

Report Prospectus:

Market Analysis and Forecast Loading & Haulage Equipment

December 2015



THE PARKER BAY COMPANY



The Parker Bay Company

630 Cherry St.

Erie, PA 16502

USA

+1 814 806-2800

info@parkerbaymining.com

ABSTRACT

SUMMARY:

The decade-long Commodities Super-Cycle that propelled mining markets to unprecedented levels was accompanied by a comparably-long and -strong growth in the markets for the largest excavators/loaders and haul trucks that helped produce those minerals. The reversal has been dramatic and severe. Although production of many minerals has not contracted or has declined only modestly, continued growth on the mine-production side produced a significant supply-imbalance with resultant sharp declines in mineral pricing and an equally sharp curtailment of capital expenditures for the equipment covered by this analysis. As measured by shipments of excavators/loaders and trucks, the market has declined by roughly two-thirds over the past 30 months and a sustained turnaround is not in evidence at year-end 2015.

In the context of this severely contracted market for the largest excavators and haulers, Parker Bay projects continued weakness worldwide for another year, followed initially by slow growth in shipments of new machines as recovering mines restart parked equipment and, in many instances, purchase and redeploy large numbers of machines currently available. A resumption of solid growth in equipment markets is projected for 2017-2020 driven initially by the necessity to begin replacing the equipment installed during 2004-2012. But it may be a decade before the equipment industry returns to the levels achieved in 2012.

This report summarizes the results of research conducted by the Parker Bay Company into the global market for two primary sets of mining tools essential to surface mining materials handling: the large mining trucks that transport ore and waste rock/overburden from the mine workface to the next stage in processing, and the three distinct types of excavating/loading equipment use to load these trucks – electric shovels, hydraulic excavators, and wheel loaders.

PARAMETERS:

<u>Product</u>	<u>Payload</u>	<u>Manufacturers Covered</u>
Mining Trucks	90 mt+	BelAZ, Caterpillar, Hitachi,
Electric Shovels	20 mt+	Joy Global/P&H, Komatsu, Liebherr, Terex.
Hydraulic Excavators	20 mt+	Regional suppliers in China, India, Russia
Wheel Loaders	20 mt+	addressed in text only.

SCOPE:

For each product line (and excavating/loading equipment combined), data and analysis of:

- | | | |
|---|----------------------|--|
| <ul style="list-style-type: none">• Annual Shipments 2005-2014• 5 year+ forecast through 2020• Year-end population/installed base 2005-2014• Annual decomissionings/removals 2005-2014 | } each broken out by | <ul style="list-style-type: none">• # Units and payload• Size class• Region and mineral• Manufacturer (historical only) |
|---|----------------------|--|

PRICING:

	<u>Standard price</u>	<u>Database Subscribers*</u>
Full report, Loading & Haulage Equipment + data file	\$5,000	\$2,500
Haulage Equipment only, report + data file	\$3,500	\$1,750
Loading Equipment only, report + data file	\$3,500	\$1,750

Non-database subscribers required to sign a non-disclosure agreement **Subscribers w/o full service may require add'l fee.*

INCLUDES:

- 130 page report and analysis (sections removed for reports on trucks or loading equipment only)
- Interactive data file allowing further examination of all items mentioned in "scope" above

CONTENTS

I. Introduction.....	1
II. Summary.....	3
II.1 Overview	3
II.2 Mineral Production & Equipment Usage	6
Projected Growth in Mineral Production	8
Equipment Intensity.....	10
II.3 Surplus Equipment	12
II.4 Market Analysis & Forecast.....	13
Mining Trucks.....	13
Excavating/Loading Equipment.....	16
Electric Shovels	20
Hydraulic Excavators	23
Wheel Loaders	25
III. Product & Market Definitions	28
IV. Machine Population & 2005-14 Shipments by Product, Size-Class, Manufacturer.....	34
IV.1 Mining Trucks.....	34
Regional & Mineral Analysis.....	34
Shipments 2005-2014	36
Shipments by Size-Class	37
Market Shares by Manufacturer	39
IV.2 Excavating/Loading Equipment (combined)	41
Regional & Mineral Analysis.....	41
Shipments 2005-2014	43
Shipments by Size-Class	44
Market Shares by Manufacturer	44
IV.3 Electric Shovels	46
Regional & Mineral Analysis.....	46
Shipments 2005-2014	48
Shipments by Size-Class	49
Market Shares by Manufacturer	50
IV.4 Hydraulic Excavators	52

