新兴电池技术正在改写电池常规

NEW BATTERY TECHNOLOGIES ARE BEING REWRITTEN THE NORMAL BATTERY

文 / 李丹妮 The text/danni li

近期，电池业内出现了许多新的电池技术。推出有寿命将达 15 年之久的新电池；锂电池的正极材料将用沙子来做；有改变常规用碳作负极；薄膜柔性锌电池即将进入生活；特别是碳纤维EV锂电池材料意义重大；多功能锂离子结构汽车电池既是车体、又是电池；等等。令人眼花缭乱、耳目一新。

Recently, the battery industry has appeared many new battery technologies. Had launch the new battery of which has using life for 15 years,Lithium battery cathode material will be done with sand; Have changed the conventional carbon as negative; Thin-film flexible zinc battery is about to enter real life; Especially the carbon fiber EV lithium battery materials is of great significance; Multi-functional lithium ion battery structure is both a bodywork and battery; And so on. It is Dazzling and refreshing.

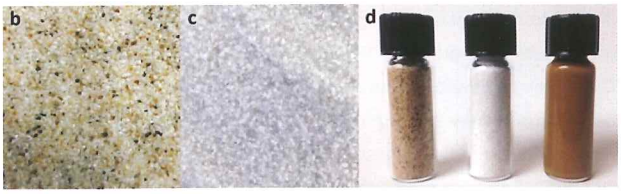
UC Riverside研究人员开发出的硅阳极锂离子电池，具备优越的性能。
UC Riverside researchers developed silicon anode of lithium ion battery, of which with superior performance.

美国　加州大学用沙子做阳极锂电池

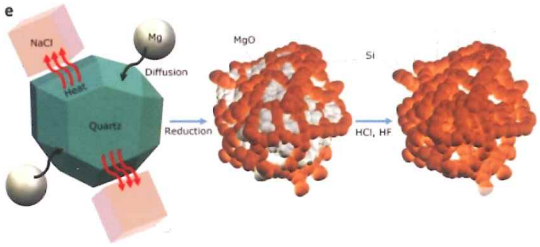
传统锂离子电池采用石墨作为阳极，人们认为这种材料的性能已经达到了极限，研究人员正在努力寻找潜在的替代品。有人将重点放在纳米硅上，但是仍面临着量产难和退化快的问题。不过，加州大学河滨分校的团队却成功地克服了这一难关，并开发出利用沙子作为锂离子电池阳极的方法。

The University of California Use Sand to Make Anode Lithium Battery

Traditional lithium ion battery using graphite as anode, people think that the performance of the material has reached the limit, the researchers are trying to find potential substitutes. Someone is focus on nanometer silicon, but it is still face the difficulty problems with degradation and fast production. However, the team at the University of California, Riverside, has successfully overcome the difficulties, and developed the way to use sand to make lithium ion battery anode.



由左及右：未经纯化的沙子(b)，提纯后的沙子(c)，以及瓶装的未提纯沙、提纯沙、纳米硅(d)。
By the left and right: without the purification of sand (b), sand (c) after purification, and bottled without purification, purification of the sand, sand nano silicon (d).



从沙转变成纳米硅的原理图。
The principle diagram of shift from sand to nanometer silicon.

加大河滨分校一名叫扎卡里·费佛斯(Zachary Favors)的研究生，致力于开发更好的锂离子电池。当他在圣克莱蒙特(San Clemente)冲浪的时候，突然想到沙滩上的沙子。沙子主要是由石英(二氧化硅)组成。为了找到石英比例较高的沙地，他遍遍全美并寻访了德克萨斯州的锡达河水库(Cedar Creek Reservoir)，收集到一些沙样，并带到该校伯恩斯工程学院(Bourns College of Engineering)的实验室。这是他与工程教授Cengiz和Mihri Ozkan所共事的地方。

在将原料研磨到纳米尺度之前，需要经过一系列的纯化步骤(看起来像糖粉)——提纯研磨后的粉末与盐、镁共同加热——盐扮演了吸热剂的角色，而镁元素则会去除掉石英中的氧元素，从而提炼出纯硅。

更重要的是，在上述过程中，其形成了一致性的、具有多孔和三维海绵状的纯纳米硅。而孔隙又是改进电池阳极性能的关键——因为它提供了更大的表面积，并允许锂离子更迅速地行进。

