



# INVESTOR PRESENTATION

November 2019



**PQ Corporation**

Simpler +  
**STRONGER**

# LEGAL DISCLAIMER

## Forward-Looking Statements

Some of the information contained in this presentation constitutes “forward-looking statements”. Forward-looking statements can be identified by words such as “anticipates,” “intends,” “plans,” “seeks,” “believes,” “estimates,” “expects,” “projects” and similar references to future periods. Forward-looking statements are based on our current expectations and assumptions regarding our business, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict. Examples of forward looking statements include, but are not limited to, statements regarding our results of operations, financial condition, liquidity, prospects, growth, strategies, product and service offerings and 2019 outlook. Our actual results may differ materially from those contemplated by the forward-looking statements. We caution you, therefore, against relying on any of these forward-looking statements. They are neither statements of historical fact nor guarantees or assurances of future performance. Important factors that could cause actual results to differ materially from those in the forward-looking statements include, but are not limited to, regional, national or global political, economic, business, competitive, market and regulatory conditions, currency exchange rates and other factors, including those described in the sections titled “Risk Factors” and “Management Discussion & Analysis of Financial Condition and Results of Operations” in our filings with the SEC, which are available on the SEC’s website at [www.sec.gov](http://www.sec.gov). Any forward-looking statement made by us in this presentation speaks only as of the date on which it is made. Factors or events that could cause our actual results to differ may emerge from time to time, and it is not possible for us to predict all of them. We undertake no obligation to update any forward-looking statement, whether as a result of new information, future developments or otherwise, except as may be required by applicable law.

Certain supply share statistics included in this presentation, including our estimated supply share positions, are based on management estimates.

## Non-GAAP Financial Measures

This presentation includes certain non-GAAP financial measures, including adjusted EBITDA, adjusted EBITDA margin, Adjusted diluted EPS, Adjusted net income and adjusted free cash flow which are provided to assist in an understanding of our business and its performance. These non-GAAP financial measures should be considered only as supplemental to, and not as superior to, financial measures prepared in accordance with GAAP. Non-GAAP financial measures should be read only in conjunction with consolidated financials prepared in accordance with GAAP. Reconciliations of non-GAAP measures to the relevant GAAP measures are provided in the appendix of this presentation.

The Company is not able to provide a reconciliation of the Company’s non-GAAP financial guidance to the corresponding GAAP measures without unreasonable effort because of the inherent difficulty in forecasting and quantifying certain amounts necessary for such a reconciliation such as certain non-cash, nonrecurring or other items, including transaction and restructuring related items, that are included in net income and EBITDA as well as the related tax impacts of these items and asset dispositions/acquisitions and changes in foreign currency exchange rates that are included in cash flow, due to the uncertainty and variability of the nature and amount of these future charges and costs.

## Non-GAAP Financial Measures – Business Combination

On May 4, 2016, we consummated a series of transactions (the “Business Combination”) to reorganize and combine the businesses of PQ Holdings Inc. and Eco Services Operations LLC under a new holding company, PQ Group Holdings Inc. In this presentation, we present pro forma information for the years ended December 31, 2016 and 2015, which gives effect to the Business Combination and the related financing transactions as if they occurred on January 1, 2015. Such information is illustrative and not intended to represent what our results of operations would have been had the Business Combination and related financing transactions occurred at any time prior to May 4, 2016 or to project our results of operations for any future period. Such information may not be comparable to, or indicative of, future performance.

## Zeolyst Joint Venture

Zeolyst International and Zeolyst C.V. (our 50% owned joint ventures that we refer to collectively as our “Zeolyst Joint Venture”) are accounted for as an equity method investment in accordance with GAAP. The presentation of our Zeolyst Joint Venture’s sales in this presentation represents 50% of the sales of our Zeolyst Joint Venture. We do not record sales by our Zeolyst Joint Venture as revenue and such sales are not consolidated within our results of operations. However, our Adjusted EBITDA reflects our share of the earnings of our Zeolyst Joint Venture that have been recorded as equity in net income from affiliated companies in our consolidated statements of income for such periods and includes Zeolyst Joint Venture adjustments on a proportionate basis based on our 50% ownership interest. Accordingly, our Adjusted EBITDA margins are calculated including 50% of the sales of our Zeolyst Joint Venture for the relevant periods in the denominator.

# PQ CORPORATION



OUR COMPANY

**BY THE NUMBERS**



~200 years in business



~3,200 employees



6 continents



~4,000 global customers



~70 manufacturing facilities

## OVERVIEW

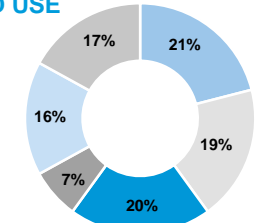
- Founded in 1831
- Headquarters in Malvern, PA
- IPO in September 2017

## 2018 FINANCIAL HIGHLIGHTS

- Revenues: ~ \$1.6 Billion
- Adjusted EBITDA: \$464 Million
- Adjusted EBITDA Margin: ~ 26%
- Cash from Operations: ~ \$250 Million

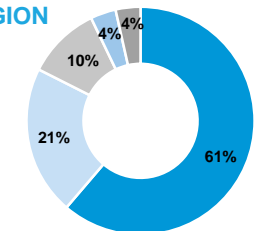
## 2018 SALES AND ZEOLYST JV SALES BY REGION AND END USE<sup>1</sup>

### END USE



- Fuels & Emissions Controls
- Highway Safety & Construction
- Industrial & Process Chemicals
- Natural Resources
- Consumer Products
- Packaging & Engineered Plastics

### REGION



- North America
- Europe
- Asia
- Rest of World
- South America

(1) Sales include proportionate 50% share of sales from Zeolyst joint venture

# OUR BUSINESS UNITS

## REFINING SERVICES



### Increased octane demand

- Sulfuric acid production expertise
- End-to-end logistics and services

(\$ MM)	2018
Sales	455.6
Adjusted EBITDA	176.5
Adjusted EBITDA Margin	38.7%

- > 50% US supplier of regeneration demand
- > 70% of regeneration contracts under 5 – 10 year take-or-pay terms
- ~90% costs protected with pass-through

## CATALYSTS<sup>1</sup>



### Tighter fuels standards Light weighting demand

- Tailored catalyst solutions
- Zeolite IP chemistry expertise

(\$ MM)	2018
Silica Catalysts Sales	72.1
Zeolyst JV Sales	156.7
Adjusted EBITDA	81.1
Adjusted EBITDA Margin <sup>2</sup>	35.4%

- Leading catalyst supplier for hydrocracking sulfur removal
- Supplier to top 3 NOx emission control producers
- Specified with top silica licensors & sole supplier to top MMA producer

## PERFORMANCE MATERIALS



### Higher highway safety standards

- ~100 years glass technology leader
- Innovation in microspheres and thermoplastics technology

(\$ MM)	2018
Sales	378.3
Adjusted EBITDA	72.5
Adjusted EBITDA Margin	19.2%

- Lead bead supplier to NA, Europe, Latin America
- Breadth of supply to diverse end markets
- Pricing and cost protection enabled by transactional volume and diverse customer and market base

