Guangxi Liugong Machinery Co., Ltd.
No.1 Liutai Road, Liuzhou, Guangxi 545007, PR China

T +86 772 3886124
E overseas@liugong.com
www.liugong.com

LIUGONG NON-FERROUS METAL MINE SOLUTION

Contents

PREFACE P01

INTRODUCTION TO NON-FERROUS METAL MINE P03

LIUGONG TOTAL SOLUTIONS P11

LIUGONG EQUIPMENT SOLUTIONS P13

ONSITE EVALUATION P45

TECHNOLOGICAL SOLUTIONS P47

AFTERMARKET SOLUTIONS P51

FINANCIAL SOLUTIONS P53

INTELLIGENT, GREEN MINING SOLUTIONS P55

PREFACE

From our foundation in 1958, and the introduction of China's first modernized wheel loader in 1966, for over 65 years we've put our customers at the heart of everything we do. Through continuous effort and technological innovation, LiuGong has developed a series of tough equipment. Today, we offer over 30 product lines covering all major construction applications. Across the world, from the searing heat of the Sahara, to the extremely cold of the Antarctic, we've built our reputation for designing and building a tough range of machines that help our customers do more and earn more. LiuGong continue to expand global network and provide trusted local support to customers. With over 500 certified and trained dealers in over 130 countries and regions, we provide a service team that puts you first whenever and wherever you need us.

LiuGong has over 30 years of experience providing equipment and services to more than 1,000 global mining worksites. Our team of professional product application engineers is present on-site globally, understanding the needs of mining users, offering technical trainings and advices on equipment selection, fleet matching, equipment operation, and operator training. Feedback on equipment usage from mining sites is promptly relayed to our R&D team, inspiring the design and optimization of our full range of robust equipment. We also collaborate with customers to develop new products tailored to specific working conditions and personalized requirements.

We know that delivering optimum performance is all about details, that can save valuable seconds and lead to greater profitability. LiuGong provides comprehensive non-ferrous metal mining product solutions that meet your all-around needs—safety, efficiency, energy saving, environmental protection, and intelligence.

Focusing on enhancing corporate ESG (Environmental, Social, and Governance) performance and strengthening core competitiveness, LiuGong's full solutions will help you create greater value.

INTRODUCTION TO NON-FERROUS METAL MINE

Metal Minerals

Metal minerals refer to mineral resources from which certain metal elements can be extracted for industrial use.

Currently, based on industrial utilization characteristics, they are generally classified into:

- Ferrous Metal (or Ferroalloy Metal) Minerals: such as iron, manganese, chromium, vanadium, etc.
- Non-ferrous Metal Minerals: such as copper, aluminum, lead, zinc, tin, bismuth, antimony, mercury, nickel, cobalt, tungsten, molybdenum, etc.
- Precious Metal Minerals: such as gold, silver, platinum, etc.
- Radioactive Metal Minerals: such as uranium, thorium, etc.
- Rare and Dispersed Element Minerals: such as lithium, beryllium, niobium, tantalum, rare earth elements, germanium, gallium, indium, cadmium, etc.

Global Distribution of Non-ferrous Metal Mines

Global Reserves and Distribution of Major Non-ferrous Metal Mines

Copper

Chile 21.3% | Australia 10.9% | Peru 9.1% | Russia 7% | Mexico 6% | United States 4.9% | Democratic Republic of Congo 3.4% | Poland 3.5% | other countries 33.9%

Approximately 890 million tons of global reserves.

Aluminum

Guinea 24.5% | Vietnam 19.2% | Australia 17.5% | Brazil 8.9% | Jamaica 0.7% | other countries 29.2%

Approximately 30.2 billion tons of global reserves.

Lead

Australia 41.1% | China 20% | Peru 7.1% | Mexico 6.2% | United States 5.6% | other countries 20%

Approximately 90 million tons of global reserves.

Zinc

Australia 27.6% | China 17.6% | Russia 8.8% | Peru 7.6% | Mexico 7.6% | other countries 30.8%

Approximately 250 million tons of global reserves.

Nickel

Indonesia 22.1% | Australia 22.1% | Brazil 16.8% | Russia 7.9% | Philippines 5.1% | other countries 26%

Approximately 95 million tons of global reserves.

Tin

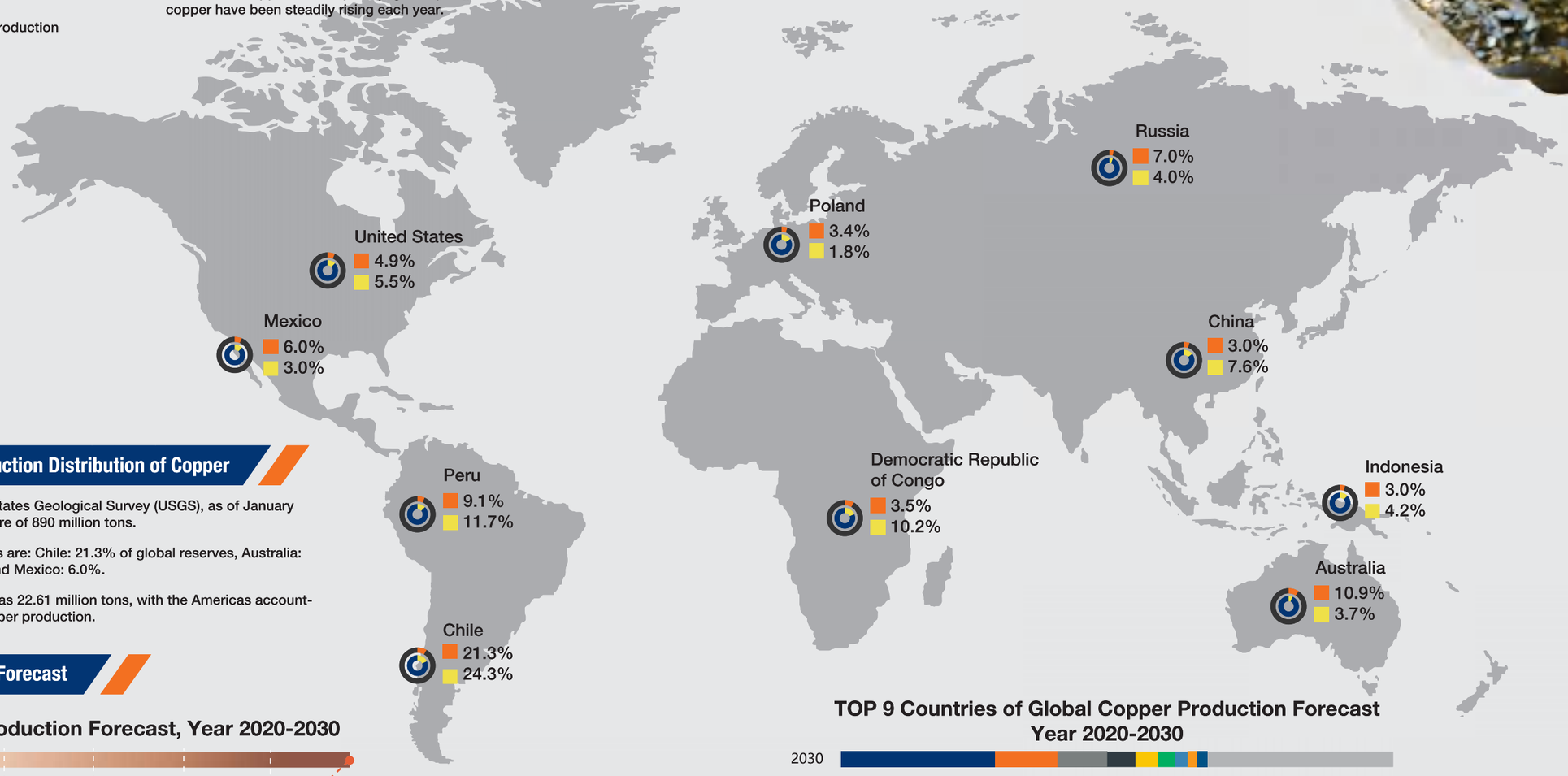
China 22.4% | Indonesia 16.3% | Myanmar 14.3% | Australia 11.4% | Brazil 8.6% | other countries 27.1%

Approximately 4.9 million tons of global reserves.