CONTENTS

Regional & Mineral Analysis.....	52
Shipments 2005-2014	54
Shipments by Size-Class	54
Market Shares by Manufacturer	56
IV.5 Wheel Loaders	57
Regional & Mineral Analysis.....	58
Shipments 2005-2014	60
Shipments by Size-Class	61
Market Shares by Manufacturer	62
V. Mineral Mining Market Developments and Projections: 2015-2020	64
V.1 Coal	64
V.2 Copper	66
V.3 Gold.....	68
V.4 Iron.....	69
V.5 Oil Sands	71
VI. Mining Truck Forecast 2015-2020	74
Removals, Replacement Requirements	74
Redeployment of Surplus Equipment	76
Incremental Requirements & Projected Population	77
Total Shipments by Region & Mineral: 2015-2020.....	81
Shipments by Year: 2015-2020	83
Annual Shipments by Size-Class 2015-2020	84
VII. Excavating/Loading Equipment Forecast 2015-2020.....	87
Projected Population	87
Removals, Replacement Requirements	88
Redeployment of Surplus Equipment	89
Total Shipments by Region & Mineral: 2015-2020.....	91
Shipments by Year: 2015-2020	92
Shares, Shipments by Product: 2015-2020.....	93
VII.1 Electric Shovels	94
Removals, Replacement Requirements	94

CONTENTS

	Redeployment of Surplus Equipment	96
	Incremental Requirements & Projected Population	97
	Total Shipments by Region & Mineral: 2015-2020.....	100
	Shipments by Year: 2015-2020	102
	Annual Shipments by Size-Class 2015-2020	103
VII.2	Hydraulic Excavators	105
	Removals, Replacement Requirements	105
	Redeployment of Surplus Equipment	107
	Incremental Requirements & Projected Population	108
	Total Shipments by Region & Mineral: 2015-2020.....	112
	Shipments by Year: 2015-2020	113
	Annual Shipments by Size-Class 2015-2020	114
VII.3	Wheel Loaders	116
	Removals, Replacement Requirements	116
	Redeployment of Surplus Equipment	118
	Incremental Requirements & Projected Population	119
	Total Shipments by Region & Mineral: 2015-2020.....	122
	Shipments by Year: 2015-2020	123
	Annual Shipments by Size-Class 2015-2020	124
Appendix:	Forecasting Procedure	126
	Mineral Projections.....	126
	Equipment Intensity & Incremental Requirements.....	127
	Estimated Machine Service Life and Replacement Requirements	128
	Surplus Equipment & Redeployment	129

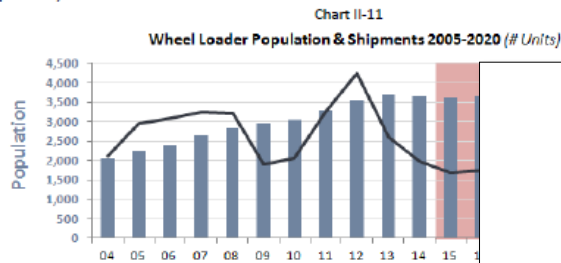
REPORT - SAMPLE

commanding share of the 20-25 mt class, they have secured a majority of all units in the increasingly popular 30-35 mt class. Komatsu has achieved more limited success with its wheel loader line accounting just under one-fourth of the active population and a somewhat improved 27% of the past 10 years' shipments. Joy/LeTourneau is a virtual non-factor in the 20-25 mt size-class thus limiting its overall market share to 11%. But the Company holds a 20% share competing at 30-35 mt and has a monopoly at 40-mt and above. As noted, the volume at 40-50 mt and 63-mt is small but provides a viable niche for LeTourneau and is a segment that has grown at above average rates.

Forecast: All of the mineral and equipment market assumptions and driving factors defined above and in the balance of this report will impact wheel loaders in like manner with a few notable exceptions. Wheel loaders are projected to decline slightly as a share of the installed base of excavators/loaders (28.9% at Dec. 31, 2020 vs. 29.5% at Dec. 31, 2014). In total the number of units running at the end of the decade will have increased by just 300 units to nearly 4,000. Given the projected 4% increase in average payload, the installed capacity of wheel loaders will grow by 13%, below that of the two competitive products and reflecting, to a degree, adverse conditions in two key mineral applications: coal and iron.