## PERFORMANCE CHEMICALS



### Environmentally driven consumer demand

- Silicate/Zeolite innovation
- Tailored product sizing and coating

(\$ MM)	2018
Sales	717.3
Adjusted EBITDA	170.9
Adjusted EBITDA Margin	23.8%

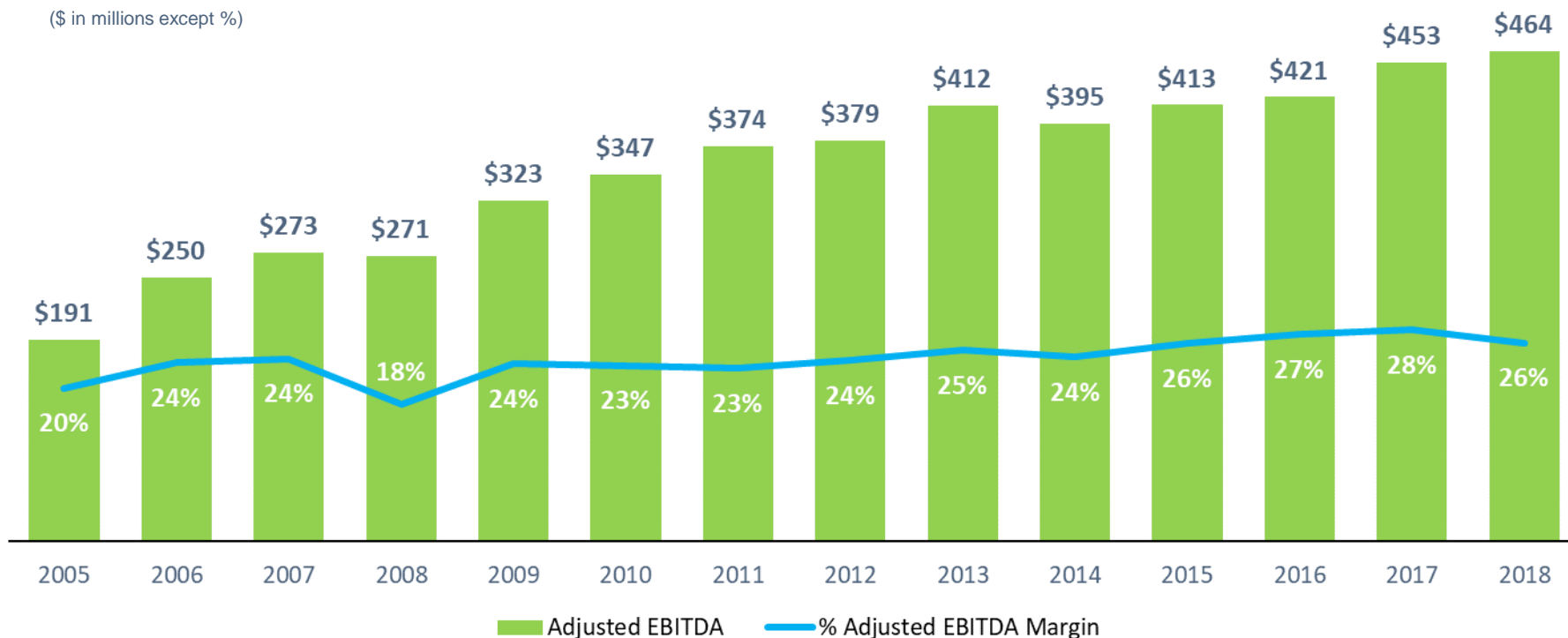
- Largest global supplier of sodium silicate
- > 70% sales contracted for 1 – 3 year terms
- A large component of our North America material cost protected with pass-through

**Leading Furnace Technology / Material Science Capabilities / Global Operational Network**

# FINANCIAL PERFORMANCE ACROSS MACROECONOMIC CYCLES

## Adjusted EBITDA and Adjusted EBITDA Margin (%)<sup>1,2,3</sup>

(\$ in millions except %)



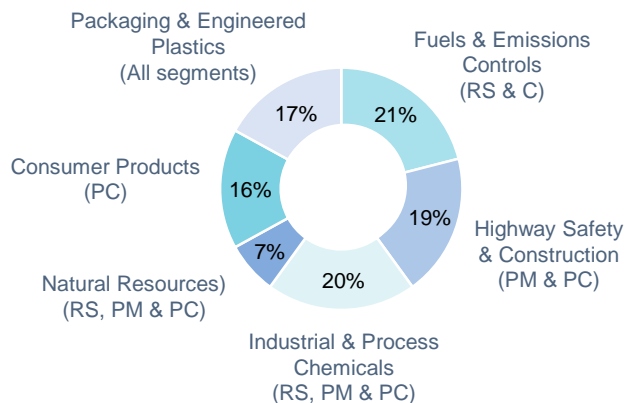
(1) Adjusted EBITDA for the period from 2005 to 2014 represents Legacy Eco Adjusted EBITDA and Legacy PQ Adjusted EBITDA prior to the Business Combination. Adjusted EBITDA for 2015 and 2016 is presented on a pro forma basis to give effect to the Business Combination as further described in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2017

(2) See Reconciliations for additional information regarding Adjusted EBITDA, including a reconciliation of the amounts to net income (loss) for each of the periods presented as well as information regarding the Legacy Eco and Legacy PQ financial information included in such amounts

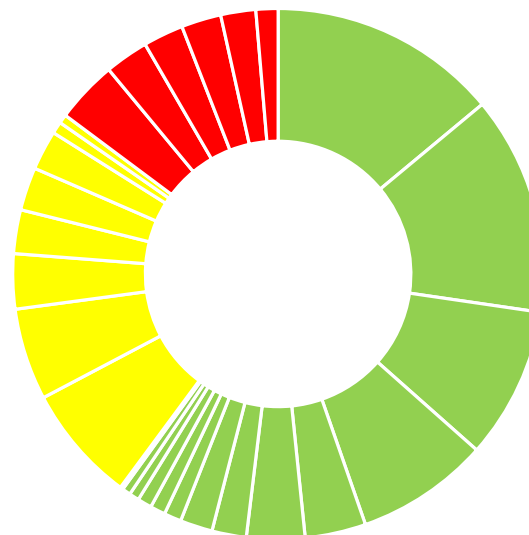
(3) Adjusted EBITDA margin calculation includes proportionate 50% share of sales from Zeolyst Joint Venture

# A PORTFOLIO OF STABILITY

% of 2018 Sales by End Use<sup>1</sup>



End Markets Categorized by Sensitivity to Downturn<sup>2</sup>



Six Primary End Uses  
Serve ~28  
Secondary End Uses

Sensitivity to Economic Downturn (% of Sales)