Data source: United States Geological Survey (USGS)

Global Distribution of Copper Mines

Among the various types of non-ferrous metal mines, copper mines have high extraction value and significant volumes. The development of sectors such as photovoltaics (PV), wind power, new energy vehicles, power batteries, energy storage, and charging stations, along with the increase in data centers and AI computing centers, have stimulated the demand for copper. Consequently, global production and prices of copper have been steadily rising each year.



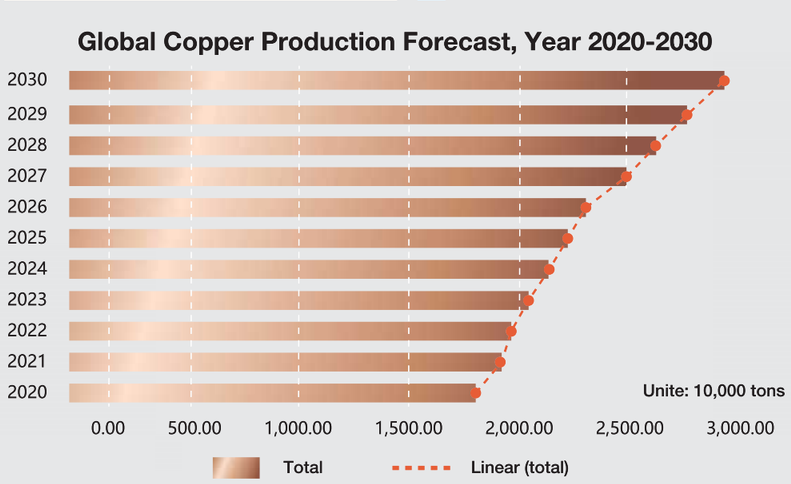
Global Reserves and Production Distribution of Copper

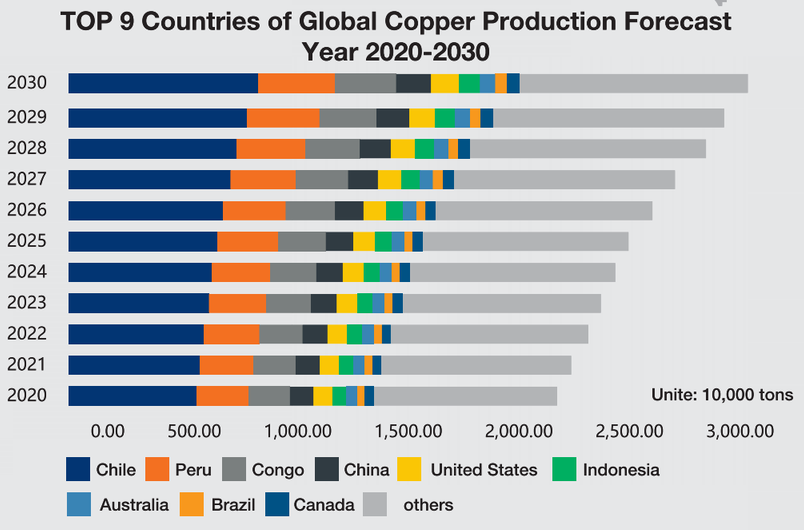
According to data from the United States Geological Survey (USGS), as of January 2023, the global copper reserves were of 890 million tons.

The countries with the largest shares are: Chile: 21.3% of global reserves, Australia: 10.9%, Peru: 9.1%, Russia: 7.0%, and Mexico: 6.0%.

In 2023, global copper production was 22.61 million tons, with the Americas accounting for 43.1% of the total global copper production.

Global Copper Production Forecast





Data source: USGS

Classification of Non-ferrous Metal Mines

Mining Methods

Open-pit Mining

Underground Mining

Material Transportation Methods

Intermittent

Road Transportation

- Highly maneuverable and easy to deploy
- Simplified mining process
- Strong climbing ability
- Small amount of infrastructure work and fast construction speed
- Simple transportation operations
- Short reasonable transportation distance
- High transportation cost
- Complex maintenance
- Highly affected by weather

Combined

Railway Transportation

- Large transportation capacity
- Low transportation cost
- Sturdy equipment structure
- Strong equipment versatility
- High infrastructure investment
- Slow construction speed
- Greatly affected by terrain
- Transportation efficiency significantly decreases with increasing mining depth

Continuous

Belt Transportation

- Continuous transportation operations
- Large transportation capacity
- Strong climbing ability
- Capable of centralized control
- Lower transportation costs compared to road transportation
- Strict requirements for transported materials
- Highly affected by climate

Mine Size Based on Annual Production

Mine Sizes	Small Mine	Medium-sized Mine	Large Mine
Ore Production	<300,000 tons/year	300,000 – 1 million tons/year	>1 million tons/year

Development Trends of Global Non-ferrous Metal Mining

The global mining supply chain is undergoing continuous structural adjustments, with accelerating trends toward regionalization and localization.

Supply and Demand

- The global energy resources are experiencing a divergence in new reserves, production, and consumption.
- The supply and demand for bulk minerals are noticeably differentiated.

Trade

- The overall trade volume of major global mineral products has decreased.
- However, the trade volume in strategic emerging markets has increased.

Market Prices

- Prices of major global mineral products have surged and then declined.
- Investment in the new energy sector is increasing, with the number and scale of global hydrogen projects expanding rapidly.
- Environmental, Social, and Governance (ESG) criterias have become core indicators for mining companies to attract investment and enhance competitiveness.

Policy Adjustments

- Developed economies are adjusting their strategies for critical minerals and updating critical mineral lists.
- Developing countries are revising mining systems and laws to strengthen resource management.

Technological Advancements

- Mining technology and equipment are moving towards intelligence, with 5G technology and Artificial Intelligence leading the industry towards green and low-carbon development.
- Rapid progress in resource recycling technologies, with the recycling rate of bulk mineral resources exceeding 50%, and significant potential for the recycling of strategic emerging minerals.

LIUGONG TOTAL SOLUTIONS

LiuGong provides complete mining solutions for global non-ferrous metal open-pit mining customers, meeting their operational needs

Equipment Solutions

LiuGong provides efficient, reliable, and environmentally friendly equipment solutions, systems, and advanced technologies for the entire process of non-ferrous metal mining, including surface stripping, ore extraction, crushing and screening, transportation, and backfilling. These solutions ensure the safe, efficient, and sustainable development of non-ferrous metal production, offering comprehensive and customized solutions for the industry.

Experts On-site Research and Planning

Before mining, LiuGong experts conduct on-site surveys, collects data and materials, performs sample experiments and analyses, optimizes mine layout, and selects the best equipment and fleet. They compare fleet capacity, efficiency, and estimate total cost of ownership (TCO), and recommend mining operation plans. During mining operations, LiuGong experts continuously optimize fleet matching through on-site assessments, provide operational techniques training to improve fleet efficiency, as well as safety operation training, fatigue and distraction management training to ensure safe and efficient mine operations.

Technical Solutions

LiuGong's iLINK Equipment Intelligence System provides equipment status monitoring and health management, to maintain high-performance efficiency and increase equipment uptime. LiuGong's Smart Mining Management System enables comprehensive mine operation management, utilizing AI intelligent scheduling according to production plans and progress. It offers real-time monitoring from fleet efficiency to equipment full lifecycle management, enhancing fleet productivity and reducing cost per ton.

Aftermarket Solutions

LiuGong provides customers with professional services, including equipment handovers, safety operation and basic maintenance training, efficiency-improving operational techniques training, genuine parts supply, on-site service, maintenance, periodic inspections, oil sample analysis, equipment health management, preventive maintenance, overhauls, and remanufacturing value-added services, ensuring high-performance operation throughout the equipment lifecycle.

