Buyer's Guide

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Power banks

- √ China supply market analysis
- √ Sourcing tips
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Buyer's Guide to sourcing power banks

An exclusive and in-depth report on sourcing power banks in China, including supply market analysis, 17 supplier profiles, 14 hot products, cost breakdown, price guide and advice on supplier selection.

Slimmer, efficient power banks take the lead

Suppliers are increasing the use of Li-poly cells as demand for stylish and sleek power banks rises.

Sleek power banks with high conversion rates have become the top focus for China suppliers.

In an effort to create slimmer models, more manufacturers are adopting Li-poly battery cells instead of 18650 Li-ion cells. Li-poly cells provide about 20 percent more energy than 18650 Li-ion cells in the same form factor.

Shenzhen Vodasion Technology Co. Ltd offers an extremely thin 2500mAh power bank measuring only 96x62x6.6mm. At just a bit larger than a credit card, this could easily be the world's smallest power bank. And since Li-poly cells are regarded as much more stable and safer than 18650, it is believed that China suppliers will prefer more Li-poly in future products.

In addition, asynchronous rectification techniques (a way of improving rectification through the replacement of diodes with transistor-controlled switches) are adopted by an increasing number of makers for higher conversion rates. With these methods, the conversion rate of power banks can exceed 85 percent, and may be able to reach 93 percent or more.

Further, manufacturers are also concentrating on differentiating their power banks by providing additional functions. Currently, suppliers add on basic functions such as an LED flashlight, laser pointer or dual USB ports. However, more sophisticated functions are in the pipeline such as card readers, a hard drive, fast charging and intelligent charging capability, a WIFI/3G router, and solar panel and wireless charging.

Extremely thin, 2500mAh power bank measuring only 96x62x6.6mm

High-capacity models on the rise

At present, China suppliers produce power banks with capacities between 1000mAh to 26000mAh. Generally, models under 2200mAh are targeted at the promotional market, and those with 3000mAh to 8000mAh capacity dominate the mainstream market.

As capacity needs increase, however, models from 5000mAh to 12000mAh will be the most in demand in the coming years. At present, models above 12000mAh make up less than 20 percent of China's output.

Classified by type of battery cell, models with conventional Li-ion cells still account for the majority of the market. Considering the cost-to-energy rate, the cylindrical 18mmx65.2mm 18650 cell is the most economical option for power banks. On the other hand, although they only perform slightly better in

offering higher energy capacities, newer Li-poly cells are easy to shape and can be fitted into any shape of power bank with a smaller, thinner appearance and lighter weight.

Additionally, in order to enhance a product's utility and sales appeal, suppliers are offering practical add-ons such as LEDs for lighting and alarm, laser pointers, card readers, intelligent charging, and over-charge protection features.

Cost breakdown

Battery cells and PCB panels account for 70 percent to 80 percent of the total cost of a power bank, and these two factors overwhelmingly determine the final pricing of a finished product.

Generally, battery cells account for about 50 percent to 60 percent of the total cost. Relatively inexpensive 18650 Li-ion battery cells are the most common option right now. Depending on the specifications and place of origin, they generally cost between US$0.70 to nearly US$4.50 per unit.

For example, the price of a single 2000mAh China-made 18650 cell (from BYD, BAK, ATL, Forster or Lishen, for example) is about US$0.80 to US$1.30, while local 2600mAh 18650 cells are sold between US$1.20 to US$1.80.

Imported 18650 cells (mostly from Samsung, Sanyo and Panasonic) take more share in high-end power banks, and usually cost at least US$1.90. For imported cells, a 2600mAh 18650 cell costs at least US$1.90, while cells with 3000mAh capacity can cost between US$2.40 to US$3.30. Cells with 3200mAh to 3400mAh will be priced between US$3 to around US$4.50.

