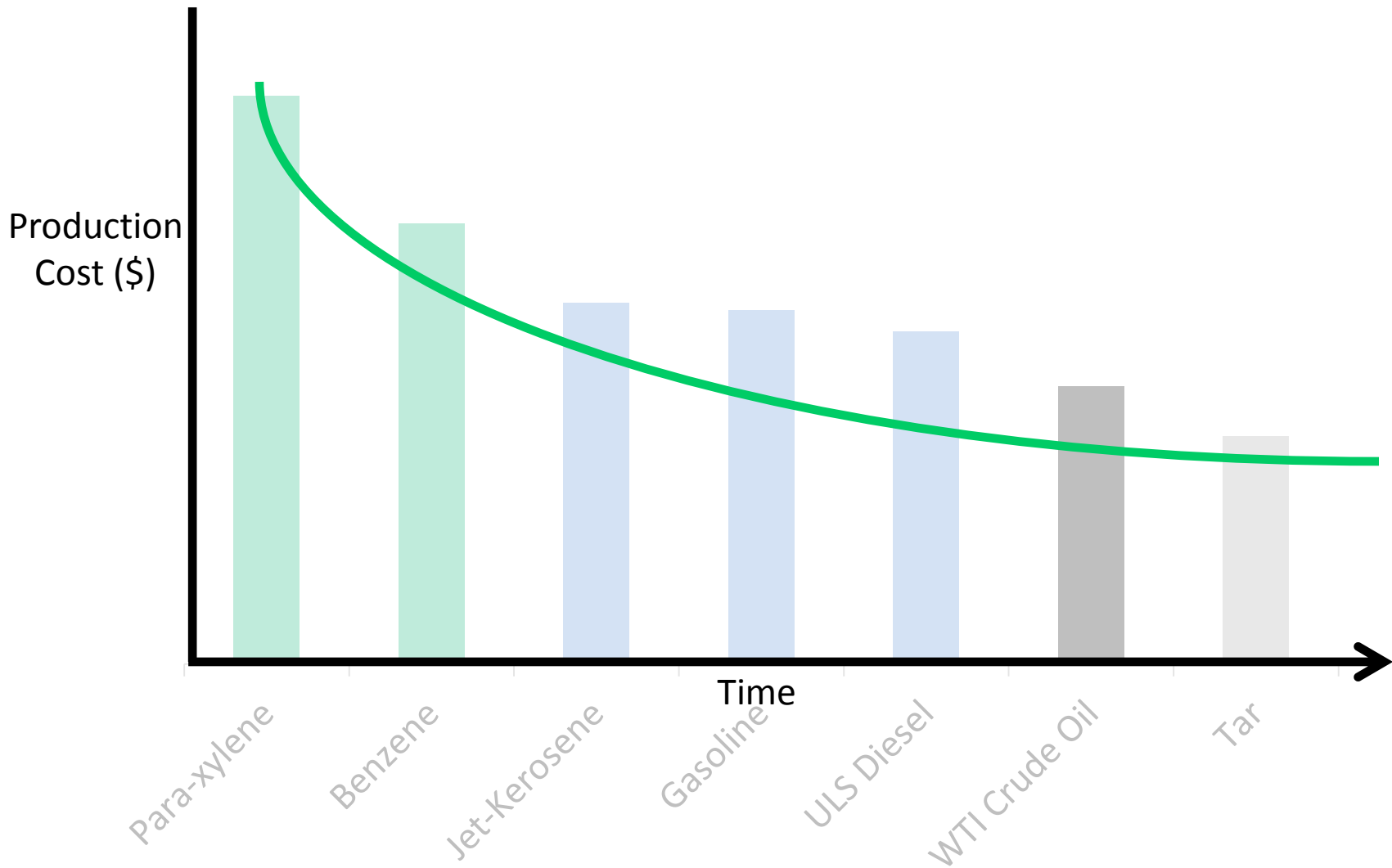
...and what is it worth?