Intelligent, Green, and Low-carbon Solutions

As electrification deepens, LiuGong collaborates closely with customers to plan clean energy (wind and solar) and energy storage for charging equipment, gradually achieving the goals of intelligent, green, and low-carbon mine operations.

Financial Solutions

LiuGong financial solutions help customers focus more on mining and operations.

Together with global customers, LiuGong is dedicated to continuously optimizing every process of mining operations, creating efficient, high productivity, safe, intelligent, and green mines, thereby contributing to the sustainable development of the global economy.

LIUGONG
EQUIPMENT SOLUTIONS

Product Portfolio Solutions

Based on the scale of metal mines, the recommended equipment combinations are as follows:

Open-pit Mining / Year		Metal Mine		
		< 300,000 tons	300,000 – 1 million tons	>1 million tons
Product Portfolio	Wheel Loaders	5-7 T	7-9 T	9-25 T
	Excavators	20-50 T	50-70 T	75-200 T
	Mining Trucks	Highway Trucks Rigid Mining Trucks Articulated Trucks	60 T Wide-body Mining Trucks 50 T Rigid Mining Trucks	70-80 T Wide-body Mining Trucks 100-400 T Rigid Mining Trucks
	Bulldozers	260 hp	320 hp	360-600 hp
	Rollers	20 T	22-26 T	26-36 T
	Motor Graders	230 hp	260-300 hp	300-500 hp
	Drilling and Blasting Equipment	4-5 I	4-7 I	Rotary Drills
	Crushing and Screening Equipment	Fixed Crushing Stations 1,000 t/h Mobile Crushing Stations 250 t/h	Fixed Crushing Stations 1,500 t/h Mobile Crushing Stations 450 t/h	Fixed Crushing Stations 2,500 t/h

Open-pit Metal Mining Process Flow

Site Preparation and Road Construction

- Bulldozer
  - LD36,LD60D
- Motor Grader
  - 4260D,4320D
- Excavator
  - 922F,936F,952F
- Roller
  - 6618E,6626E,6620E

Surface Stripping

- Excavator
  - 952F,975F,995F,9135F
- Wide-body Mining Truck
  - DW90A, DW105A, DW120A, DW90AE, DW105AE
- Rigid Mining Truck
  - DR50C, DR50CE, DE100C, DE120C, DE220C
- Bulldozer
  - LD36D, LD60D

Drilling and Blasting

- Drilling Rig
  - DH45A-H, DH47A-H, DH845, DH846, DH947, RD45A-CS

Loading and Hauling

- Excavator
  - 952F,975F,995F,9135F
- Wide-body Mining Truck
  - DW90A, DW105A, DW120A, DW90AE, DW105AE
- Rigid Mining Truck
  - DR50C, DE100C

Crushing and Screening

- Crushing Station
  - Mobile Crushing Station
  - Fixed Crushing Station
- Wheel Loader
  - 890T,8128H,8250H
- Excavator
  - 952F,975F,995F,9135F

Storage and Secondary Transportation

- Wheel Loader
  - 890T,8128H,8250H
- Wide-body Mining Truck
  - DW90A

Site Reclamation (Re-greening)

- Bulldozer
  - LD36D, LD60D
- Wheel Loader
  - 890T,8128H,8250H
- Excavator
  - 952F,975F,995F,9135F

Site Preparation and Road Construction

LiuGong Equipment Solutions for Road Construction

The more efficiently the site preperation and road construction is completed, the faster the mine will generate benefits.

LiuGong provides highly efficient and reliable complete set of equipment tailored for global mining customers, the combined fleet performance matching increases overall efficiency by 15% while reducing maintenance costs by 10%.

LiuGong equipment is designed to efficiently complete road construction and maintenance tasks. Good transportation roads and jobsites not only improve fleet capacity and ensure safe operations but also significantly reduce fuel consumption and tire wearing, extend equipment operation life and reduce cost per ton.

Bulldozers

Model	Operation Weight	Rated Power	Blade Capacity (Std.)
LD36D	40,000 kg	280 kW (375 hp)	11.7 m^3
LD60D	70,800 kg	455 kW (610 hp)	18.9 m^3

IMPRESSIVE PERFORMANCE BEHIND EVERY PUSH

High Efficiency, 15% Increased Productivity

Equipped with world leading Cummins engines, with advanced fuel efficiency, coupled with load sensitive hydraulic systems, increasing productivity and oil saving.

Robust and Reliable

Extended equipment lifespan due to heavy-duty chassis and high-strength, high wear resistant main frame, providing optimized performance in mining conditions.

Easy Maintenance

Reduced maintenance costs through efficient and convenient maintenance system design and connected maintenance channels.

Motor Graders

Model	Operation Weight	Rated Power	Traction Force	Blade Width
4260D	20,500 kg	200 kW (268 hp)	112 kN	4,270 mm
4320D	28,800 kg	240 kW (322 hp)	162 kN	4,570 mm

Panoramic View and User-friendly Design

The frame structure of LiuGong motor grader is symmetrical, with balanced stress, ensuring smooth and stable operation in mining environments.

Structural Strength: Improved overall strength by 25%, suitable for rugged mining conditions.

Blade Options: Optional blade configurations for enhanced operational capabilities.

Operator Comfort: User-friendly integrated control levers for efficient and ergonomic operation, reducing operator fatigue.

Excavators

Model	Rated Power	Bucket Capacity (Std.)	Production / hour
922F	124 kW (167 hp)	1.0 m^3	80~180 m^3
936F	264 kW (354 hp)	1.9 m^3	220-320 m^3
952F	280 kW (375 hp)	3.2 m^3	250-320 m^3

Rollers

Model	Operating Weight	Rated Power	Amplitude	Frequency
6614E	14,000 kg	118 kW (158 hp)	2.0 mm/1.2 mm	30/33 Hz
6616E	15,500 kg	118 kW (158 hp)	2.0 mm/1.3 mm	30/33 Hz
6618E	18,300 kg	147 kW (197 hp)	2.0 mm/1.3 mm	28/32 Hz
6620E	20,000 kg	147 kW (197 hp)	2.0 mm/1.3 mm	28/32 Hz
6626E	26,000 kg	177 kW (237 hp)	2.1 mm/1.2 mm	28/32 Hz

Surface Stripping

LiuGong Equipment Solutions for Surface Stripping

Efficient completion of surface stripping to access ore veins/bodies (mining) is crucial for profitability in mining operations. Typically, the overburden stripping volume in open-pit non-ferrous metal mines is 5 to 6 times the mining volume, or even exceeding 10 times.

The powerful LiuGong mining bulldozer helps efficiently and quickly clear the surface; high-performance excavators, paired with wide-body mining trucks, handle excavation and transport. LiuGong's electric mining trucks, equipped with energy recovery systems, recharge autonomously during heavy downhill loads, saving both fuel and electricity. LiuGong's full set of matched equipment ensures excellent performance in surface stripping.

Excavators

Model	Rated Power	Bucket Capacity (Std.)	Production / hour
952F	280 kW（375 hp）	3.2 m³	250 – 320 m³
975F	563 kW（755 hp）	4.6 m³	320 – 400 m³
995F	447.5 kW（600 hp）	6.2 m³	450 – 550 m³
9135F	567 kW（760 hp）	9.0 m³	560 – 690 m³

THE POWER TO BRING RESULTS

Excellent Performance

LiuGong excavators are equipped with multiple innovative hydraulic technologies, new intelligent electronic control system, and independent cooling system, achieving higher overall operational efficiency and better fuel economy.

Robust and Durable

Key components of LiuGong excavators and mining trucks are welded from high-strength steel plates, providing high thickness, strength, and wear resistance.

Convenient Maintenance

Major maintenance points are centrally located with connected maintenance channels, ensuring easier maintenance.

