



Scaling the recycled plastics eco-system- an OEM perspective

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Three things I hope you'll take away from this talk

1. **What is driving the usage** of recycled plastic in computers & printers?
2. **What are the challenges** to scaling the usage of recycled plastic in IT hardware?
3. **What is the key ingredient to scale** recycled plastic usage in IT hardware?



Every 60 Seconds....

HP EMEA delivers to our customers



50 *PC & Tablets*



35 *Printers*



550 *Ink & Toner*
supplies + PC accessories



Sustainability at HP



Engineered with integrity

- Industry-leading supply chain practices
- Workers rights, safety, and privacy
- Carbon reduction goals across the value chain



Full circle innovation

- Leader in eco-labelled PCs and printers
- Closed loop recycling
- Service-based models
- Next-generation digital printing technology



Enabling everyone

- HP Jet Fusion 3D printing solution
- HP LIFE
- HP Future Classroom
- Volunteerism at HP

Sustainability has value to many stakeholders



Customers call for it

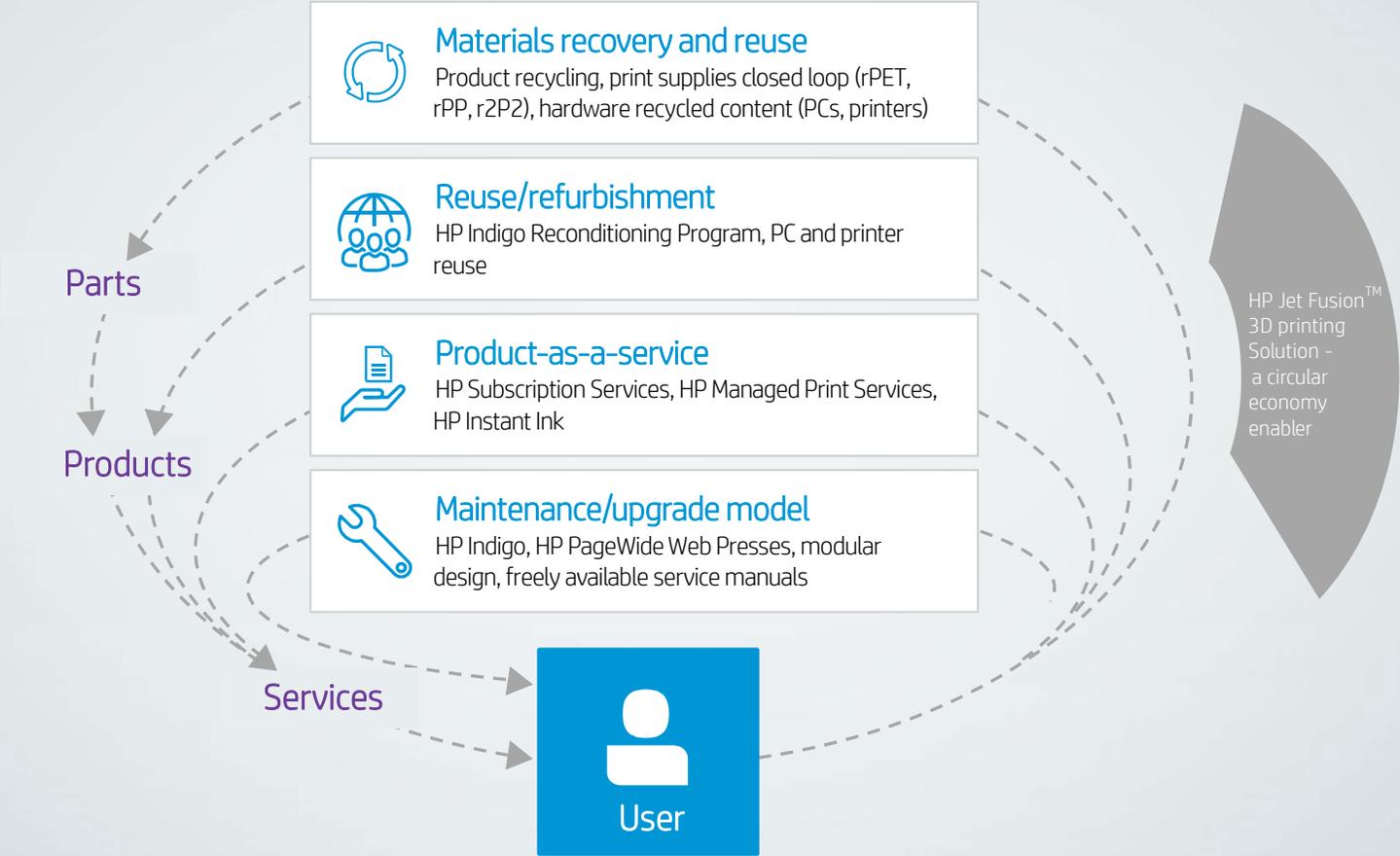


Employees value it



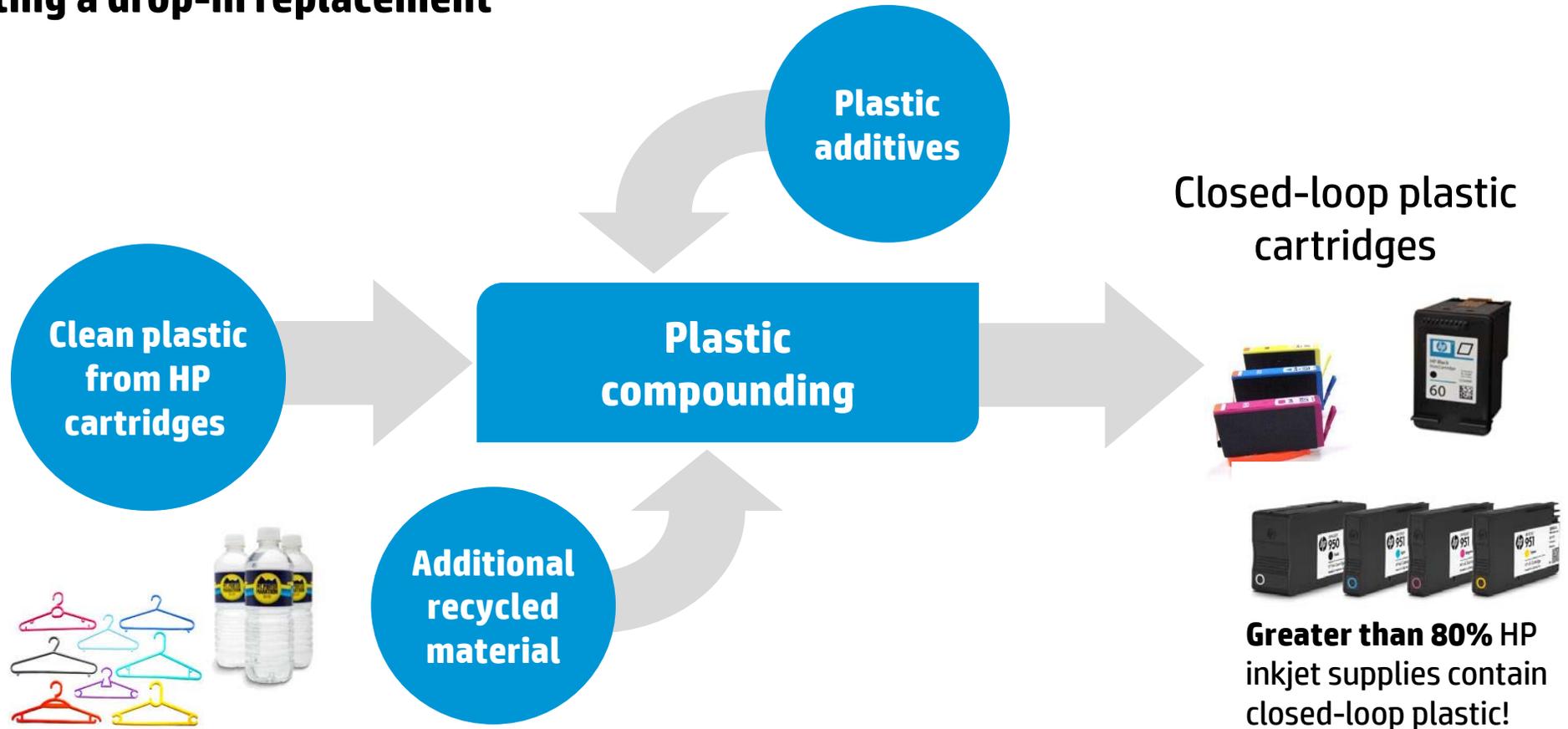
Investors watch for it

Propelling a more circular economy



Innovation – closed loop resin formulation

Creating a drop-in replacement



Closed-loop plastic development results

How much and how many?

126m

Pounds recycled content material used since program start