Although large wheel loaders are built for heavy-duty mining duties, their average service life (approx. 70,000 operating hours) is estimated to be shorter than that of electric or hydraulic shovels. As a result, replacement requirements through 2020 are projected to include nearly one third of the machines in the Dec. 31, 2014 population. The resulting average of nearly 200 replacements per year is greater than the number of new loaders being shipped during 2015-2017. In part this will be due to the substitution of new shipments by surplus equipment being redeployed during that time.

In addition to these replacements, shipments will be required to grow the active population. While that increase is modest by historical standards, it will still require an additional 300 machines with aggregate payload of 11,000 mt. Unit shipments will increase at a lower rate because of continuing shift toward bigger loaders. Units in the 20-25 mt class will remain the mainstays for most mines, but units in the 30-mt and larger range will account for half of the capacity delivered during 2015-2020 as compared to 40% over the past ten years.



Like its competitive counterparts, the active population and requirement remain stagnant during 2015-2016. When growth does resume, projected overall population will be modest averaging less than 2%/year. In replacement demand, shipments will increase by 20%/annum in the initial years followed by solid if less impressive gains through 2020. By then, wheel loader population will reach a 2012 peak of 4,000 units with aggregate capacity of almost 7,500 mt. These projected levels are significantly higher than the 2004 population of 2,000 units.

The Parker Bay Company: Market Analysis & Forecast – Loading and Haulage Equipment

over the past decade portending a near-term decline in world gold output as existing mines' reserves are depleted and not fully replaced.

Oil sands represent the smallest and also most concentrated of the five major minerals with only a handful of mega-mines in Alberta, Canada accounting for nearly US\$4 billion worth of trucks and loaders at year-end 2014. These operations also represent a unique segment for mining suppliers in that the scale and long-term nature of the oil sands reserves drive mines to utilize the largest scale equipment available. These mines have worked with equipment manufacturers to pioneer both machine scale and features designed to address unique mining conditions (e.g., high-floatation undercarriages/crawler tracks). The combination of the multi-billion dollar expansions at Suncor, Syncrude, Shell/Albian, new mines at CNR/Horizon and Imperial/Kearl and the ongoing development of Fort Hills, drove oil sands equipment growth faster than any other mineral sector -- +179% over the past decade. Not surprisingly, these mines have been hit hard by weak oil prices. But the decades-long planning horizon for these projects ensures continued equipment demand even if some capex for these products is postponed in the short-term.

Other Minerals: While accounting for just 9% of global equipment in place (and a somewhat smaller share of the past decade's shipments), the minerals encompassed herein are nevertheless a major market segment for the suppliers of larger excavators/loaders and trucks: over US\$7 billion in shipments during 2005-2014 and US\$10 billion of active equipment in 2014. No single mineral accounted for more than 1.4% of industry shipments, and most mines in this category are decidedly smaller than those operated by the five major minerals: the average value of installed equipment per mine was US\$34 MM vs. US\$135 MM average for mines of the five major minerals. Average equipment size is similarly smaller: average payload of trucks in operation is just 116 mt vs. 160 mt for the five majors. Although the increase in equipment utilized by mines in this diverse sector was below rates for the five major minerals during the past decade, the aggregate of all equipment in place nearly doubled. And the outlook for several of these minerals is expected to be sufficiently strong to warrant a share of 2015-20 shipments above historical norms.

Table II - 2
Equipment Values by Mineral (MM US\$)

	12/31/04 Population		2005-14 Shipments		12/31/14 Population	
	MM US\$	%	MM US\$	%	MM US\$	%
Coal	23,577	46%	33,350	42%	46,769	43%
Copper	9,448	19%	14,289	18%	20,277	19%
Gold	4,247	8%	8,323	11%	10,434	10%
Iron	6,868	14%	13,220	17%	17,203	16%
Oil Sands	1,427	3%	2,978	4%	3,975	4%
Others	5,148	10%	7,046	9%	10,224	9%
TOTAL	50,715		79,206		108,882	

Projected Growth in Mineral Production

Global mine production of the five key minerals increased by 1.7 to 4.4% annually over the decade ending 2014. But that growth was appreciably stronger through 2012 for coal and iron and it slowed dramatically between 2012 and 2014 for both. At the same time, copper, gold and oil sands continued to grow despite sharp declines in prices obtained for these minerals.