Wide-body Mining Trucks

Model	Rated Power	Battery Capacity	Heaped Capacity
DW90A	382 kW（512 hp）	/	38 m³
DW105A	382 kW（512 hp）	/	43 m³
DW120A	570 kW（764 hp）	/	45 m³
DW90AE	500 kW（671 hp）	423/396 kWh	38 m³
DW105AE	500 kW（671 hp）	423/396 kWh	45 m³

Powerful Performance

Through in-depth research into mining conditions, LiuGong has enhanced the power systems of its mining trucks, significantly improving vehicle maneuverability and transportation efficiency.

Fuel Efficiency

Electric wide-body trucks feature a 500 kW motor and 396 kWh battery, ensuring worry-free endurance, with energy regenerative braking under heavy downhill conditions to extend operating time.

Efficient Partnerships

The 975F excavator is paired with the DW90A wide-body mining truck.

The 995F excavator is paired with the DW105A wide-body mining truck.

The 9135F excavator is paired with the DW120A wide-body mining truck.

Maximizing loading efficiency and reducing overall fuel consumption per hour.

Bulldozers

Model	Operating Weight	Rated Power	Blade Capacity (Std.)	Attachment
LD36D	40,000 kg	280 kW（375 hp）	11.7 m³	Semi-U
LD60D	70,800 kg	455 kW（610 hp）	18.9 m³	Semi-U

Rigid Mining Trucks

Model	Drive	Rated Power	Heaped Capacity
DR50C	Mechanical	388 kW （520 hp）	29.8 m³
DR50CE	Electrical motor (423 kWh)	480 kW （644 hp）	30 m³
DE100C	Electrical motor	2×563 kW （1,509 hp）	63 m³
DE240C	Electrical final drive	1,860 kW （2,494 hp）	113 m³

Safe and Reliable

LiuGong rigid mining trucks are equipped with NC load-sensitive steering valve at Mid-position, using two cylinders to drive a disconnect dual-trapezium steering mechanism. Even losing engine power, emergency steering can provide power for at least two steering cycles from left-to-right.

Comfort and Durability

Independent suspension with oil/gas (nitrogen) cylinders that automatically damping adapt based on load conditions, maintaining excellent shock resistance. This not only enhances driver comfort but also effectively reduces the impact of material loading and driving on uneven surfaces, thereby extending the truck's operational life.

Robust for Heavy Loads

LiuGong mining trucks employ heavy-duty, fully floating semi-axles with a primary spiral bevel gear main reducer and planetary rim reducers, using high-strength cast-welded structure. Electric trucks use electric wheels for easier braking.

Efficient Braking

Utilizing a hydraulic control system with independent front and rear control circuits. Both front and rear brakes, including emergency brakes, are supported by independent nitrogen/oil accumulators for energy supply. The addition of shuttle valves to the brake circuits improves response time and enhances safety.

Drilling and Blasting

Achieving optimal blasting results can not only improve loading efficiency and fleet productivity, but also reduce fuel consumption and minimize the investment for secondary crushing equipment, significantly reducing mining operating costs.

LiuGong drilling rigs, combined with Smart Mining System, precisely locate the drilling position, depth, explosive dosage, evaluate and continuously improve the blasting effect to ensure optimal blasting effect.

Drilling Rigs

Type	Model	Diameter	Rated Power
Separated down-the-hole drill	DH45A-H	90-115 mm	73.5 kW (99 hp)
Separated down-the-hole drill	DH47A-H	90-185 mm	73.5 kW (99 hp)
Integrated down-the-hole drill	DH845	90-130 mm	194 kW (260 hp)
Integrated down-the-hole drill	DH846	115-138 mm	194 kW (260 hp)
Integrated down-the-hole drill	DH947	90-152 mm	230 kW (308 hp)
Top-Hammer down-the-hole drill	RD45A-CS	76-127 mm	194 kW (260 hp)

Meeting Diverse Needs

Separated DTH drill paired with air compressor offer cost-effective solutions, suitable for complex and hard rock conditions, ensuring straight and deep drilling.

Integrated DTH drill come standard with world-class air compressor and comfortable operator cabins, facilitating fast drilling with low fuel consumption.

High Precision Performance

Automatically adjusts feed speed, feed pressure, and impact pressure based on rock conditions to maintain optimal working status, preventing stuck drills and reducing thread wear and other abnormal incidents.

Reliable and Durable

Hydraulic components sourced from reputable world-class manufacturers ensure durability, while high-precision filters extend the life of hydraulic components.

Additionally, LiuGong provides on-site support with professional technicians, offering installation guidance and operating training for users.

Loading and Hauling

The excavating, loading and transporting of ore account for approximately 40-50% of overall mining operation costs, making efficient loading crucial for fleet productivity. The combination of LiuGong large excavators and mining trucks stands out as the mainstream load and haul solution, featured by robust and durable, with strong power and good performance matching, improving the efficiency of the entire fleet.

Large Excavators

Model	Rated Power	Bucket Capacity (Std.)	Production / Hour
952F	280 kW (375 hp)	3.2 m³	250 – 320 m³
975F	563 kW (755 hp)	4.6 m³	320 – 400 m³
995F	447.5 kW (600 hp)	6.2 m³	450 – 550 m³
9135F	567 kW (760 hp)	9.0 m³	560 – 690 m³

Large Excavators and Mining Trucks

Outstanding Performance
LiuGong excavators are equipped with innovative hydraulic technologies, new intelligent electronic control system, and independent cooling system, resulting in higher working efficiency and better fuel economy.

Robust and Durable
Key components of LiuGong excavators and mining trucks are welded from high-strength steel plates, offering high thickness, strength, and wear resistance.

Convenient Maintenance
Major maintenance points are centrally located with connected maintenance channels, ensuring easier maintenance.

Wide-body Mining Trucks

Model	Rated Power	Battery Capacity	Heaped Capacity
DW90A	382 kW (512 hp)	/	38 m³
DW105A	382 kW (512 hp)	/	43 m³
DW120A	570 kW (764 hp)	/	45 m³
DW90AE	500 kW (671 hp)	423/396 kWh	38 m³
DW105AE	500 kW (671 hp)	528/423/396 kWh	45 m³

Low Investment, High Returns
LiuGongls wide-body trucks are designed for cost-effectiveness, aiming to reduce initial investment. The efficient power system, durable components, and excellent maintenance performance contribute to lower operating and maintenance costs, while delivering outstanding performance and high efficiency, ensuring substantial return on investment.

High Reliability
Professional designed, using high-quality components, and subjected to rigorous reliability testing, LiuGong mining truck works stablely under various complex conditions, minimizing the risk of failures and ensuring consistent productivity and uptime.

Efficient Matching
LiuGongls wide-body mining trucks are meticulously designed for different applications, paired with efficient loading equipment to ensure smooth operations and adaptable to diverse construction environments. Maximizing productivity per hour further enhances overall efficiency.

Large Wheel Loaders + Mining Trucks

Outstanding Performance

Mature and reliable engine technology, full variable displacement hydraulic technology, and electro-hydraulic control system. Designed for mining applications, optional intelligent bucket loading system to enhance overall working efficiency and fuel economy.

Robust and Durable

Adapting new crocodile-type structure, tough and reliable. The bucket is made of high-strength wear-resistant materials, ensuring a long service life. High electrical protection grade meets the requirements of harsh conditions.

Safety and Comfort

Equipped with an extra-large, full-view, FOPS-certified quiet cab, standard rear-view camera, multi-level shock absorption, providing a comfortable and safe operating environment.

Convenient Maintenance

High degree of automation with dydraulic driven and intelligent monitoring, ensuring high efficiency. Fully covered maintenance channels for easier maintenance.

Good blasting is the basis for high loading efficiency of large wheel loaders. LiuGong large wheel loaders featured by:

1. Large bucket capacity, one-button loading, high efficiency, fuel saving
2. Flexible mobility, flat ground loading, without requirement on loading platform
3. Maintain site cleanliness without the need for auxiliary equipment assistance

LiuGongls large loaders, paired with mining trucks, maximize fleet productivity and reduce transportation costs.