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Innovation cost curve



Innovations in Bio-PET and Bio-aromatics



Dasani turnaround

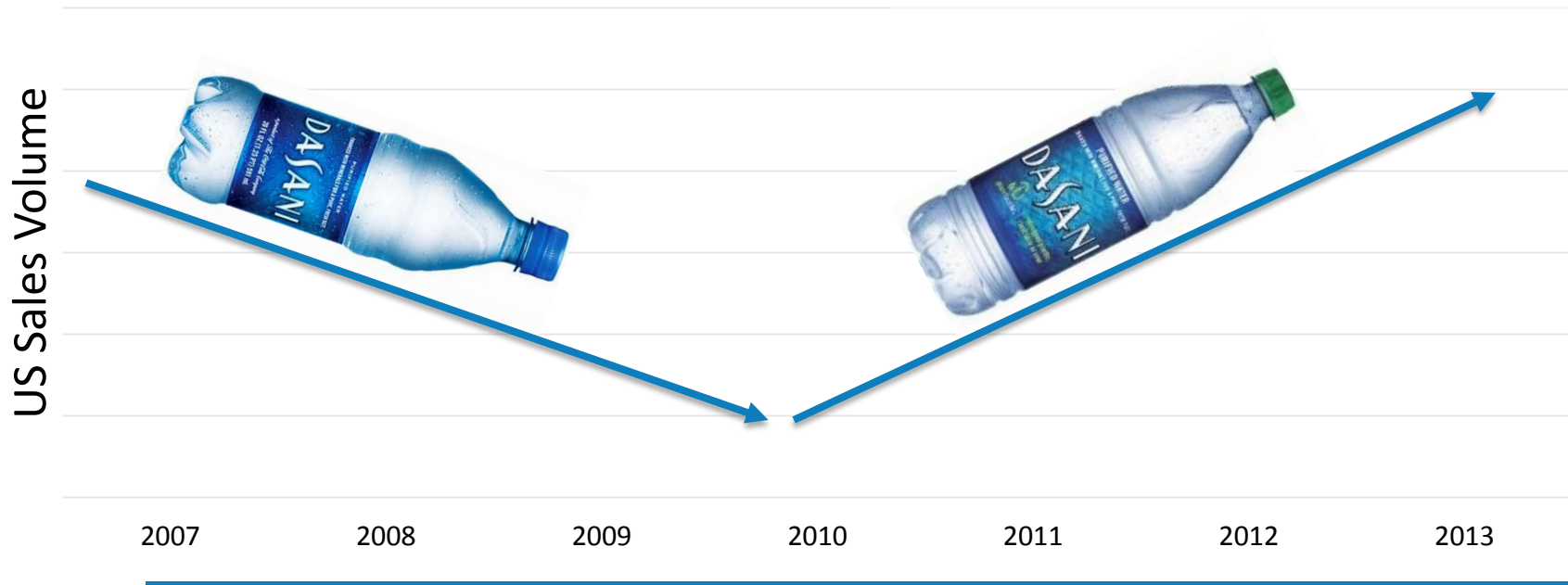
New York Times, Oct 20th 2009

Mr. Kent said that sales of Dasani brand water in North America were **down by more than 19 percent**. Sales of multipacks of Dasani, a popular packaging for water, were down even more, he said.

Muhtar Kent, Oct 2012

(KO earnings call)

“The rest of our North America water business **grew 4% in the quarter**, led by Dasani which maintained its **premium price position** and saw further gains across key brand equity measures driven by consumer awareness of our **innovative plant bottle packaging.**”





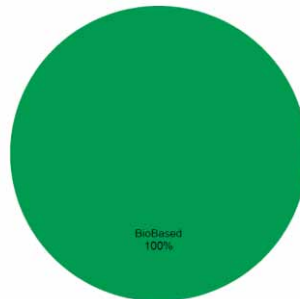
Steady Progress Towards 100% Renewable PET

100% renewable bottles
successfully made using:



Mean Biobased Result : 100 %

Proportions Biobased vs. Fossil Based
indicated by 14C content



30% bio-PET in products



Advanced performance materials

Many made with aromatic monomers



Summary

- Bio-based aromatics can address some of the challenges facing the BTX value chain
- 30% bio-PET is already proving to be a success and there is great demand for 100% bio-PET
- Bio-based aromatic chemicals form a solid complement for co-development and commercialization of biofuels





Thank you.

Andrew Held
Senior Director, Deployment and Engineering
andrew_held@virent.com