该团队已经开发出了一颗硬币般大小、使用新型硅纳米阳极的成品。据说比传统锂离子电池有着更显著的3倍电池容量的性能。可减少移动电话的充电间隔、或者电动汽车等设备昂贵的更换费用。

目前，研究人员正在寻找量产方法，并把硬币大小的锂离子电池提升到手机电池那么大。该技术已经申请专利。详细内容已发表在《科技报告》(Scientific Reports)期刊上。

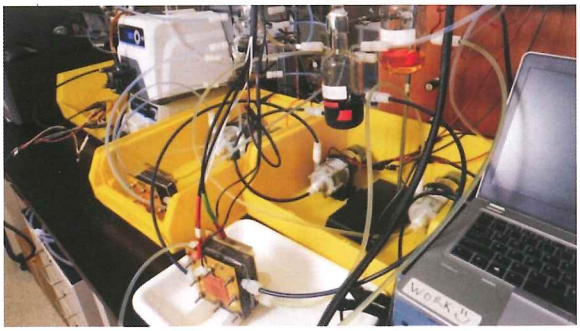
A man named Zachary Favors graduate student from University of California Riverside, committed to developing better lithium ion batteries. While he was surfing in San Clemente, he has suddenly thought of the sands on the beach. Sand is mainly composed of quartz (silica). In order to find the Higher percentage of quartz sand, he has walked across the whole United States and searched the Cedar river Reservoir in Texas, collected some samples, and brought them to the laboratory of Bourns College of Engineering . This is the working place for he and engineering professor and Mrs Cengiz Mihri Ozkan .

Before grinding to nanoscale materials, need to go through a series of purification steps (looks like icing sugar) – purified powder after grinding heat – together with salt, magnesium, salt was playing the role of the heat absorbing agent, and magnesium is to get rid of quartz in oxygen, thus extracting pure silicon.

And, more importantly, in the process of mentioned above, it has formed the consistency with porous and three-dimensional pure nanometer silicon sponge. The pore is the key to improve the performance of the battery anode, because it provides greater surface area, and allow the lithium ion enter into it more quickly.

The team has developed a coin size, with new type nano silicon anode product. It is said that has 3 times more significant battery capacity than traditional lithium-ion batteries performance. Can reduce the mobile phone charge interval, or expensive to replace electric vehicles and other devices.

Now, researchers are looking for production method, and the size up the coin lithium ion battery into the mobile phone battery. The technique had applied for patent. Details have been published in the journal (Scientific Reports).

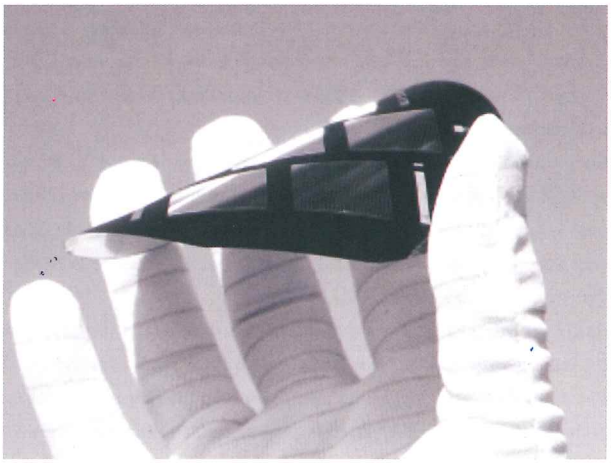


美国南加州大学发明超长寿命新电池

The University of Southern California has invented the long life new battery

可充电电池对现代人类生活不可或缺，但寿命偏短让人十分纠结。美国南加州大学的科学家们开发出寿命将达15年之久的新电池。这种新型电池采用的是“有机氧化还原液流设计”，研究者将电活性材料溶解在水中，将它们分别放在两个储存池里。这些液体随后被注入反应室中，一张薄膜将它们分隔开，薄膜允许两边的电子传递而产生了电能。

这种设计并不能说是首创，不过他们的贡献在于电池非常环保，无重金属材料，而且价格便宜。这种新型电池的成本仅是传统锂离子电池的十分之一。需要注意的是目前距离实用化还远得很，体积庞大不能满足便携设备的要求。