Li-poly cells with same capacities cost 20 percent to 30 percent more than conventional 18650 Li-ion cells. Considering their reasonable cost-to-energy

Price guide

FOB price	Features	Add-ons
US$20 to US$30 or above	**Capacity:** 8000mAh to 20000mAh **Cells:** More imported 18650 Li-ion and Li-poly **PCB:** Most PCBs with Taiwan-made battery management ICs and intelligent MCU; a few with Japan or US chips **Shell:** Aluminum alloy (with oxidized, brushed or matted treatment)	Intelligent charging; over-charging protection; fast charging, WIFI/3G router, card reader
US$10 to US$19	**Capacity:** 5000mAh to 12000mAh **Cells:** 18650 Li-ion and Li-poly from both local and imported sources **PCB:** PCBs with Taiwan or locally made battery management ICs and an intelligent MCU; with dual USB **Shell:** Aluminum alloy (with oxidized, brushed or matted treatment); ABS/PC with silk screen printing	Intelligent charging; over-charging protection; fast charging, WIFI/3G router; card reader
US$5 to US$10	**Capacity:** 1400mAh to 5000mAh **Cells:** More locally-made 18650 Li-ion and Li-poly **PCB:** PCBs with local 3-in-1 or 5-in-1 solution chips; some with dual USB **Shell:** ABS/PC with silk screen printing	None; LED light; laser pointer; card reader

rate, most makers purchase Li-poly cells from China suppliers, with the unit cost around US$1 to US$1.50 per 1000mAh.

The second major cost component, PCB panels, accounts for around 10 percent to 20 percent of the overall cost of a power bank. Low-end PCBs with domestic 3-in-1 or 5-in-1 solution chips usually cost under US$1.70. More sophisticated PCBs with independent battery charging management ICs and intelligent protective MCUs (from both domestic and Taiwan manufacturers) will be priced between US$1.80 to US$3.30. The most expensive PCBs with Seiko or Texas Instrument chips are priced above US$6.50 per unit. According to suppliers interviewed for this story, the first two types of PCBs dominate the majority of the market.

Finally, the remaining cost of a power bank comprises the aluminum alloy or ABS/PC shell with different surface treatments (about 15 percent), and the last 10 percent to 15 percent is from other materials and labor cost.

The bill of materials of power banks is quite similar across the industry, and there is little space for suppliers to differentiate. Therefore in 2015, expect most suppliers to keep their power banks in the same price ranges as 2014, and even drop a little bit if the order volume increases significantly.

Supplier demographics

There are an estimated 5,000 power bank makers in China, and about 85 percent of them are located in Shenzhen, Guangdong province. Despite focusing on mature Asian markets, South America, Western Europe and the US are expected to be booming destinations in the future. It is conservatively estimated by China Market Intelligence Center that overall annual sales from domestic and export sales can reach almost US$4.62 billion by the end of 2015.

Classified by annual sales and production output, large power bank makers usually have strong R&D and production capabilities, including in-house manufacturing of PCBs, shells, assembly, and even battery cells. With a monthly output of at least 300,000 to 600,000 units, the largest companies may boast annual sales exceeding US$150 million.

Middle-sized manufacturers usually have about 300 to 600 staff, with monthly output between 100,000 to 250,000 units. Annual sales are typically between US$10 million to US$35 million.

Finally, it is estimated small manufacturers make up more than 50 percent of the industry. With basic R&D and in-house assembly, these companies typically have fewer than 200 workers and staff, monthly output is generally between 15,000 and 80,000 units. Annual sales are between US$2 million and US$8 million.

Tips on selecting a qualified supplier

Even though power banks is a relatively new category that started only a few years ago, it is without a doubt already a mature industry. All China makers face furious competition with product innovation, and even more in pricing.

With this pricing pressure, most large and middle sized makers choose to concentrate more on developing better, more differentiated products, ensuring high product quality and increasing capacity.