Parker Bay's assessment of these markets, based in large part on forecasts developed by industry/trade organizations and mining/mineral suppliers is summarized in Table II 3 and reflects a general consensus that the slowdown in the Chinese economy will persist and may even accelerate for the next few years with

DATA FILE - SAMPLE

Product:		ation 12/31/2014 - Wheel Loader														Payload		Removed 2015-2020, W			
Wheel Loader																# Units	Avg PL				
259	26	23	20	35	23	258	27							126	20	701	25	79	25	11	20
489				283				122								2,606	3,770		182		
25	20	10	27	4	31	12	23							124	21	175	22	9	20	4	24
				1,332		7,579		2,960								1,908	21,829	24		518	2,3
50	27	218	35	121	24	260	31							92	21	741	23	20	26	72	31
15,939				2,028		2,367		2,795						333		7,028	30,491	34		5,858	7
687	23	69	29	96	25	109	26	16	21	344	20	1,321	23			506	3,500	4	258	23	28
				825		512		726		930									147		
41	20	23	22	34	21	42	22							21	24	162	22	7	20	4	21
30,314				11,689		8,106		21,363		333		18,335	90,140						9,891		3,7
1,264	24	379	31	342	24	775	16	21	875	21	3,651	25					424	23	127	25	
				34%		13%		9%		24%		0%	20%								

in cumulative payload by region and mineral 2014 / 2004 - Wheel Loader							
Coal	Copper	Gold	Iron	Oil Sands	Others	TOTAL	Apr
145.3%	38.8%	530.8%	174.2%		148.1%	159.4%	10.0%
278.6%	320.5%		805.8%		471.5%	335.9%	15.9%
31.6%	54.6%	12.9%	231.2%		128.8%	87.7%	6.5%
-6.6%	107.6%		312.8%		173.0%	124.4%	8.4%
58.6%	179.9%	156.4%	157.9%		81.8%	146.0%	9.4%
9.6%	169.9%	41.7%	43.7%	49.0%	135.4%	37.8%	3.3%
	2459.0%	169.0%	615.4%		166.5%	473.8%	19.1%

Region: All		Product: Loading Equip					Unit: Payload		red: maximum			
Size Class	2005	2006	2007	2008	2009	2010	# Units	MM\$	2013	2014	Total	
20-25	5,385	5,870	5,095	6,335	4,585	5,585	2,670	6.5%	4,980	3,615	66,315	
% chg	26.3%	11.2%	-15.6%	24.9%	-45.2%	22.1%	67.0%	6.5%	-48.2%	-24.8%		
30-35	4,980	5,240	5,080	5,150	5,750	5,850	4,980	5,980	3,810	2,905	45,470	
% chg	48.9%	11.4%	4.6%	-4.8%	-27.0%	-1.0%	36.3%	38.6%	-44.5%	-47.7%		
40-50	5,780	4,650	4,630	5,885	3,740	4,138	5,882	5,352	5,130	5,189	47,760	
% chg	50.1%	22.7%	0.1%	16.1%	-34.0%	25.1%	17.0%	53.0%	-11.3%	-17.8%		
63	3,295	3,545	3,268	3,770	2,884	3,898	4,285	5,240	3,843	5,755	30,314	
% chg	48.0%	-4.1%	5.9%	21.2%	-13.6%	21.1%	45.7%	31.3%	-30.7%	-15.7%		
77	356	356	356	406	407	402	405	5,270	509	218	5,285	
% chg	100.0%	0.0%	290.0%	14.3%	37.5%	-45.5%	-16.7%	100.0%	-50.0%	-57.1%		
90+	5,380	5,280	5,150	5,170	5,980	5,880	5,780	5,350	5,980	5,750	25,380	
% chg	40.0%	0.0%	100.0%	17.0%	-11.3%	45.1%	-1.1%	8.7%	-1.0%	-41.6%		
TOTAL	17,230	18,281	18,482	25,168	17,054	20,910	26,400	36,118	26,512	30,485	215,747	
	42.2%	11.9%	17.6%	11.0%	-32.2%	16.7%	33.6%	28.2%	-17.8%	-41.1%		