# PQ's SUSTAINABLE BUSINESS MODEL

## Inorganic Materials Drive ~ 3/4 of our Sales




### REFINING SERVICES



-  Largest North America recycler of spent sulfuric acid, avoiding 1.5 million tons of landfill or deep well disposal annually
-  One of largest consumers of refinery by-product sulfur, converting for other applications
-  World class low SO<sub>2</sub> emissions




### CATALYSTS



-  Remove sulfur from diesel fuel for land and marine transportation
-  Reduce NO<sub>x</sub> emissions from diesel engines by ~80%
-  Improve fuel economy by reducing friction in lubricants





### PERFORMANCE MATERIALS



-  Recycle > 1 billion pounds of glass per year, avoiding landfill use
-  Improve safety and save lives through superior road and airport marking technologies
-  Glass bead applications provide alternative to petroleum-based solvents for industrial cleaning and surface finishing applications

### PERFORMANCE CHEMICALS



-  Silica-based sensory particles for personal care products replace plastic spheres
-  Specialty silicas for use in low VOC environmentally-friendly coatings
-  Sodium silicate is a feedstock in production of silica to replace carbon black in fuel efficient "green tires"
-  Sodium silicates inhibit corrosion in municipal water treatment pipelines

 Safety Conscious

 Emissions

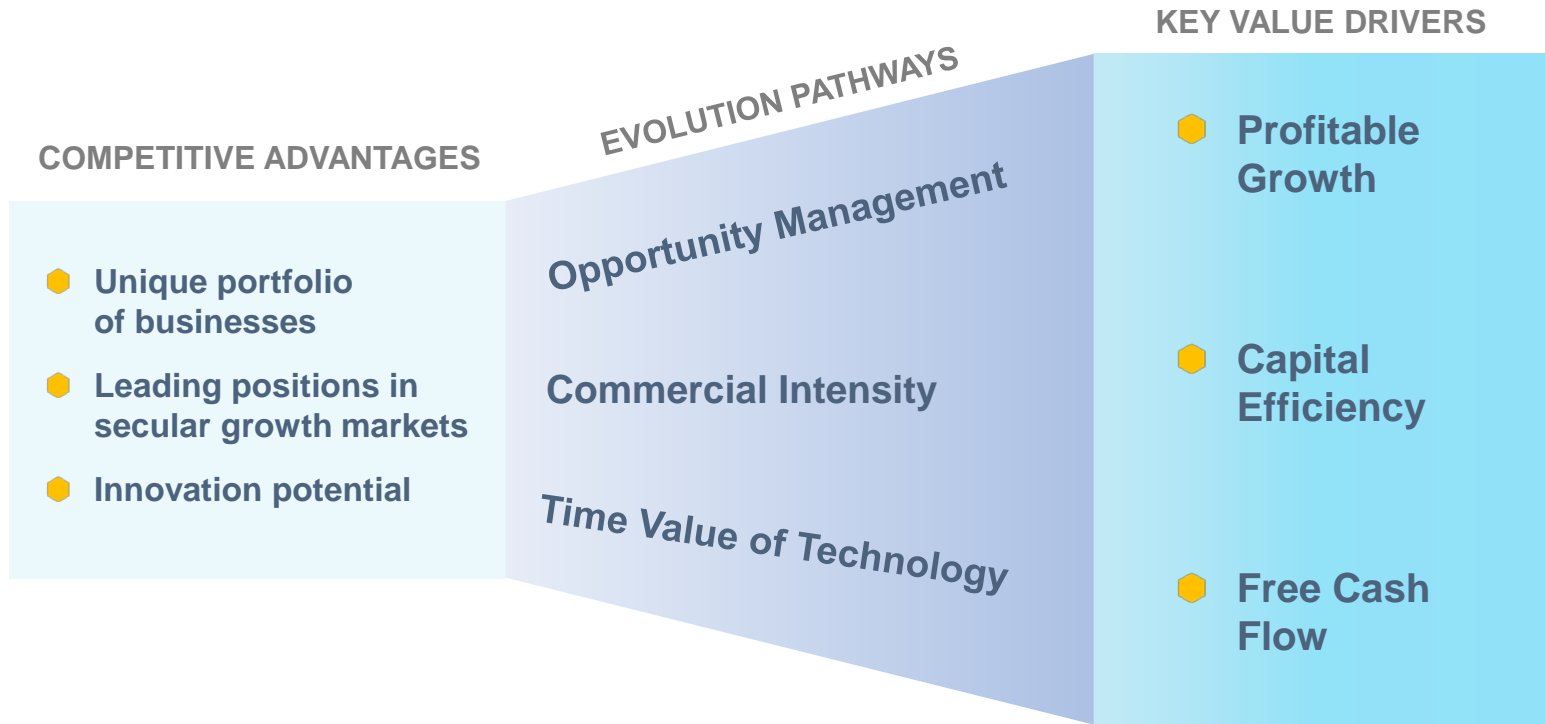
 Recyclability

 Environmentally Friendly

 Efficient Energy Usage

 Innovative Green Solution

# PORTFOLIO STRENGTHS AND PRIORITIES





# WHY PQ's SPECIALTY CHEMICAL PORTFOLIO?



#1 and #2 positions in nearly all product lines



Sustainable growth from diverse underlying secular macro trends



Input cost small as percentage of customer total product cost



Track record of innovation and customer collaboration



Environmentally friendly end market applications and solutions



Stable, high-margins drive strong sustainable free cash flow

# SUPPLEMENTAL INFORMATION

# SUPPLEMENTAL INFORMATION

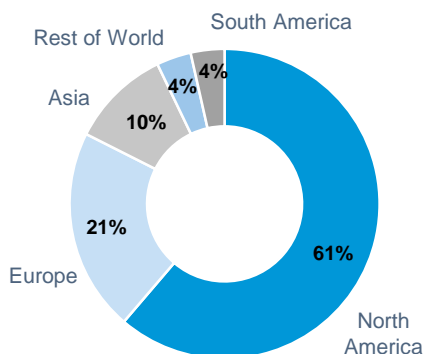
## 2018 Capital Expenditures, Capitalization, Sales by End Use and Region

CAPITAL EXPENDITURES <sup>1</sup> (\$ in millions)	Full Year 2018
Maintenance <sup>2</sup>	94.7
Growth <sup>3</sup>	37.0
<b>Total</b>	<b>131.7</b>

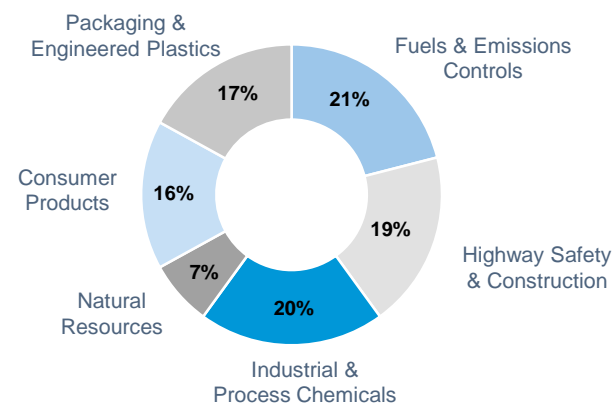
% OF SALES GROWTH BY END USE <sup>4</sup>	
Fuels & Emissions Controls	+ 6%
Highway Safety & Construction	+ 19%
Industrial & Process Chemicals	+ 6%
Natural Resources	+ 16%
Consumer Products	+ 1%
Packaging & Engineered Plastics	+ 13%