On the other hand, some smaller manufacturers have sunk into cutting corners by providing cheap but unqualified products, with misleading power capacity, second-hand battery cells and rough processing. Then, how to identify a qualified power bank maker? Here is some advice:

Supplier-selection tips

1. Do not choose suppliers only on price, and especially be wary if the price is unexpectedly low.
2. Tear-down inspection is a must. This is the most direct method to judge the quality of a product:
   a. Test cell capacity with battery testers
   b. Check if there is a tag of clear specs on the cell's packaging
   c. Check if there is any over-welding, solder leakage or burns on the inside

   d. See if there is a layer of insulation or protection between the cells and PCB
   e. Make sure the PCB is clean and clear
3. Visit the factory if possible. A good factory should be well-organized in terms of plant layout, especially the warehouse and production lines. Some of them comply with the 5S standard and have ISO certification.
4. Ask if they conduct in-house R&D on PCB design, molding, appearance and even battery cells.
5. Focus on the QC process:
   a. For IQC, ask if the company has professional battery testers for cell inspection, or if they conduct only visual inspections. Ideally, they should conduct IQC on 100 percent of outsourced parts and components.
   b. Ask if the supplier conducts IPQC during production
   c. For OQC, the age test is important. The cycle time can vary from one supplier to another, but generally most companies have an 18-hour cycle with 8 hours for charging, 2 hours for discharging and another 8 hours for recharging.
   Some makers have a longer OQC process,with 3 or 4 cycles, usually lasting 72 hours, while others shrink the process into 72 to hours.

Buyers ensure power bank quality with trusted suppliers

Verifying the capacity of power banks can take hours of time that many are not willing to invest. The best solution seems to be finding reliable companies and sticking with them.

"In the past, when we first started out, every single battery cell we'd buy from the supplier, we'd do the test, but that's very time consuming," said Wei Zheng, sales manager of power bank supplier ETycho. "Now we just make sure we just do business with reliable battery cell suppliers."

Zheng added that ETycho continues to randomly check battery cells, as well. Some power bank companies might not be as scrupulous as others, though, so buyers of the power banks also remain vigilant and look for reliable suppliers.

While Zheng said the most accurate way to measure capacity of a battery is with expensive specialized equipment, some people are using phone apps to gauge how much power the devices hold. This was the case with a couple buyers from a Latin American promotional company who asked not to be identified to avoid angering their suppliers. The buyers said quality issues come up at any fair in any product category.

Calvin Ng of the Malaysia-based distributor Global Synergy said he also uses his phone to check power banks by running through a few cycles. Ng said he avoids less established companies, preferring brands he knows will help fix any problems he has with the products.

There are a number of factors that can result in the sale of under-capacity batteries. Zheng said suppliers are under pressure to get orders out, and the very competitive market probably does not help matters as manufacturers look for ways to keep prices down. This can result in cutting corners and even putting out faulty products, Zheng said.

“Like any other products, there are going to be some faulty ones that are below expected capacity,” he said. “What do they do with it? They can trash it or they can try to sell it on the market to salvage whatever value they can get out of those lower quality units.”

Zheng also said cell manufacturers like to have some of the expensive machines available for buyers to see, giving the impression of good quality control. These machines might never or rarely be used, though, because the process of checking capacity is very time consuming.

The preference for sourcing power banks in China seems to be finding reliable suppliers. Power bank suppliers have cell manufacturers they trust, and power bank buyers have suppliers they trust. Still, it would be a foolhardy business practice to completely put one’s business in the hands of a third party, so buyers prefer to follow the old maxim “trust, but verify” by conducting random checks to ensure their trusted partners are maintaining quality.

Gallery View: Multifunctional power banks

Here is a selection of analyst-picked innovative power banks.

China's power banks industry has already undergone significant maturation over the past year. While, the possibility of a technical leap is low in the short term, it does not mean that this has led to generally lower prices and higher quality.

While most manufacturers are making strides in developing features like better battery capacity, charging speed, and miniaturization, manufacturers in China have also found other ways to innovate – "all in one" designs have been in development, combining power banks with other portable devices to provide more functionality.

Currently, power bank manufacturers intend to provide several added power bank functions. Some of the most commonly added functions to power banks are:

Portable routers
USB drive/card readers
Flash drives
LED flashlights
Solar charging
Laser pointers
3G data connections
Intelligent charging
Dual-charging
Fast charging

The gallery below demonstrates 17 power banks with some of these functions.