Large Wheel Loaders

Model	Rated Power	Rock Bucket
890T	262 kW (351 hp)	4.5-6.0 m^3
8100TE	210 kW (285 hp)	4.5-10 m^3
8110TE	264 kW (359 hp)	4.5-10 m^3
8128H	418 kW (561 hp)	6.0-8.0 m^3
8250TE	641 kW (860 hp) fuel / 418 kW (414 hp) electric	9.0-15 m^3

Loading Matching Recommendations

Not Recommended | Average | Recommended

Product			Wide-body Mining Truck				Rigid Mining Truck		
Times			60T	70T	80T	100T	45T	91T	230T
			DW90	DW105	DW120	DW150	DR50C	DE100C	DE240
Excavator	50T	950/952	9-10				7-8		
	60T	965	8-9				6-7		
	70T	970/975	7-8	8-9	9-10		5-6		
	90T	990/995		7-8	8-9		4-5	9-10	
	130T	9125/9135		5-6	7-8	8-9		7-8	
	150T	9150			5-6	7-8		6-7	
	200T	9200				6-7		4-5	
	400T	9400							5-7
Wheel Loader	12T	8128	4-5	6	7	8	4		
	16T	8160		4-5	5	6-7			
	25T	8250				4		4	
	40T	8400							5

The number of excavators matched with mining trucks = Mining truck cycle time (loading, loaded transport, unloading, empty transport, waiting time) / Excavator loading time for a full mining truck, round to the nearest integer.

For example, with 9125 matched with DW105, at a 2 km haulage distance, 1 unit of 9125 matches with 4 units of DW105. For every additional 1 km of haulage distance, increase by 1-2 units of DW105, adjusting based on the transportation road conditions.

Crushing and Screening

Crushing and screening of ores are crucial steps in mine processing. It involves conducting experimental analysis on ore samples (hardness, crushing plasticity, viscosity, etc.), and selecting appropriate equipment based on results and operational requirements.

LiuGong loaders/excavators can handle feeding for crushing and screening machines, as well as secondary transport after discharge.

Crushing and Screening Station

Model	LJ106DP	LJ116E	LI1213DP	LI1214E	LC300DP	LS133DP
Type	Jaw	Jaw	Impact	Impact	Cone	Screener
Weight	52,000 kg	54,000 kg	63,500 kg	54,000 kg	56,000 kg	32000 kg
Crusher Model	C106	C116	C250	C315	HP300	/
Feeder Size	1,060 mm x 700 mm	1,150 mm x 760 mm	1,300 mm x 900 mm	1,300 mm x 960 mm	/	/
Hopper Capacity	4 m^3	6 m^3	5 m^3	7 m^3	3 m^3	3.1 m^3
Power Type	Dual Power	Cable Driven	Dual Power	Cable Driven	Dual Power	Dual Power
Engine Model	QSL8.9	QSB5.9	QSZ13	QSB5.9	KTA19	QSB5.9
Engine Power Rate	235 kW	113 kW	512 kW	133 kW	490 kW	120 kW
Output t/h	130-520 t/h	150-520 t/h	150-360 t/h	170-400 t/h	100-380 t/h	180-350 t/h

1.Liugong New series of Mobile crushing and screening product line provides excellent performance
2.We have dual power, external cable power, diesel engine power. With different power type, we can fulfill customers' various working condition, and we aim to provide lower energy cost to achieve better TCO.
3.With low frequency reposition application, we also have modular crushing and screening plant to help our customer have a lower investment.

Site Reclamation (Re-greening)

Site reclamation (Re-greening) involves filling the site with earthworks excavated from pre-stripped and re-landscaping the area. Equipment used from previous processes such as site construction or surface stripping operations can efficiently accomplish these tasks.

Bulldozers

Model	Operating Weight	Rated Power	Blade Capacity
LD36D	40,000 kg	280 kW (375 hp)	11.7 m³
LD60D	70,800 kg	455 kW (610 hp)	18.9 m³

Large Wheel Loaders + Mining Trucks

Product	Model	Rated Power	Rock Bucket
Wheel Loader	890T	262 kW (351 hp)	4.5-6.0 m³
	8128H	418 kW (561 hp)	6.0-8.0 m³
	8250TE	641 kW (860 hp) fuel / 418 kW (414 hp) electric	9.0-18 m³
Wide-body Mining Truck	DW90A	382 kW (512 hp)	26-38 m³

Rigid Mining Trucks

Model	Drive	Rated Power	Heaped Capacity
DR50C	Mechanical	388 kW (520 hp)	29.8 m³
DR50CE	Electrical motor (423 kWh)	480 kW (644 hp)	30 m³
DE100C	Electrical motor	2×563 kW (1,509 hp)	63 m³
DE240C	Electrical final drive	1860 kW (2,494 hp)	113 m³

Large Excavators

Model	Rated Power	Bucket Capacity (Std.)	Production / Hour
952F	280 kW (375 hp)	3.2 m³	250-320 m³
975F	563 kW (755 hp)	4.6 m³	320-400 m³
995F	447.5 kW (600 hp)	6.2 m³	450-550 m³
9135F	567 kW (760 hp)	9.0 m³	560-690 m³

Special Mining Attachments

Hydraulic hammers are usually used in non-ferrous metal mines for secondary crushing, for breaking up rock roots, or for crushing large blocks with diameters over 500 mm. Rippers are used for surface loosening and stripping. Rock arms are used for surface stripping, as well as for non-explosive excavation in shale, sandstone, or highly weathered areas.

Attachment	Application	Model Recommended	Remarks
Hydraulic Hammer	Used for secondary crushing in mining	922F to 952F	Side-mounted hammer, drill rod 140-195 mm, matched with excavator hydraulic flow and pressure
Rock Arm	Used for surface stripping, soft rocks such as shale and sandstone, or non-explosive excavation in highly weathered hard rocks	952F and larger models	customized according to excavator tonnage
Ripper	Used for surface loosening and stripping	952F to 975F	Assisting in excavation

LiuGong Equipment Solution for Open-Pit Copper Mining

Copper ore is extremely heavy, with a loose density of about 1.8-2.3 t/m ³ after blasting. Due to the low copper content in the ore, the stripping amount is relatively large. The primary load and haul equipment is large excavators, large loaders, and large tonnage mining trucks to reduce ton costs.

The following solutions are based on conditions below

1. Blasting Conditions: Ensure efficient blasting to loosen ore with specific gravity ranging from 1.8 to 2.3 t/m³.

2. Work Surface and Road Maintenance: Maintain optimal conditions to support equipment operations and ensure a safe working environment.

3. Speed Limit and Haulage Distance: 25 km/h speed limit within the mine, with a haulage distance of 2 km and a slope of ±5%.

4. Capacity Calculation: Based on 85% overall labor efficiency and 90% bucket fill efficiency, operating 16 hours per day for 26 days per month, aiming for a monthly extraction volume of 400,000 cubic meters.

Recommended equipment combination solutions:
Solution 1

No.	Model	Units
1	Bulldozer LD36D	1
2	Motor Grader 4260D	1
3	Wheel Loader 890T	3
4	Down-the-hole Drill DH47	3
5	Roller 6620E	1
6	Excavator 952F, with 3.2 m³ rock bucket	4
7	Wide-body Mining Truck DW90A	12
Production	15,800 m³/day	410,800 m³/month

- Suitable for areas with lower labor costs.
- Equipment with a certain surplus capacity and high reserve factor, making it easy to expand incrementally.
- Ideal for multi-point mining operations.

Solution 2

No.	Model	Units
1	Bulldozer LD36D	1
2	Motor Grader 4260D	1
3	Wheel Loder 890T	3
4	Down-the-hole Drill DH47	3
5	Roller 6620E	1
6	Excavator 9135F, with 9 m³ heavy duty bucket	2
7	Wide-body Mining Truck DW105A	8
Production	16,000 m³/day	416,000 m³/month

- Suitable for areas with relatively higher labor costs, fewer operators, and a focus on efficiency.
- Designed for more centralized mining veins.