- More than 3,150 forty foot RC container loads*
- Over container RC material per day for past seven years

* Assumes 40,000 pound container loads

3.2B

Cartridges manufactured with recycled content material

- More than 3.8 billion PET water/soda bottles used
- More than 75 million PP hangers used

HP's closed-loop ink program diverts **1 million** water bottles per day from landfill



3.8 billion water bottles stacked end to end - would reach to the moon and back



Manufacturing Original HP ink cartridges with recycled plastics for past three years¹

How the numbers added up for 2013-2015



33% carbon footprint reduction

Like taking **1,375** cars off the road each of last 3 years²



54% reduction in fossil fuel consumption

Conserved more than **120,000** barrels of oil³



75% LESS water used

Enough to supply **283 million** American households for a day⁴

¹ For rPET cartridges produced in 2013 and beyond. Based on a 2014 life cycle assessment (LCA) performed by Four Elements Consulting and commissioned by HP. The study compared the environmental impact of using polyethylene terephthalate (PET) plastic with the environmental impact of using recycled PET to manufacture new Original ink cartridges. For details see www.hp.com/recycledplasticsLCA

² Calculated with the EPA Greenhouse Gas Equivalencies Calculator. For details, see www.epa.gov/cleanenergy/energy-resources/calculator.html

³ Assumes 7.5 barrels of oil in a metric ton.