With emergency car jump starter function

Model ZQ-P03 from Dongguan City Zhongqi Electronics Technology Co. Ltd is a large capacity power bank with car jump starter function. It costs US$48.

Capacity(mAh)	12,000
Size (mm)	160x77x29
Input	12V/1A
Battery type	Lithium
Conversion rate	90%
Output	5V/2A, 12V (16V, 19V)/1A

CONTACT SUPPLIER

With laser pointer

Shenzhen Elite Power Co. Ltd's model EP-U315 is a combined laser pointer and power bank. FOB price is US$8.50.

Capacity(mAh)	3,000
Size (mm)	100x44x13.9
Input	5V/1A
Battery type	Polymer
Conversion rate	Over 85%
Output	5V/1A

CONTACT SUPPLIER

Solar-powered, 5,000mAh

E-Mate Technologies Limited-designed solar-powered power bank EPB-020 can be charged by its solar panels or like other power banks, it can be charged by power cable.

Capacity (mAh)	5,000
Size (mm)	102x46.5x24
Input	5V/0.8A
Battery type	Polymer
Conversion rate	N/A
Output	5V/1A

CONTACT SUPPLIER

Battery-equipped case for Samsung Galaxy S5

Power case M96A-P96 from Shenzhen E'allto Technology Co. Ltd. is made for Samsung Galaxy S5 mini. It uses an extra battery cover design to provide more convenience to users. The price is US$9.

Capacity (mAh)	3,000
Size (mm)	140x67x17
Input	5V/0.8A
Battery type	Polymer
Conversion rate	N/A
Output	5V/0.8A

CONTACT SUPPLIER

Fast charging, very high capacity

The Golf GF-131, by Shenzhen Golf & Feihuang Technology Co. Ltd, is a very high-capacity power bank. Priced at US$17, it also has fast charging capability.

Capacity (mAh)	16,000
Size (mm)	117x13.5x158
Input	5V/1A
Battery type	Polymer
Conversion rate	70%
Output	5V/2.1A

CONTACT SUPPLIER

Take a selfie

Shenzhen YOOBAO Technology Co. Ltd's power bank S2 is ideal for taking selfies. The power bank has a camera and built-in Bluetooth chipset and an LED flashlight.

Capacity(mAh)	5,200
Size (mm)	78x78x23
Input	5V/1A
Battery type	Lithium
Conversion rate	N/A
Output	5V/1A

CONTACT SUPPLIER

Multifunction with WiFi router

Model MU3R from Shenzhen Power Unite Technology Co. Ltd is a multi-function power bank with 3G WiFi hotspot functionality, optional storage function and fast-charging. FOB price is US$21.

Capacity (mAh)	7,800
Size (mm)	115.5x65x23
Input	5V/1A
Battery type	Lithium
Conversion rate	N/A
Output	5V/1A&2A

CONTACT SUPPLIER

High-capacity and with leatherette cover

Model LX-8000PJ from Radioway Technology Limited is a leatherette–covered power bank with a built-in cable. FOB price is US$12.99.

Capacity (mAh)	8,000
Size (mm)	151x71x15
Input	5V/1A
Battery type	Polymer
Conversion rate	N/A
Output	5V/1A

CONTACT SUPPLIER

Laptop power bank

Shenzhen EABL Science and Technology Co. Ltd model P1200A-C-87-611 can be used to charge a laptop via 19V (16V or 12V)/1A output. It can also charge phones and other devices via 5V/1A output. Price is US$45.80.