LiuGong equipment has been widely applied in large copper mines in Chile, Russia, Zambia and other countries, ensuring high mining efficiency and uptime.

LiuGong Equipment Solutions for Open-pit Nickel Mining

Open-pit nickel mining primarily involves lateritic nickel ore, with a density ranging from 1.3 to 1.5 t/m³. The ore is characterized by high moisture content, significant viscosity, high ground water content at operation sites, and wet and muddy transportation roads. Excavation and loading efficiencies, as well as transportation efficiency, are relatively low, typically proceeding with direct mining after stripping.

Excavation and loading equipment consist mainly of 20 ton excavators and 3-5 ton wheel loaders, while hauling equipment includes 30-40 ton mining dump trucks and articulated trucks.

The following solution is based on conditions below:

Bucket fill rate of 100%, overall labor efficiency of 85%, 8 hours/day, 26 days/month, haulage distance of 5 km, average speed of 15 km/h, and a monthly extraction volume of 400,000 cubic meters.

Recommended equipment combination solution:

No.	Model	Units
1	Bulldozer LD36D	2
2	Wheel Loader 856H, 2.7 m³ BOCE bucket	4
3	Motor Grader 4230D	2
4	Roller 6626E	1
5	Excavator 922F, with 1 m³ bucket	12
6	40 t Rigid Mining Truck / Articulated Truck	80
Production	12*1,296 m³/day	404,000 m³/month

LiuGong equipment has been widely applied in nickel mining operations in countries such as Indonesia, the Philippines, and South Africa, with over 1,000 units of equipment combinations sold. The equipment ensures high excavation efficiency and rapid ore extraction.

LiuGong Equipment Solutions for Open-pit Bauxite Mining

The open-pit red soil type aluminum ore has a loose density of around 1.5 t/m ^{3}. If it is humid/rainy season and the road conditions deteriorate, it needs to be repaired. After surface stripping, blasting and excavation will be carried out, and then transported to the crushing station for processing.

The following solution is based on the conditions below:

Haulage distance of 2 km, good blasting conditions, 970E excavator with 4.0 m^3 bucket, cycle time of 40 seconds, bucket fill rate of 90%, overall labor efficiency of 85%, 16 hours/day, 26 days/month, monthly extraction volume of 1 million cubic meters.

Advantages of Using LiuGong's Complete Mining Equipment Set:

- LiuGong's complete equipment set features superior configuration and performance matching, improving overall fleet efficiency by 15%.
- One-stop procurement saves costs, with integrated management of services, maintenance, and smart parts supply, reducing fleet operating costs, increasing uptime, and extending equipment lifespan.
- LiuGong's main mining equipment is equipped with Cummins engines selected for their reliability, power, fuel efficiency, intelligence, and suitability for harsh operating conditions in open-pit mines.
- Utilizing world class hydraulic components and fully electronic hydraulic systems with large displacement electronic control pumps ensuring more precise control, higher efficiency, and lower energy consumption, reducing fuel consumption by 10% compared to industry average level.

Recommended equipment combination solution:

No.	Model	Units
1	Bulldozer LD36D	2
2	Wheel Loader 856H	8
3	Motor Grader 4260D	1
4	Roller 6626E	1
5	Excavator 936F, with hydraulic hammer	1
6	Down-the-hole Drill DH47A-H	2
7	Fixed Crushing Station 1,500 t/h	2
8	Excavator 975F, with 4.6 m^3 heavy duty bucket	8
9	Wide-body Mining Truck DW90A	48
Production	26,240 m^3/day	682,240 m^3/month

LiuGong equipment has been widely used in bauxite mining in countries such as Guinea, Indonesia, and Vietnam, with high production capacity for excavation, loading, and hauling equipment, ensuring continuous and uninterrupted production for customers.

ONSITE EVALUATION

When a new mining project starts, the selection and efficiency of the fleet are influenced by numerous factors and variables. Estimations often involve significant errors, leading to considerable deviations in fleet selection and Total Cost of Ownership (TCO) estimation, which can result in decision-making mistakes. Consequently, mining operational costs may increase, and investment returns could decrease, or even lead to losses.

Drawing on years of mature experience, LiuGong ensures more accurate fleet selection and TCO estimation for open-pit metal mines through expert on-site evaluation and advanced data analysis techniques.

LiuGong's application experts conduct on-site evaluations to thoroughly understand the actual operational needs of mining customers. Through precise and meticulous on-site investigations and data collection—including road planning, mining processes and schedules, production requirements, information gathering (climate, working hours, local government environmental policies, safety regulations, local work practices, etc.), and sample analysis of mining materials (such as density, hardness, loose coefficient)—LiuGong uses its proprietary product matching calculation system to accurately match machine performance with production efficiency requirements.

This approach enables LiuGong to provide optimal fleet recommendations tailored to the customer's needs. Following TCO assessment, LiuGong delivers a comprehensive analysis report that details the comparison of production efficiency and costs among different fleets, along with operational recommendations. So as to help clients make informed decisions, reducing cost per ton.

Customer requirements

↓

Fleet matching

↓

Fleet TCO estimation

↓

Optimal Fleet Recommendation (OFR)

↓

Report generation

Product matching calculation system

Support system

TCO estimation system

Technologies

Systematic Evaluation

- Fleet matching recommendations
- Recommended equipment and technology
- Equipment selection
- Site layout
- Expert on-site guidance
- Service fees

Information Collection

- Equipment cycle time
- Equipment configuration
- Transportation road analysis
- Measurement of material density
- Production capacity requirements
- Operator efficiency and working hours
- Selection of ground engaging tools

Analysis Tools

- Fleet output and cost
- Cycle time calculation software
- Onboard load data
- iLINK data
- Smart Mining Management System data

Analysis

Productivity Analysis

- Equipment load analysis
- Equipment loading and weighing System
- Belt weighing system
- Volume measurement system
- Equipment/fleet/mine production statistics
- Comparative analysis of different fleet production

Fuel Analysis

- Equipment/fleet fuel consumption
- Equipment/fleet fuel efficiency analysis
- Emissions
- Equipment idle time analysis

Transport Road Analysis

- Comprehensive transport road conditions
- Heavy load section analysis
- Safety ramp analysis
- Optimization recommendations
- Analysis of transport roads and vehicle speeds

Application Analysis

- Equipment/fleet quantity
- Working load size
- Equipment and fleet optimization plans
- Equipment and fleet utilization efficiency analysis

Recommendation

Recommendations to Customers

- Fleet output and cost
- Configuration recommendations for optimizing fleet productivity
- Improvement plans after detailed site inspection
- Analysis of operator techniques

Value-Added Services

Safety Services

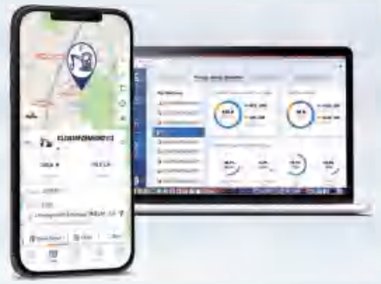
- Fatigue and distraction management
- Cultivating a safety culture
- Product safety operation training

TECHNOLOGICAL SOLUTIONS

iLINK Equipment Intelligence System

Based on the iLINK system analysis, we will provide the following reports:

- Detailed operation and equipment usage reports.
- Recommendations for improving operator skills based on the mineral and mining environment.
- Total cost of ownership analysis.
- Sensitivity analysis, ideal combination of equipment for operations.