⁴ Calculated with the US Dept of Interior, US Geological Survey data <http://ga.water.usgs.gov/edu/qahome.html>

Advancing responsible recycling in Haiti

Providing landfill workers in Haiti with educational, training, and healthcare opportunities

Purchasing recycled PET plastic to manufacture new HP print cartridges

Creating more sustainable jobs and driving a more inclusive circular economy by opening up new markets for collected plastic

Photo courtesy of Thread



Key Challenges to Scaling Recycled Plastic Use in IT Hardware

1. Material properties of plastic required in new products
 - Mechanical
 - Cosmetic
 - Regulatory
2. Operational challenges of achieving those properties with recycled resin vs virgin resin
 - Cost compare to virgin
 - Assurance of supply at necessary volumes



When it comes to Recycled Plastic Usage, Commercial Displays Lead the Way



- 23 current HP commercial displays are TCO Edge certified!
 - Received TCO Edge certification through using 85% post-consumer recycled plastic (according to TCO definition)
- In 2016, 70% of HP commercial displays shipped with more than 10% post-consumer recycled plastic.
- 7 commercial displays introduced in 2016 shipped with more than 30% post-consumer recycled plastic (according to EPEAT definition)

Ecolabels drive market demand for recycled plastic in computers & displays

	current EPEAT criteria	draft EPEAT 2.0 criteria (2018/19)
Minimum level of PCR plastic required to earn <u>minimum</u> eco-label tier (bronze)	0%	2%
Optional criterion for PCR plastic that can be earned to achieve silver and gold tiers	1 point 10% 2 points 25% frequently used by desktops and displays to reach gold tier; rarely used by mobile products	<ul style="list-style-type: none"> Levels <u>increasing</u> for desktops, AiO, and displays due to solid adoption rates demonstrated in EPEAT registry Levels <u>decreasing</u> for notebooks and tablets due to low current adoption rates in EPEAT registry
Optional criterion that incentivize the use of certified <u>closed loop</u> PCR plastic	NO	YES 3 rd optional point for 10% <u>certified</u> closed loop PCR plastic



TCO-edge 2.0 from July 2014 requires **85%** PCR.



EPEAT 2.0 recycled plastic implications for industry

- Required 2% recycled plastic content requirement will drive
 - higher use of recycled plastic notebooks
 - higher % of products that have *some* recycled content
- Unclear if this will drive total recycled plastic usage up or down
 - Underlying standard appears to be growing dramatically and shifting emphasis towards corporate criteria
 - Standard is still potentially a year from publishing and it's likely that design teams will wait for dust to settle before responding



Ecolabels drive market demand for recycled plastic in printers too



	Current EPEAT criteria (2012)
Mandatory level of PCR criterion (4.2.1.2)	> 5 grams postconsumer recycled plastic
Optional PCR criterion #1 (4.2.1.3)	> 5% or 10% postconsumer recycled plastic
Optional PCR criterion #2 (4.2.1.4)	>25% postconsumer recycled plastic

In 2015, HP Launched 5 EPEAT Gold LaserJet Printers in the US

Nearly all HP Gold models feature :

- Recovered content in fiber-based packaging (required)
- 5% content of postconsumer recycled plastic
- 90 % recyclable packaging



HP LaserJet Enterprise M506DN*
(Gold: US Gov Sku- Only)



HP LaserJet Enterprise M402DN*
(Gold: US Gov Sku- Only)



HP LaserJet Enterprise Flow MFP M527c*
HP LaserJet Managed Flow MFP M527cm*
HP LaserJet Enterprise Flow MFP M527z *
(GOLD: US SKU)



Closing the plastic loop

Keys to HP's closed-loop plastic success



Innovation in recycling and RCP solutions

With no precedent or roadmap, creativity and invention essential



Partnering with innovative suppliers

Collaboration with partners leveraged core competencies



Patience and persistence through development process

Management provided team time and resources for success



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A black and white portrait of David Packard, an elderly man with a thoughtful expression, resting his chin on his hand. He is wearing a light-colored shirt and a dark tie.

Thank you

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Digital Europe Paper on Best Practices in Recycled Plastics:

<http://www.digitaleurope.org/Digital-Headlines/Story/newsID/511>

“The betterment of our society is not a job to be left to a few. It is a responsibility to be shared by all”

David Packard