CAPITALIZATION	2018
<b>Debt:</b>	<b>(\$ in millions)</b>
ABL Revolving Credit Facility	—
USD First Lien Term Loan	1,157.5
First Lien Secured Notes	625.0
<b>Total First Lien Debt</b>	<b>1,782.5</b>
Senior Unsecured Notes	300.0
Other debt	65.9
<b>Total Debt</b>	<b>2,148.4</b>
Cash	57.9
<b>Net Debt</b>	<b>2,090.5</b>
<b>Net Debt/Adjusted EBITDA</b>	<b>4.5x</b>

% SALES BY REGION<sup>4</sup>



% OF SALES BY END USE<sup>4</sup>



# MACRO INDUSTRY TRENDS

## Turbocharged Engines

**+7%**

North America CAGR from 2018 – 2025; turbo vehicles rise to ~40% of total NA vehicles in 2025 from ~25% in 2018



## Heavy Duty Diesel Emissions

**+2x**

Global catalyst consumption growth between 2020 – 2025 with China VI implementation



## Silicates & Silicas

**+2 – 3%**

Global CAGR consumption from 2017 – 2022 of sodium silicates and specialty silicas



## Hydrocracking

**+6%**

Global CAGR for capacity expansions from 2018 – 2022 to meet higher standards for lower sulfur in fuels



## Transportation Safety

**+4%**

Global CAGR from 2018 – 2023 for traffic marking paints



## Polyethylene

**+4 – 5%**

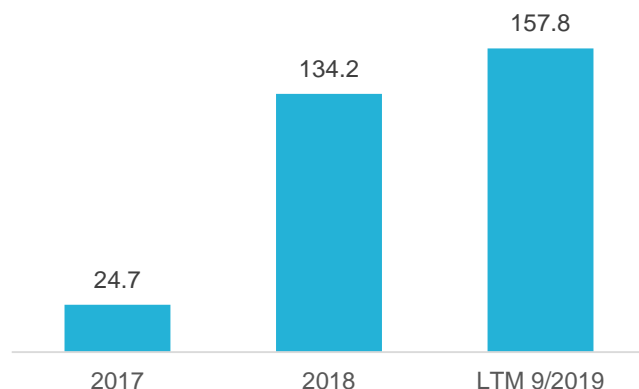
Global CAGR from 2017 to 2024 for PE capacity expansions



# ADJUSTED FREE CASH FLOW AND LEVERAGE RATIO

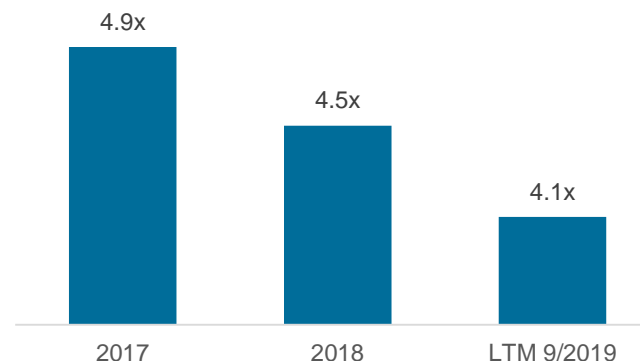
## ADJUSTED FREE CASH FLOW (\$mm)

Adjusted Free Cash Flow used to repay debt



## NET DEBT/ADJUSTED EBITDA RATIO

Progress to leverage target of 3.0 – 3.5x



- Fixed/floating ratio of 90/10 limits exposure to higher interest rates
  - Interest rate caps extend through July 2022
- Weighted average cost of debt of ~5%
- No near-term maturities; no pre-pay penalty on term loan

# QUARTERLY SEGMENT SALES, ADJUSTED EBITDA AND MARGINS

Third Quarter 2019, Year-to-Date 2019 and Year 2018

(\$ in millions except %, unaudited)	Three Months Ended			Nine Months Ended	Three Months Ended				Year Ended
	March 31, 2019	June 30, 2019	September 30, 2019	September 30, 2019	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018	December 31, 2018
<b>Sales:</b>									
Refining Services	105.8	117.3	118.3	341.5	100.7	112.1	123.4	119.4	455.6
Silica Catalysts	15.9	20.9	25.6	62.3	16.5	17.3	16.3	22.0	72.1
Performance Materials	61.1	118.9	115.1	295.1	62.7	126.5	115.4	73.7	378.3
Performance Chemicals	180.5	177.8	167.9	526.2	190.0	183.8	174.7	168.8	717.3
Eliminations	(4.1)	(3.2)	(3.1)	(10.4)	(3.7)	(5.0)	(2.6)	(3.8)	(15.1)
<b>Total sales</b>	<b>359.2</b>	<b>431.7</b>	<b>423.8</b>	<b>1,214.7</b>	<b>366.2</b>	<b>434.7</b>	<b>427.2</b>	<b>380.1</b>	<b>1,608.2</b>
Zeolyst joint venture sales	29.5	39.1	54.4	123.0	38.3	49.5	32.3	36.6	156.7
<b>Adjusted EBITDA:</b>									
Refining Services	39.7	42.8	51.2	133.7	35.5	41.3	49.6	50.1	176.5
Catalysts	18.1	29.6	31.6	79.4	22.9	23.6	15.7	18.9	81.1
Performance Materials	10.5	29.2	25.8	65.5	12.1	28.6	21.3	10.5	72.5
Performance Chemicals	42.7	41.2	36.8	120.6	45.1	44.8	41.8	39.2	170.9
<b>Total Segment Adjusted EBITDA</b>	<b>111.0</b>	<b>142.8</b>	<b>145.4</b>	<b>399.2</b>	<b>115.6</b>	<b>138.3</b>	<b>128.4</b>	<b>118.7</b>	<b>501.0</b>
Corporate	(10.0)	(10.3)	(7.7)	(28.0)	(7.7)	(9.4)	(10.3)	(9.6)	(37.0)
<b>Total Adjusted EBITDA</b>	<b>101.0</b>	<b>132.5</b>	<b>137.7</b>	<b>371.2</b>	<b>107.9</b>	<b>128.9</b>	<b>118.1</b>	<b>109.1</b>	<b>464.0</b>
<b>Adjusted EBITDA Margin:</b>									
Refining Services	37.5%	36.5%	43.3%	39.2%	35.3%	36.8%	40.2%	42.0%	38.7%
Catalysts <sup>1</sup>	40.0%	49.4%	39.5%	42.8%	41.8%	35.3%	32.3%	32.3%	35.4%
Performance Materials	17.2%	24.6%	22.4%	22.2%	19.3%	22.6%	18.5%	14.2%	19.2%
Performance Chemicals	23.7%	23.1%	21.9%	22.9%	23.7%	24.4%	23.9%	23.2%	23.8%
<b>Total Adjusted EBITDA Margin<sup>1</sup></b>	<b>26.0%</b>	<b>28.1%</b>	<b>28.8%</b>	<b>27.7%</b>	<b>26.7%</b>	<b>26.6%</b>	<b>25.7%</b>	<b>26.2%</b>	<b>26.3%</b>