Scalability
Third-party platform compatibility, custom open API data integration interface

Positioning
EQUIPMENT MONITORING
- **Path Track**
- **Electronic fence**
- Positioning tracking

Maintenance and Diagnosis
MAINTENANCE REMINDER
- **Preventive maintenance (under development)**
- **Remote Diagnosis**
- Engine fault codes

Management
matrix access management (6 level access)

Asset Safety
ASSET MANAGEMENT
- **Driver Behavior**
- **Accident prevention**
- in time feedback

Operating Parameters
DATA REPORTS
- **Running time (engine hours)**
- **Data analysis reports (daily, weekly, monthly)**
- Fuel consumption (electronically controlled engine products)
- Load factor
- Energy-saving report
- **machine MCU operation parameters acquisition (real time)**

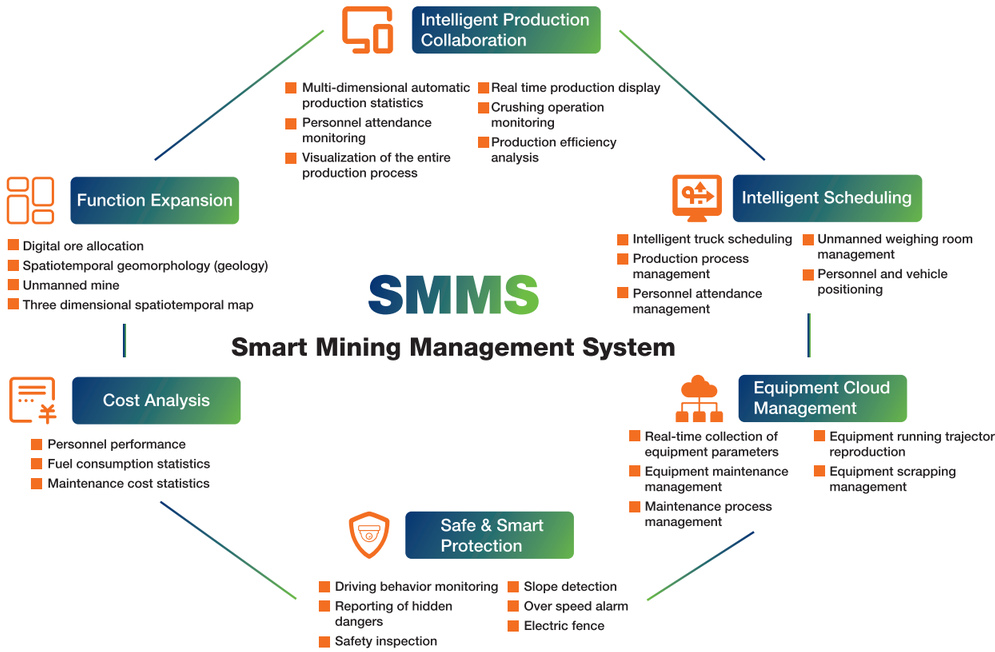
Smart Management Platform, Digitized Decision-Making

LiuGong's iLINK Equipment Intelligence System gives you real-time information on all of your machines. It provides you with equipment productivity evaluation, fault analysis, equipment maintenance reminders, remote equipment management, and other value-added services. For example, it provides you with a comprehensive analysis of equipment usage and the entire operating system to optimize the operation process.

We have global customer references with operations in various mining environments. Based on the knowledge and experience we gained from our global customers, we are able to provide you with the right guidance for your mining operations.

Smart Mining Management System

The Smart Mining Management System (SMMS) integrates LiuGong's iLINK system to monitor key equipment status information such as position, fuel consumption, operation, and remote diagnostics in real-time. It manages the entire lifecycle of equipment including regular/preventive maintenance, repairs, and spare parts inventory to increase equipment uptime, reduce maintenance time, and lower TCO. SMMS monitors real-time production, progress, and safe operations of the entire fleet, digitally and intelligently schedules and dispatches based on actual mining conditions, optimizing equipment matching, and enhancing fleet productivity. It provides technological support for efficient, safe, and intelligent mining operations.



Benefits of the Smart Mining Management System (SMMS) application to its mine users:

1. Digital management of all mining process, real-time data statistics and intelligent deployment improve operation efficiency by over 10%.

2. Precise digital management of production, equipment, and personnel, reducing overall costs by more than 10%.

3. Real time & comprehensive monitoring eliminates overloading and speeding. E-fence and fatigue management systems avoid safety accidents, enhance supervision capacity, and reduce on-site safety personnel.

System Structure

Application Layer

The application layer is the front-end of LiuGong Smart Construction System. Users can access the real-time mining production situation, as well as equipment operating status at anytime, anywhere, easily achieving one-click scheduling and data query.

Network Layer

Vehicle-to-vehicle communication is realized through the self-organized vehicle network, which offers low latency and easy maintenance, and is highly applicable to mining operations. Through the 4G/5G networks of telecom operators, vehicles realize data interaction with servers. The data interactions have no regional and time restrictions, and do not require users to build their own base stations.

Perception Layer

The perception layer collects data from drivers, vehicles, and loading points in real time through data acquisition equipment such as in-vehicle TBOX terminals and sensors, and monitors the operating status of vehicles in real time.

AFTERMARKET SOLUTIONS

Product Training

We provide customers with professional product training, including basic theoretical knowledge training, online learning platform, equipment operation training, equipment maintenance and professional technical skills training for service engineers. Customized training programs are offered based on the actual level of each customer's team.

Service Solutions

With over 500 certified and trained dealers in more than 130 countries around the world, we provide trusted and local support to our customers. With more than 30 overseas subsidiaries and agencies, over 20 overseas regional parts distribution centers (PDC), and 16 regional joint training centers, as well as call centers covering multiple countries, we provide a variety of customized service solutions to meet the actual needs of our customers.

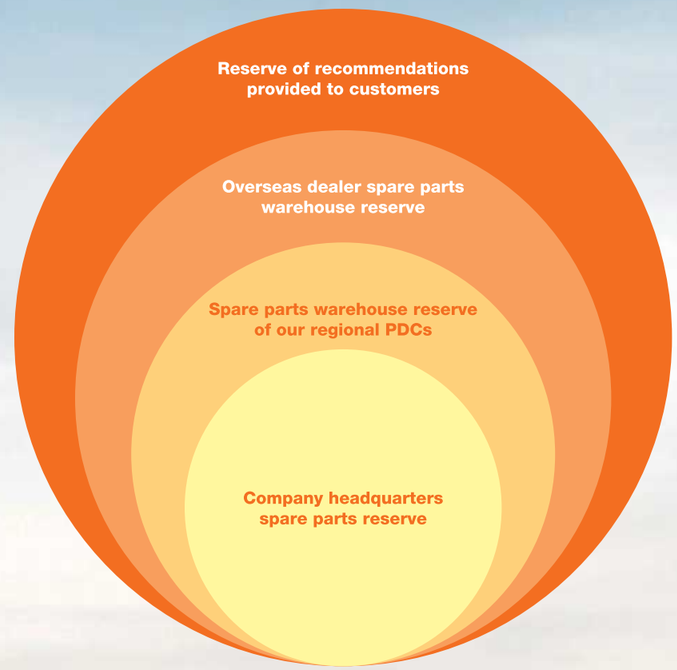
Our service solutions include

- Equipment Maintenance Plan
- Maintenance Training Program
- Equipment Disassembly, Assembly, and Transportation
- Equipment Downtime Service
- Equipment Upgrade and Replacement Services
- Service Package
- Customized Product Warranty Options

Parts Guarantee

Adequate and accurate spare parts reserves are very important for mining users. What's more, we can also provide appropriate consignment plans based on the business needs of our coal mining customers. We also offer various forms of credit sales, such as installment payments and deferred payments.

LiuGong meets the needs of mining customers through four levels of spare parts reserves.



FINANCIAL SOLUTION

We are committed to continually improve full solution, including credit and financial solu tions for our dealers and customers by innovation in equipment and service network to meet with their needs.

LiuGong began to offer financial leasing solutions to global customers since 2010. We understand our customers' businesses and provide multiple solutions to fit their needs.