Capacity (mAh)	20,000
Size (mm)	175x115x22
Input	13V/1A
Battery type	Lithium
Conversion rate	N/A
Output	19V(16V&12V&
5V)/1A	

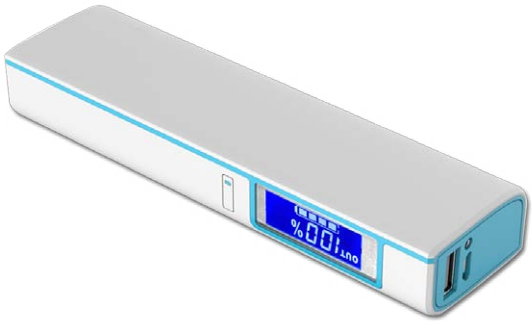
CONTACT SUPPLIER

Thin and light

Emie Technology Co. Ltd manufactures an ultrathin power bank at a thickness of 5.2mm, weighing 300g. It can charge 2 devices (including tablets) at the same time. It costs US$32.

Capacity (mAh)	8,000
Size (mm)	213x140x5.2
Input	5V/0.5-2.1A
Battery type	Polymer
Conversion rate	Over 80%
Output	5V/0.5-2.1A

CONTACT SUPPLIER



Laser pointer, intelligent charging

Model D90 from Difung Energy Technology Co. Ltd, provides intelligent charging functions which can automatically detect the charging devices and provide the most suitable current. It costs US$14.50.

Capacity (mAh)	9,000
Size (mm)	N/A
Input	5V/1A
Battery type	Lithium
Conversion rate	N/A
Output	5V/2.1A

CONTACT SUPPLIER

With micro connector for convenience

Shenzhen Joway Power Supply Co. Ltd offers power bank JP52 with mini-USB connector that can be attached to the power bank as a small handle integrating it with the product.

Capacity (mAh)	6,000
Size (mm)	136x72.5x13.3
Input	5V/2A
Battery type	N/A
Conversion rate	N/A
Output	5V/2A

CONTACT SUPPLIER

High conversion rate, dual charging

Model WE-Y78A from Shenzhen YKSH Sci & Tech Development Co. Ltd is a square-shaped power bank with conversion rate of 90%. It supports dual-port charging with an intelligent detection function. The price is US$8.40.

Capacity (mAh)	7,800
Size (mm)	78x78x23
Input	5~5.25V/ 0.8A
Battery type	Lithium
Conversion rate	90%
Output	5.0±0.2V/1A & 2A

CONTACT SUPPLIER

Thin and card-shaped power bank

Shenzhen Vodasion Technology Co. Ltd's IP-205-2 is a thin, playing card-shaped power bank with built-in cables. This small and highly portable power bank costs up to US$4.20.

Capacity (mAh)	2,500
Size (mm)	96x62x6.6
Input	5V/1A
Battery type	Polymer
Conversion rate	N/A
Output	5V/1A

CONTACT SUPPLIER

Company name	Annual sales (US$ million)	Power bank sales (US$ million)	Power bank monthly output (units)	R&D spending (US$)	Power bank output (mAh)	Main markets	Small orders (US$)
Century New Energy	20	20	20,000	50,000	2000-5000 (35%), 5000-10000 (45%)	Europe and US (70%)	<5,000
Difung (E-power)	10	8	70,000	500,000	2000-5000 (40%), 5000-10000 (40%)	US (20%), Western Europe (50%)	<1,000
EABL Science and Technology	8	7.8	100,000	100,000	Under 2000 (70%), 2000-5000 (20%)	US (30%), Europe (30%)	<1,000
E'allto	60	40	250,000	N/A	2000-5000 (40%), 5000-10000 (30%)	US (20%), Western Europe (50%)	<1,000
Elite	85	11.29	150,000	500,000	2000-5000 (30%), 5000-10000 (50%)	US (20%), Western Europe (20%)	<1,000
E-Mate	5	3	15,000	100,000	2000-5000 (55%), 5000-10000 (35%)	South America (30%), Western Europe (30%)	<5,000
Emie	10	8	20,000	500,000	5200-8000 (80%), Above 8000 (20%)	US (20%), EU (20%)	<5,000
Golf & Feihuang	32	28.8	500,000	1,000,000	2000-5000 (35%), 5000-10000 (50%)	Europe and US (80%)	<1,000
Joway	85	40	600,000	5,000,000	2000-5000 (45%), 5000-10000 (35%)	Indonesia (25%), US (20%)	<1,000
Power Unite	50	5	15,000	100,000	2000-5000 (35%), 5000-8000 (35%)	Southeast Asia (35%), Western Europe (25%)	<5,000
Radioway	1.88	1	12,000	280,000	2000-5000 (35%), 5000-10000 (45%)	US (25%), Western Europe (40%)	<1,000
SEST Telecom	10	9	280,000	1,000,000	5000-10000 (50%), Above 10000 (30%)	Asia (80%), Western Europe (10%)	<5,000
SOCW	24.5	24.5	100,000	1,500,000	2000-5000 (20%), 5000-10000 (40%)	US (22%), Australia (18%)	<10,000
Vodasion	2	1.8	19,000	200,000	2500 (35%), 6000-8000 (35%)	US (35%), Mid-East (25%)	<5,000
YKSH Sci & Tech	12	2.1	25,000	150,000	3000-6000 (30%), 6000-10000 (35%)	Western Europe (25%), South-East Asia (40%)	<1,000
Yoobao	120	100	600,000	5,000,000	5000-10000 (50%), Above 10000 (25%)	Europe (20%), US (20%)	<1,000
ZhongQi	1.95	1.95	10,000	3,000	2000-6000 (35%), 8000-10000 (40%)	US (30%), Europe (40%)	<1,000