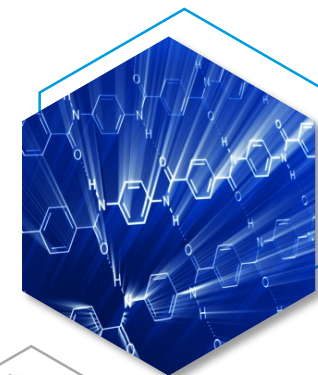


# ADJUSTED FREE CASH FLOW

(\$ in millions)	Nine Months Ended September 30, 2019	Three Months Ended December 31, 2018	LTM September 30, 2019	Full Year 2018	Full Year 2017
<b>Cash Flow from Operations before interest and tax</b>	<b>277.5</b>	<b>111.8</b>	<b>389.3</b>	<b>377.5</b>	<b>364.5</b>
Less:					
Cash paid for taxes	13.3	7.7	21.0	23.8	29.2
Cash paid for interest <sup>1</sup>	82.3	21.5	103.8	105.1	170.1
<b>Cash Flow from Operations</b>	<b>181.9</b>	<b>82.6</b>	<b>264.5</b>	<b>248.6</b>	<b>165.2</b>
Less: Purchases of property, plant and equipment <sup>2</sup>	91.7	36.4	128.1	131.7	140.5
<b>Free Cash Flow</b>	<b>90.2</b>	<b>46.2</b>	<b>136.4</b>	<b>116.9</b>	<b>24.7</b>
Plus: Proceeds from sale of assets	—	12.4	12.4	12.4	—
Plus: Net interest proceeds on currency swaps	8.4	0.6	9.0	4.9	—
<b>Adjusted Free Cash Flow</b>	<b>98.6</b>	<b>59.2</b>	<b>157.8</b>	<b>134.2</b>	<b>24.7</b>

# 2019 GUIDANCE UPDATE

(\$ in millions, except % and per share)	2018 Actual	2019 Outlook
Sales	1,608.2	1,560 – 1,580
Adjusted EBITDA	464.0	470 – 485
<b>Adjusted Free Cash Flow</b>	<b>134.2</b>	<b>125 – 145<sup>1</sup></b>
Adjusted Diluted EPS	0.87	0.84 – 0.87
Interest Expense	113.7	112 – 116
Depreciation & Amortization		
PQ	185.2	180 – 185
Zeolyst JV	12.6	14 – 16
Capital Expenditures	131.7	130 - 135
Effective Tax Rate (ex tax reform)	23.5%	mid 20%



**Raising debt repayment to \$170 million to \$190 million**

Note: Guidance issued as of Third Quarter 2019 Earnings Call on October 31, 2019

(1) Excludes sale proceeds from sulfate salts product line of \$28 million in Q219 and swap restructuring of \$38 million in Q419

# RECONCILIATION OF SALES AND ADJUSTED EBITDA

## 2005 – 2018

(\$ in millions)	Year Ended December 31,													2018
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 Pro forma <sup>3</sup>	2016 Pro forma <sup>3</sup>	2017	
<b>Reconciliation of sales and adjusted EBITDA</b>														
Legacy PQ Sales <sup>1</sup>	635.3	708.6	775.0	977.0	1,009.9	1,087.9	1,115.0	1,084.8	1,085.0	1,114.9				
Legacy Eco Services Sales <sup>2,5</sup>	260.2	288.7	289.4	449.4	293.9	331.0	415.4	410.4	390.8	397.4				
<b>Total Sales</b>	<b>895.5</b>	<b>997.3</b>	<b>1,064.4</b>	<b>1,426.4</b>	<b>1,303.8</b>	<b>1,418.9</b>	<b>1,530.4</b>	<b>1,495.2</b>	<b>1,475.8</b>	<b>1,512.3</b>	<b>1,413.2</b>	<b>1,403.0</b>	<b>1,472.1</b>	<b>1,608.2</b>
<b>Zeolyst Joint Venture total net sales</b>	<b>45.6</b>	<b>60.4</b>	<b>63.8</b>	<b>69.4</b>	<b>63.2</b>	<b>69.9</b>	<b>99.0</b>	<b>87.3</b>	<b>148.5</b>	<b>106.7</b>	<b>159.8</b>	<b>131.3</b>	<b>143.8</b>	<b>156.7</b>
Legacy PQ Adjusted EBITDA <sup>1</sup>	119.6	151.2	177.3	164.3	225.4	253.8	274.6	268.7	306.8	288.1				
Legacy Eco Services Adjusted EBITDA <sup>2</sup>	71.5	99.0	96.0	106.4	97.5	93.6	99.8	110.8	105.5	107.2				
<b>Total Adjusted EBITDA</b>	<b>191.1</b>	<b>250.2</b>	<b>273.3</b>	<b>270.7</b>	<b>322.9</b>	<b>347.4</b>	<b>374.4</b>	<b>379.5</b>	<b>412.3</b>	<b>395.3</b>	<b>413.2</b>	<b>420.8</b>	<b>453.3</b>	<b>464.0</b>
<b>% Adjusted EBITDA Margin<sup>4</sup></b>	<b>20.3%</b>	<b>23.7%</b>	<b>24.2%</b>	<b>18.1%</b>	<b>23.6%</b>	<b>23.3%</b>	<b>23.0%</b>	<b>24.0%</b>	<b>25.4%</b>	<b>24.4%</b>	<b>26.3%</b>	<b>27.4%</b>	<b>28.1%</b>	<b>26.3%</b>

(1) Legacy PQ is the results of PQ Holdings Inc. prior to the Business Combination in May 2016

(2) Legacy Eco Services is the results of Eco Services which prior to December 1, 2014 was part of Solvay / Rhodia. Information for 2005 through 2010 is derived from financial information obtained in connection with the acquisition of Legacy Eco and is unaudited and, in some cases, is based upon management estimates

(3) Reflects unaudited pro forma results which gives effect to the Business Combination

(4) Adjusted EBITDA margin calculation includes proportionate 50% share of sales from Zeolyst Joint Venture

(5) Amounts presented for Legacy Eco Services in 2014 includes \$361.8 and \$35.5 of sales and \$98.1 and \$9.1 of Adjusted EBITDA for the predecessor and successor periods, respectively. Refer to reconciliations for additional details.