Financial Leasing

Financial leasing is a great solution for customers to procure new machinery without the pressure of making a large payment in one go. Customers don't need to pay the full amount at once, which greatly reduces their payment pressure. Customers can use the equipment they need to complete their job and earn income to pay off the equipment. This provides our dealers and customers with more business opportunities.

Other Creative Financial Solutions

LiuGong is also actively exploring partnerships with Sinosure, and a number of Indonesian banks and leasing providers to offer our customers more creative leasing and insurance solutions that meet their needs.

Looking toward the future, LiuGong is planning a number of new credit and financial solutions which includes customized leasing, diverse payment scheme, etc. for our key customers and dealers.

INTELLIGENT, GREEN MINING SOLUTIONS

Solar Power Plants

Energy Storage Stations

LiuGong Electric Products

As electrification deepens, LiuGong collaborates closely with customers to deploy clean energy solutions (wind, solar) and energy storage charging equipment, gradually achieving intelligent, green, and low-carbon mining operations goals.

Intelligent, Green, Low Carbon Mining

Electric Product Solutions

Site Preparation and Road Construction | Surface Stripping | Drilling and Blasting | Loading and Hauling | Crushing and Screening | Storage and Secondary Transportation | Site Reclamation (Re-greening)

Motor Grader: 4280DE

Excavator: 922FE

Wheel Loader: 870HE

Mobile Crusher

Wheel Loader: 870HE

Wheel Loader: 870HE

Roller: 6622E

Mining Truck: DW90AE, DW105AE, DR50CE

Excavator: 922FE

Mobile Screener

Mining Truck: DW90AE, DW105AE

Excavator: 922FE

Mining Truck: DW90AE, DW105AE, DR50CE

Mining Truck: DW90AE, DW105AE, DR50CE

Product	Model	Battery Capacity	Operating Weight	Bucket/Body Size	Blade Width	Centrifugal Force
Electric Wheel Loader	870HE	423 kWh	24,200 kg	4.7 m³	/	/
Electric Wide-Body Mining Truck	DW90AE	423 kWh	95,500 kg	32-36 m³	/	/
Electric Wide-Body Mining Truck	DW105AE	423/528 kWh	109,500 kg	36-40 m³	/	/
Electric Rigid Mining Truck	DR50CE	423 kWh	85,000 kg	22-30 m³	/	/
Electric Motor Grader	4280DE	423 kWh	24,000 kg	/	4,270 mm	/
Electric Roller	6622EE	423 kWh	22,000 kg	/	/	400/335 kN

Ultra-long endurance, low-carbon & environmental protection

Equipped with a 423/528 kWh large-capacity battery, providing ultra-long endurance, electric energy-driven, using lithium iron phosphate batteries, zero emissions, low noise, and intelligent temperature control.

Intelligent Matching for Optimal Efficiency

LiuGong's unique whole-machine matching technology and motor control technology ensure optimal machine performance under rigorous operation conditions. Greater traction force increases significant efficiency advantages under heavy-duty applications.

Optimal matching of the entire machine with the motor ensures operation in the high-efficiency zone, achieving significant energy savings.

High Efficiency and Energy Saving

The independently innovated energy recovery system can achieve reverse charging of the battery during gear shifting or braking, saving 15-20% energy.

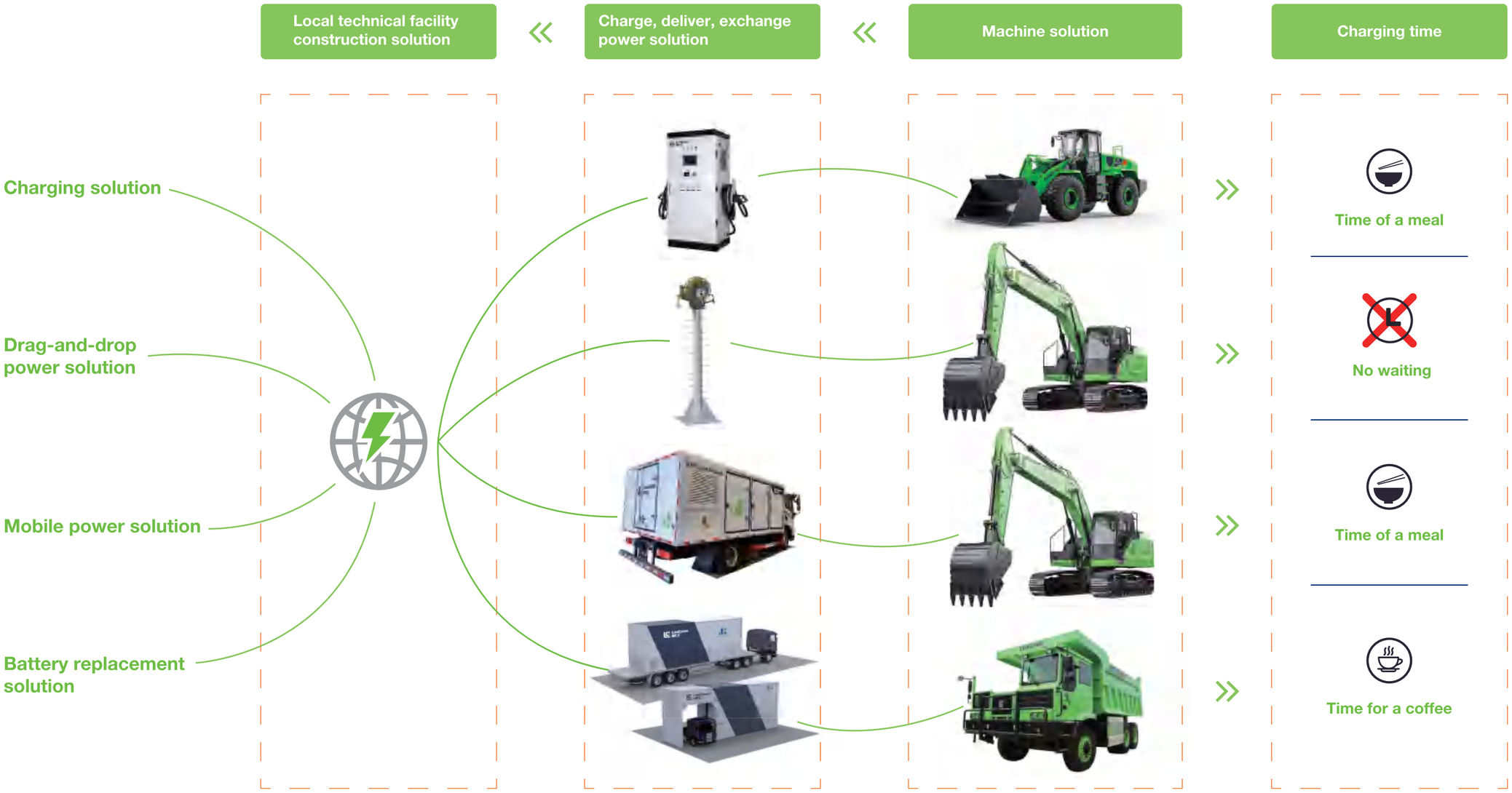
Economically Robust

Utilizes maintenance-free batteries, with low overall machine maintenance costs and long maintenance cycles. Strong traction force and power, capable of handling heavy-duty mining applications with ease. Reduces frequency of shovel adjustments, significantly improving efficiency. Lower operating costs compared to fuel-powered machines.

Comfortable Operation

Spacious cab with high-quality interior, high-back shock-absorbing seats, sliding and tilting windows, makes operators feel more comfortable during long time working. Active noise reduction layout design plus multiple noise reduction measures reduce cabin noise by over 10 dB(A). Intelligent temperature control, three-dimensional air supply for heating and cooling.

Power Distribution Solutions for Electric Products



LiuGong provides customers with various charging solutions to meet their diverse charging needs, enabling electric machinery to complete charging in the shortest possible time and meet their high-intensity endurance requirements.