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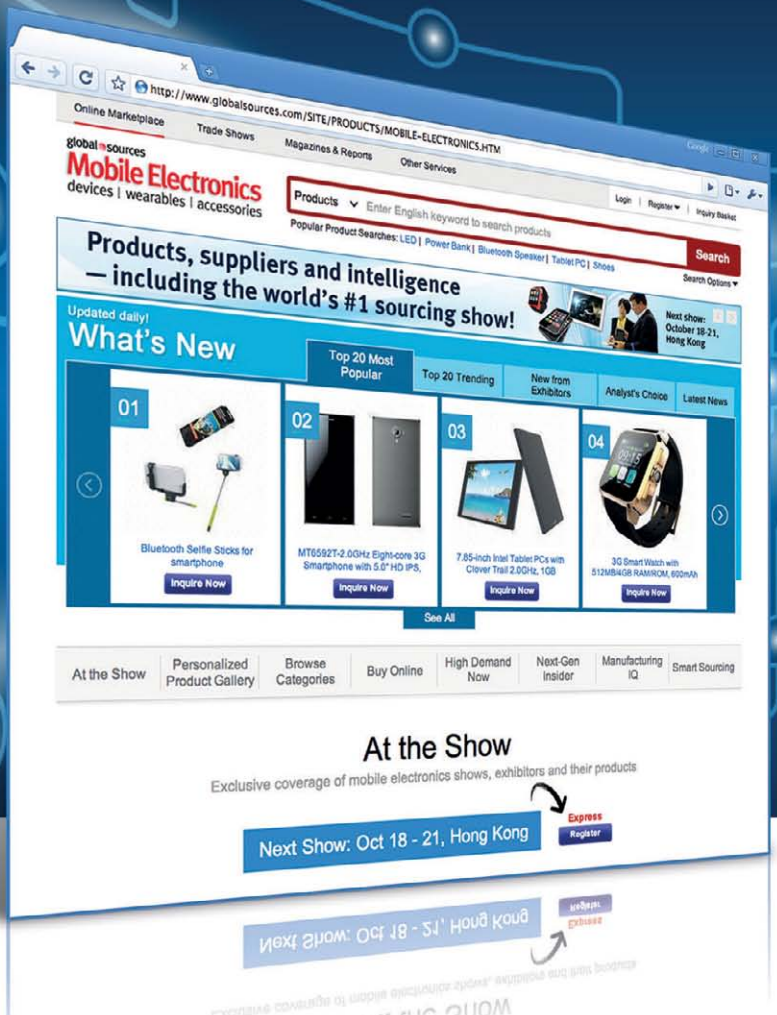

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