# RECONCILIATIONS FOR ADJUSTED EBITDA

2005 – 2014 Legacy PQ<sup>1</sup> Net Income (Loss) to Adjusted EBITDA Reconciliation

	Year Ended December 31,									
(\$ in millions)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>Reconciliation of net income (loss) attributable to Legacy PQ to Adjusted EBITDA</b>										
Net income (loss) attributable to Legacy PQ	(41.9)	14.2	(64.7)	(168.2)	(10.6)	11.5	(65.4)	5.2	26.7	(3.6)
Provision for (benefit from) income taxes	(2.2)	14.0	(29.5)	(28.7)	(12.1)	(4.7)	(0.4)	18.9	10.6	7.5
Interest expense	38.3	51.9	79.5	119.2	117.8	112.9	121.2	111.2	120.3	111.6
Depreciation and amortization	44.6	46.8	57.1	88.6	99.6	96.1	98.0	93.4	89.4	91.3
<b>EBITDA</b>	<b>38.8</b>	<b>126.9</b>	<b>42.4</b>	<b>10.9</b>	<b>194.7</b>	<b>215.8</b>	<b>153.4</b>	<b>228.7</b>	<b>247.0</b>	<b>206.8</b>
Joint venture depreciation, amortization and interest	2.4	2.1	2.1	2.3	2.1	2.5	3.2	3.3	6.1	6.9
Amortization of investment in affiliate step-up	6.1	1.2	24.7	4.0	2.7	2.7	2.7	2.6	2.4	2.4
Amortization of inventory step-up	32.7	14.0	22.2	28.3	—	—	—	—	—	—
Impairment of long-lived and intangible assets	—	—	—	—	0.3	4.2	67.0	—	0.9	—
Debt extinguishment costs	—	—	32.6	—	—	—	2.3	20.1	20.3	2.5
Net loss on asset disposals	0.3	0.2	0.7	0.1	1.0	(1.1)	2.2	0.8	0.7	0.7
Foreign currency exchange loss (gain)	—	—	1.2	77.0	(26.9)	13.9	5.6	(1.9)	4.4	23.4
Non-cash revaluation of inventory, including LIFO	(0.8)	—	1.7	1.1	7.6	(1.5)	1.5	0.3	1.2	0.8
Management advisory fees	—	2.0	2.0	3.5	5.0	5.0	7.0	7.5	5.0	5.0
Transaction related costs	29.9	0.5	35.8	11.5	0.5	5.5	7.9	0.5	5.6	24.4
Equity-based and other non-cash compensation	0.1	0.1	0.3	0.7	0.2	1.0	0.3	—	1.0	—
Restructuring, integration and business optimization expenses	12.6	4.4	7.3	7.3	11.7	2.6	5.9	5.6	5.4	4.6
Defined benefit plan pension cost (benefit)	—	—	—	0.6	(0.1)	—	—	0.5	3.6	1.8
Other	(2.5)	(0.2)	4.3	17.0	26.6	3.2	15.6	0.7	3.2	8.8
<b>Adjusted EBITDA</b>	<b>119.6</b>	<b>151.2</b>	<b>177.3</b>	<b>164.3</b>	<b>225.4</b>	<b>253.8</b>	<b>274.6</b>	<b>268.7</b>	<b>306.8</b>	<b>288.1</b>

# RECONCILIATIONS FOR ADJUSTED EBITDA

2005 – 2014 Legacy Eco Services<sup>1</sup> Net Income (Loss) to Adjusted EBITDA Reconciliation

(\$ in millions)	Year Ended December 31,										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014 Successor	2014 Predecessor
<b>Reconciliation of net income (loss) attributable to Legacy Eco Services to Adjusted EBITDA</b>											
Net income (loss) attributable to Legacy Eco Services	45.4	73.0	73.8	86.0	73.4	65.4	35.8	48.5	39.3	(22.1)	30.5
Provision for income taxes	—	—	—	—	—	—	20.5	26.3	21.4	—	14.6
Interest expense	—	—	—	—	—	—	0.2	0.2	0.1	8.5	0.1
Depreciation and amortization	26.1	26.0	22.2	20.4	24.1	27.5	30.7	38.8	43.5	3.0	42.5
<b>EBITDA</b>	<b>71.5</b>	<b>99.0</b>	<b>96.0</b>	<b>106.4</b>	<b>97.5</b>	<b>92.9</b>	<b>87.2</b>	<b>113.8</b>	<b>104.3</b>	<b>(10.6)</b>	<b>87.7</b>
Amortization of inventory step-up	—	—	—	—	—	—	2.1	—	—	3.5	—
Transaction related costs	—	—	—	—	—	—	—	—	—	15.5	—
Equity-based and other non-cash compensation	—	—	—	—	—	—	0.4	0.6	0.7	—	0.5
Restructuring, integration and business optimization expenses	—	—	—	—	—	—	—	—	—	0.2	—
Other	—	—	—	—	—	0.7	10.1	(3.6)	0.5	0.5	9.9
<b>Adjusted EBITDA</b>	<b>71.5</b>	<b>99.0</b>	<b>96.0</b>	<b>106.4</b>	<b>97.5</b>	<b>93.6</b>	<b>99.8</b>	<b>110.8</b>	<b>105.5</b>	<b>9.1</b>	<b>98.1</b>

# RECONCILIATIONS FOR ADJUSTED EBITDA

2015 – 2018 Post-Business Combination PQ Net Income (Loss) to Adjusted EBITDA Reconciliation

(\$ in millions)	Year Ended December 31,			
	2015 Pro forma <sup>1</sup>	2016 Pro forma <sup>1</sup>	2017	2018
<b>Reconciliation of net income (loss) attributable to PQ Group Holdings Inc. to Adjusted EBITDA</b>				
Net income (loss) attributable to PQ Group Holdings Inc.	(26.9)	(59.0)	57.6	58.3
Provision for (benefit from) income taxes	1.2	58.0	(119.2)	29.0
Interest expense	199.6	187.9	179.0	113.7
Depreciation and amortization	152.2	165.8	177.1	185.2
<b>EBITDA</b>	<b>326.1</b>	<b>352.7</b>	<b>294.5</b>	<b>386.2</b>
Joint venture depreciation, amortization and interest <sup>a</sup>	7.9	10.3	11.1	12.6
Amortization of investment in affiliate step-up <sup>b</sup>	6.6	5.8	8.6	6.6
Amortization of inventory step-up <sup>c</sup>	—	4.9	0.9	1.6
Impairment of long-lived and intangible assets	0.4	6.9	—	—
Debt extinguishment costs	—	1.8	61.9	7.8
Net loss on asset disposals <sup>d</sup>	5.5	4.8	5.8	6.6
Foreign currency exchange loss (gain) <sup>e</sup>	21.1	(9.0)	25.8	13.8
LIFO expense <sup>f</sup>	(2.1)	1.3	3.7	8.4
Management advisory fees <sup>g</sup>	5.6	5.3	3.8	—
Transaction and other related costs <sup>h</sup>	13.2	2.6	7.4	0.9
Equity-based and other non-cash compensation	4.2	6.5	8.8	19.5
Restructuring, integration and business optimization expenses <sup>i</sup>	8.6	17.9	13.2	14.0
Defined benefit plan pension cost (benefit) <sup>j</sup>	6.1	2.8	2.9	(0.8)
Transition services	4.9	—	—	—
Gain on contract termination <sup>k</sup>	—	—	—	(20.6)
Other <sup>l</sup>	5.1	6.2	4.9	7.4
<b>Adjusted EBITDA</b>	<b>413.2</b>	<b>420.8</b>	<b>453.3</b>	<b>464.0</b>