LIST OF TABLES

- Section II: Unit Shipments and Population by Product
Value of Equipment by Mineral Application
Key Mineral Production Data & Forecast
Annual Percentage Change in Active Machine by Major Mineral: Actual and Projection
Inactive Equipment as of 2014
Surplus Loading & Haulage Equipment to be Reapplied: 2015-2020
Mining Truck Shipments and Population Projections
Excavating/Loading Equipment Share by Product Line
Excavating/Loading Equipment Shipments and Population Projections
Electric Shovel Shipments and Population Projections
Hydraulic Excavator Shipments and Population Projections
Wheel Loader Shipments and Population Projections
- Section III: Mining Truck Manufacturers & Models by Size Class
Electric/Rope Shovel Manufacturers & Models by Size Class
Hydraulic Excavator/Shovel Manufacturers & Models by Size Class
Wheel Loader Manufacturers & Models by Size Class
- Section IV: Truck Population by Region and Mineral 2014
Truck Shipments 2004-2014 (*Units, Payload*)
Loading Equipment Population by Region and Mineral 2014
Excavating/Loading Equipment Shipments 2004-2014
Electric Shovel Population by Region and Mineral 2014
Electric Shovel Shipments 2004-2014
Hydraulic Excavator Population by Region and Mineral 2014
Hydraulic/Shovel Excavator Shipments 2004-2014
Wheel Loader Population by Region and Mineral 2014
Wheel Loader Shipments 2004-2014
- Section VI: Mining Trucks: % Removed and Requiring Replacement by Region & Mineral 2015-2020
Mining Trucks: Estimate of Removals/Replacement by Region and by Mineral 2015-2020
Surplus Mining Trucks: Inactive and Estimated Redeployment
CAGR in Truck Population & Mineral Production by Region and Mineral: 04-14, 15-20
Mining Trucks: Growth in Cumulative Payload by Region and Mineral
Mining Trucks: Projected 2020 Population by Region and Mineral
Mining Trucks: 2015-2020 Shipments by Region and Mineral
Mining Trucks: Annual Shipments by Size Class 2014-2020
- Section VII: Excavating/Loading Equipment: Growth in Cumulative Payload by Region and Mineral
Excavating/Loading Equipment: Projected 2020 Population by Region and Mineral
Excavating/Loading Equipment: Replacement Requirements by Product 2015-2020
Surplus Excavators/Loaders to be Reapplied 2015-2020
Surplus Excavators/Loaders Reapplied 2015-2020 by Region & Mineral
Excavating/Loading Equipment: 2015-2020 Shipments by Region and Mineral
Excavating/Loading Equipment Share of Annual Capacity Shipped by Product Line 2014 – 2020

LIST OF TABLES

Section VII:	Electric Shovels: Estimate of Removals/Replacement by Region and by Mineral 2015-2020
<i>(continued)</i>	Surplus Electric Shovels: Inactive and Estimated Redeployment
	CAGR in Electric Shovel Population & Mineral Production by Region and Mineral: 04-14, 15-20
	Electric Shovels: Growth in Cumulative Payload by Region and Mineral
	Electric Shovels: Projected 2020 Population by Region and Mineral
	Electric Shovels: 2015-2020 Shipments by Region and Mineral
	Electric Shovels: Annual Shipments by Size Class 2014-2020
	Hydraulic Excavators: Estimate of Removals/Replacement by Region and by Mineral 2015-2020
	Surplus Hydraulic Excavators: Inactive and Estimated Redeployment
	CAGR in Hydraulic Excavator Population & Mineral Production by Region and Mineral: 04-14, 15-20
	Hydraulic Excavators: Growth in Cumulative Payload by Region and Mineral
	Hydraulic Excavators: Projected 2020 Population by Region and Mineral
	Hydraulic Excavators: 2015-2020 Shipments by Region and Mineral
	Hydraulic Excavators: % Share of Shipments by Size Class
	Hydraulic Excavators: Annual Shipments by Size Class 2014-2020
	Wheel Loaders: Estimate of Removals/Replacement by Region and by Mineral 2015-2020
	Surplus Wheel Loaders: Inactive and Estimated Redeployment
	CAGR in Wheel Loader Population & Mineral Production by Region and Mineral: 04-14, 15-20
	Wheel Loaders: Growth in Cumulative Payload by Region and Mineral
	Wheel Loaders: Projected 2020 Population by Region and Mineral
	Wheel Loaders: 2015-2020 Shipments by Region and Mineral
	Wheel Loaders: Annual Shipments by Size Class 2014-2020