# RECONCILIATION OF NET INCOME TO SEGMENT ADJUSTED EBITDA

Third Quarter 2019, Year-to-Date 2019 and Year 2018

(\$ in millions)	Three Months Ended			Nine Months Ended September 30, 2019	Three Months Ended				Year Ended December 31, 2018
	March 31, 2019	June 30, 2019	September 30, 2019		March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018	
<b>Reconciliation of net income attributable to PQ Group Holdings Inc. to Segment Adjusted EBITDA</b>									
Net income attributable to PQ Group Holdings Inc.	3.2	30.6	26.7	60.4	0.2	15.8	14.2	28.1	58.3
Provision for (benefit from) income taxes	2.4	20.3	16.7	39.5	(0.5)	13.6	8.5	7.4	29.0
Interest expense	28.6	28.5	27.7	84.9	29.2	27.2	28.2	29.1	113.7
Depreciation and amortization	45.9	45.1	44.2	135.2	48.5	47.0	43.8	45.9	185.2
<b>EBITDA</b>	<b>80.1</b>	<b>124.5</b>	<b>115.3</b>	<b>320.0</b>	<b>77.4</b>	<b>103.6</b>	<b>94.7</b>	<b>110.5</b>	<b>386.2</b>
Joint venture depreciation, amortization and interest <sup>a</sup>	3.8	3.7	3.7	11.2	3.3	2.6	3.3	3.4	12.6
Amortization of investment in affiliate step-up <sup>b</sup>	2.6	1.7	1.7	5.9	1.7	1.7	1.7	1.5	6.6
Amortization of inventory step-up <sup>c</sup>	—	—	—	—	1.6	—	—	—	1.6
Debt extinguishment costs	—	—	1.8	1.8	5.9	—	0.9	1.0	7.8
Net loss (gain) on asset disposals <sup>d</sup>	0.8	(9.7)	1.1	(7.7)	1.2	4.8	5.2	(4.6)	6.6
Foreign currency exchange (gain) loss <sup>e</sup>	(2.7)	3.6	4.5	5.4	5.1	6.8	3.5	(1.6)	13.8
LIFO expense <sup>f</sup>	10.2	0.1	0.5	10.8	4.9	0.1	0.9	2.5	8.4
Transaction and other related costs <sup>g</sup>	0.1	1.0	0.7	1.7	0.4	0.3	0.2	—	0.9
Equity-based and other non-cash compensation	3.4	5.4	4.8	13.6	3.8	3.8	4.3	7.6	19.5
Restructuring, integration and business optimization expenses <sup>h</sup>	0.7	—	0.7	1.4	1.1	2.4	2.2	8.3	14.0
Defined benefit plan pension cost (benefit) <sup>i</sup>	1.0	0.6	0.8	2.4	0.6	(0.4)	0.1	(1.1)	(0.8)
Gain on contract termination <sup>j</sup>	—	—	—	—	—	—	—	(20.6)	(20.6)
Other <sup>k</sup>	1.0	1.6	2.1	4.7	0.9	3.2	1.1	2.2	7.4
<b>Adjusted EBITDA</b>	<b>101.0</b>	<b>132.5</b>	<b>137.7</b>	<b>371.2</b>	<b>107.9</b>	<b>128.9</b>	<b>118.1</b>	<b>109.1</b>	<b>464.0</b>
Unallocated corporate costs	10.0	10.3	7.7	28.0	7.7	9.4	10.3	9.6	37.0
<b>Total Segment Adjusted EBITDA<sup>1</sup></b>	<b>111.0</b>	<b>142.8</b>	<b>145.4</b>	<b>399.2</b>	<b>115.6</b>	<b>138.3</b>	<b>128.4</b>	<b>118.7</b>	<b>501.0</b>

<b>EBITDA Adjustments by Line Item</b>									
<b>EBITDA</b>	<b>80.1</b>	<b>124.5</b>	<b>115.3</b>	<b>320.0</b>	<b>77.4</b>	<b>103.6</b>	<b>94.7</b>	<b>110.5</b>	<b>386.2</b>
Cost of goods sold	10.8	0.4	0.9	12.1	7.3	2.6	2.1	4.3	16.3
Selling, general and administrative expenses	4.4	5.9	5.7	16.0	4.9	4.8	5.4	7.9	23.0
Other operating expense (income), net	1.8	(7.3)	6.5	1.0	2.4	7.2	7.3	(17.8)	(0.9)
Equity in net (income) from affiliated companies	2.6	1.7	1.7	5.9	1.7	1.7	1.7	1.5	6.6
Other expense (income), net <sup>2</sup>	(2.5)	3.6	3.9	5.0	10.9	6.4	3.6	(0.7)	20.2
Joint venture depreciation, amortization and interest(a)	3.8	3.7	3.7	11.2	3.3	2.6	3.3	3.4	12.6
<b>Adjusted EBITDA</b>	<b>101.0</b>	<b>132.5</b>	<b>137.7</b>	<b>371.2</b>	<b>107.9</b>	<b>128.9</b>	<b>118.1</b>	<b>109.1</b>	<b>464.0</b>

# RECONCILIATION OF QUARTERLY NET INCOME TO ADJUSTED NET INCOME AND ADJUSTED DILUTED EARNINGS PER SHARE

Third Quarter 2019, Year-to-Date 2019 and Year 2018

(\$ in millions except share and per share data)	Three Months Ended			Nine Months Ended	Three Months Ended				Year Ended
	March 31, 2019	June 30, 2019	September 30, 2019	September 30, 2019	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018	December 31, 2018
Net Income	3.5	30.7	26.8	60.9	0.5	16.2	14.4	28.5	59.6
Less: Net income attributable to the non-controlling interest	0.3	0.1	0.1	0.5	0.3	0.4	0.2	0.3	1.3
Net Income attributable to PQ Group Holdings, Inc. <sup>1</sup>	3.2	30.6	26.7	60.4	0.2	15.8	14.2	28.2	58.3
Diluted net income per share:	0.02	0.23	0.20	0.45	0.00	0.12	0.11	0.21	0.43
Net Income attributable to PQ Group Holdings, Inc. <sup>1</sup>	3.2	30.6	26.7	60.4	0.2	15.8	14.2	28.2	58.3
Amortization of investment in affiliate step-up <sup>b</sup>	1.6	1.0	1.1	3.8	1.2	1.0	0.9	1.1	4.2
Amortization of inventory step-up <sup>c</sup>	—	—	—	—	1.1	—	—	—	1.0
Debt extinguishment costs	—	—	1.2	1.2	4.1	—	0.2	0.5	4.9
Net loss (gain) on asset disposal <sup>d</sup>	0.5	(7.4)	0.8	(6.1)	0.8	3.1	2.9	(2.7)	4.1
Foreign currency exchange (gain) loss <sup>e</sup>	(2.0)	4.1	3.9	6.0	2.9	5.2	4.0	(3.9)	8.2
LIFO expense <sup>f</sup>	6.5	0.2	0.4	7.0	3.4	—	0.3	1.6	5.3
Transaction and other related costs <sup>g</sup>	0.1	0.6	0.4	1.1	0.3	0.2	0.1	—	0.6
Equity-based and other non-cash compensation	2.2	3.5	3.2	8.8	2.6	2.5	2.2	7.6	14.9
Restructuring, integration and business optimization expenses <sup>h</sup>	0.5	—	0.5	0.9	0.7	1.6	1.2	5.3	8.8
Defined benefit pension plan cost (benefit) <sup>i</sup>	0.6	0.4	0.5	1.6	0.4	(0.3)	0.1	(0.7)	(0.5)
Gain on contract termination <sup>j</sup>	—	—	—	—	—	—	—	(13.0)	(13.0)
Other <sup>k</sup>	0.6	1.0	1.4	3.2	0.7	2.0	0.4	1.4	4.6
Adjusted net income, including tax reform and non-cash GILTI tax	13.8	34.0	40.1	87.9	18.4	31.1	26.5	25.4	101.4
Impact of non-cash GILTI tax <sup>2</sup>	3.7	7.5	8.2	19.3	2.5	5.0	11.4	2.2	21.2
Impact of tax reform <sup>3</sup>	—	—	—	—	—	1.1	(2.5)	(4.5)	(6.0)
Adjusted net income	17.5	41.5	48.3	107.2	20.9	37.2	35.4	23.1	116.6
Adjusted diluted net income per share:	0.13	0.31	0.36	0.79	0.16	0.28	0.26	0.17	0.87
Diluted Weighted Average shares outstanding	134.9	135.3	135.6	135.3	133.9	134.2	134.6	135.0	134.7

(1) For additional information with respect to each adjustment, see "Reconciliations of Non-GAAP Financial Measures" within this appendix

(2) Amount represents the impact to tax expense in net income before non-controlling interest and the related adjustments to net income associated with GILTI provisions of the Tax Cuts and Jobs Act of 2017 ("TCJA"). Beginning January 1, 2018, GILTI results in taxation of "excess of foreign earnings," which is defined as amounts greater than a 10% rate of return on applicable foreign tangible asset basis. The Company is required to record incremental tax provision impact with respect to GILTI as a result of having historical U.S. net operating loss ("NOL") amounts to offset the GILTI taxable income inclusion. This NOL utilization precludes us from recognizing foreign tax credits ("FTCs") which would otherwise help offset the tax impacts of GILTI. No FTCs will be recognized with respect to GILTI until our cumulative NOL balance has been exhausted. Because the GILTI provision does not impact our cash taxes (given available U.S. NOLs), and given that we expect to recognize FTCs to offset GILTI impacts once the NOLs are exhausted, we do not view this item as a component of core operations.

(3) Represents the provisional benefit (loss) for the impact of the U.S. Tax Cuts and Jobs Act of 2017 and the Dutch Tax Plan 2019 recorded in Net Income

# RECONCILIATION OF NON-GAAP FINANCIAL MEASURES

## Descriptions to PQ Non-GAAP Reconciliations

- a) We use Adjusted EBITDA as a performance measure to evaluate our financial results. Because our Catalysts segment includes our 50% interest in our Zeolyst Joint Venture, we include an adjustment for our 50% proportionate share of depreciation, amortization and interest expense of our Zeolyst Joint Venture.
- b) Represents the amortization of the fair value adjustments associated with the equity affiliate investment in our Zeolyst Joint Venture as a result of the combination of the businesses of PQ Holdings Inc. and Eco Services Operations LLC in May 2016 (the "Business Combination"). We determined the fair value of the equity affiliate investment and the fair value step-up was then attributed to the underlying assets of our Zeolyst Joint Venture. Amortization is primarily related to the fair value adjustments associated with fixed assets and intangible assets, including customer relationships and technical know-how.
- c) As a result of the Sovitec acquisition and the Business Combination, there was a step-up in the fair value of inventory, which is amortized through cost of goods sold in the statements of income.
- d) When asset disposals occur, we remove the impact of net gain/loss of the disposed asset because such impact primarily reflects the non-cash write-off of long-lived assets no longer in use. During the three months ended June 30, 2019 and the nine months ended September 30, 2019, net loss (gain) on asset disposals reflects the gain related to the sale of a non-core product line.
- e) Reflects the exclusion of the foreign currency transaction gains and losses in the statements of income primarily related to the non-permanent intercompany debt denominated in local currency translated to U.S. dollars during 2019 and primarily related to the Euro denominated term loan (which was settled as part of the February 2018 term loan refinancing) and the non-permanent intercompany debt denominated in local currency translated to U.S. dollars during 2018.
- f) Represents non-cash adjustments to the Company's LIFO reserves for certain inventories in the U.S. that are valued using the LIFO method, which we believe provides a means of comparison to other companies that may not use the same basis of accounting for inventories.
- g) Relates to certain transaction costs including debt financing, due diligence and other costs related to several transactions that are completed, pending or abandoned and that we believe are not representative of our ongoing business operations.
- h) Includes the impact of restructuring, integration and business optimization expenses which are incremental costs that are not representative of our ongoing business operations.
- i) Represents adjustments for defined benefit pension plan costs in our statements of income. More than two-thirds of our defined benefit pension plan obligations are under defined benefit pension plans that are frozen, and the remaining obligations primarily relate to plans operated in certain of our non-U.S. locations that, pursuant to jurisdictional requirements, cannot be frozen. As such, we do not view such expenses as core to our ongoing business operations.
- j) Represents a non-cash gain on the write-off of the remaining liability under a contractual supply arrangement. As part of Eco's acquisition of substantially all of the assets of Solvay USA Inc's sulfuric acid refining services business unit on December 1, 2014, we recognized a liability as part of business combination accounting related to our obligation to serve a customer under a pre-existing unfavorable supply agreement. In December 2018, the customer who was party to the agreement closed its facility, and as a result, we were relieved from our obligation to continue to supply the customer on the below market contract. Because the fair value of the unfavorable contract liability was recognized as part of the application of business combination accounting, and since the write-off of the remaining liability was non-cash in nature, we believe this gain is a special item that is not representative of our ongoing business operations.
- k) Other costs consist of certain expenses that are not core to our ongoing business operations, including environmental remediation-related costs associated with the legacy operations of our business prior to the Business Combination, capital and franchise taxes, non-cash asset retirement obligation accretion and the initial implementation of procedures to comply with Section 404 of the Sarbanes-Oxley Act. Included in this line-item are rounding discrepancies that may arise from rounding from dollars (in thousands) to dollars (in millions).

Leading the  
way to a  
sustainable  
future