LIST OF FIGURES/CHARTS

- Section II: Mining Truck Population 2004-2020 with Shipments (Additional/Replacement Capacity)
Loading/Excavating Population 2004-2020 with Shipments (Additional/Replacement Capacity)
Historical Population Shipments by Mineral Type
Mining Truck Population & Shipments 2005-2020
Excavators/Loaders: Product Line Shares by Region
Excavators/Loaders: Product Line Shares by Mineral
Excavators/Loaders: Product Line Shares by Size Class
Excavating/Loading Equipment Population & Shipments 2005-2020
Electric Shovel Population & Shipments 2005-2020
Hydraulic Excavator Population & Shipments 2005-2020
Wheel Loader Population & Shipments 2005-2020
- Section IV: Mining Truck Population 2014: Shares by Size-Class & Region
Mining Truck Population 2014: Shares by Size-Class & Mineral
Mining Truck Shipments by Size Class 2005-2014
Mining Truck Manufacturers' Market Shares by Size Class
Excavating/Loading Equipment Population 2014: Shares by Size-Class & Mineral
Excavating/Loading Equipment Population 2014: Shares by Size-Class & Region
Excavating/Loading Equipment Shipments by Size Class 2005-2014
Excavating/Loading Equipment Manufacturers' Market Shares by Size Class
Electric Shovel Population 2014: Shares by Size-Class & Mineral
Electric Shovel Population 2014: Shares by Size-Class & Region
Electric Shovel Shipments by Size Class 2005-2014
Electric Shovel Manufacturers' Market Shares by Size Class
Hydraulic Excavator Population 2014: Shares by Size-Class & Mineral
Hydraulic Excavator Population 2014: Shares by Size-Class & Region
Hydraulic Excavator Shipments by Size Class 2005-2014
Hydraulic Excavator Manufacturers' Market Shares by Size Class
Wheel Loader Population 2014: Shares by Size-Class & Region
Wheel Loader Population 2014: Shares by Size-Class & Mineral
Wheel Loader Shipments by Size Class 2005-2014
Wheel Loader Manufacturers' Market Shares by Size Class
- Section V: Coal: Evolution of Population and Shipments relative to Production and Pricing 2003-2020
Copper: Evolution of Population and Shipments relative to Production and Pricing 2003-2020
Gold: Evolution of Population and Shipments relative to Production and Pricing 2003-2020
Iron Ore: Evolution of Population and Shipments relative to Production and Pricing 2003-2020
Oil Sands: Evolution of Population and Shipments relative to Production and Pricing 2003-2020
- Section VI: Mining Trucks: Replacement Requirements as Share of Shipments
Mining Trucks: Impact of Surplus Equipment Reapplied on 2015-2020 Shipments
Mining Trucks: Distribution of Shipments by Mineral 05-14 vs. 15-20
Mining Truck Shipments Forecast by Year 2015-2020
Share of Mining Truck Shipments by Size Class (% aggregate payload)

LIST OF FIGURES/CHARTS

- Section VII: Excavating/Loading Equipment: Replacement Requirements as Share of Shipments
- Excavating/Loading Equipment: Impact of Surplus Equipment Reapplied on 2015-2020 Shipments
- Excavating/Loading Equipment: Distribution of Shipments by Mineral 05-14 vs. 15-20
- Excavating/Loading Equipment Shipments Forecast by Year 2015-2020
- Electric Shovels: Replacement Requirements as Share of Shipments
- Electric Shovels: Impact of Surplus Equipment Reapplied on 2015-2020 Shipments
- Electric Shovels: Distribution of Shipments by Mineral 05-14 vs. 15-20
- Electric Shovel Shipments Forecast by Year 2015-2020
- Hydraulic Excavators: Replacement Requirements as Share of Shipments
- Hydraulic Excavators: Impact of Surplus Equipment Reapplied on 2015-2020 Shipments
- Hydraulic Excavators: Distribution of Shipments by Mineral 05-14 vs. 15-20
- Hydraulic Excavator Shipments Forecast by Year 2015-2020
- Wheel Loaders: Replacement Requirements as Share of Shipments
- Wheel Loaders: Impact of Surplus Equipment Reapplied on 2015-2020 Shipments
- Wheel Loaders: Distribution of Shipments by Mineral 05-14 vs. 15-20
- Wheel Loader Shipments Forecast by Year 2015-2020