美国柔性薄膜锌电池即将进入生活

美国加州出现一家以研发柔性、可反复充电的电池为主的初创公司Imprint Energy，他们已经在测试超级薄的锌电池，希望最终能够把电池卖给可穿戴设备、医疗器械、智能标签、环境传感器的制造商们。这家Imprint Energy公司的技术，主要来自联合创始人克里斯汀·何（ChristineHo）毕业时在加州大学伯克利学院取得的研究成果：当时她与日本的一名研究人员，使用3D打印机生产出极其微小的锌电池颗粒。

金属锌相比锂更加稳定，不容易发生化学反应。在电解质当中，从微观层面观察，锌会呈现出像树枝一般的形态，从一个电极蔓延到另外一个电极，缩短电池电量。克里斯汀·何开发出一种固态聚合物电解质，以避免这种问题。这种电解质还增强了锌电池的稳定性，以及反复充电的能力。

另一名公司联合创始人布鲁克斯金（BrooksKincaid）称，锌电池融合了薄膜锂电池以及印刷电池的优点。目前薄膜锂电池可以反复充电，因为包含了易起反应的物质，从而限制其储电能力，而且制造价格十分昂贵。同时，印

Rechargeable battery is integral for modern human life, but it is very entangle for its short using life. Scientists at the University of Southern California has developed the new battery of using life for 15 years.This new type of battery is using "organic oxidation influent flow design", the researchers put the electroactive materials dissolved into the water, put into the two storage pools respectively. This liquid is then injected into the reaction chamber, a piece of film is to separate them, the electron transfer on both sides of the membrane allows to generate electricity

This design can't say is the first creation, but their contributions are the battery very environmental protection, heavy metal material, and the price is cheap. The cost of this new type battery is only one of ten for the traditional lithium ion battery. Need to be aware of is quite far away from the practical application, bulky size cannot satisfy the requirement of portable devices.

USA The flexible film zinc battery is about to enter into real life

California of the USA has appeared a company which is mainly research and develop of flexible, can be recharged battery start-up Imprint Energy, they have been in the test of super thin zinc batteries, hope to eventually be able to sell the batteries to the manufacturers of wearable equipment, medical equipment, smart tags, environmental sensor . The Imprint of Energy technology, is mainly the college research results from co-founder Christine Ho when she has graduated from the university of California at Berkeley: she and a Japanese researcher to use 3 d printer to produce extremely small particles of zinc batteries.

Zinc is more stable than lithium metal, it is not easy to react. In electrolyte, viewed from the micro level, the morphology of zinc can present like branches spread from one electrode to another electrode, shorten the battery life. Christine Ho has developed a solid polymer electrolyte, in order to avoid this problem. This electrolyte also enhances the stability of the zinc batteries, and the ability to repeatedly charging.

Another company co-founder BrooksKincaid said, according to zinc battery combines the advantages of thin film lithium battery and printing cells. Thin film lithium battery can be recharged at present, because it includes the reacting substances, thereby limiting its storage capacity, and the producing price is very expensive. At the same time, although printing batteries are very cheap to manufacture, and have high storage capacity, but cannot be recharged. However, the zinc batteries were

刷电池虽制造起来很便宜，而且拥有很高储电能力，但无法反复充电。然而，Imprint Energy公司所研发的锌电池，既能制造成薄膜的样子，又可以反复充电，而且拥有很高的储电能力。

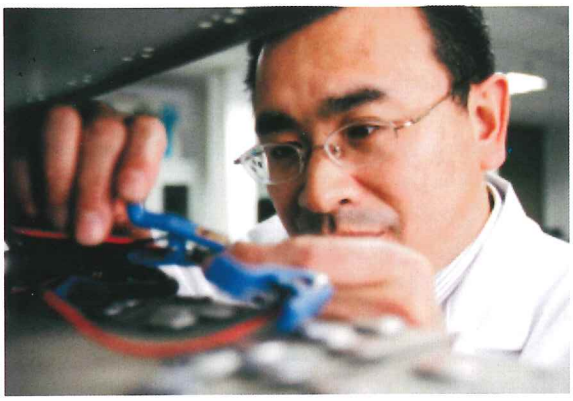
采用自己公司的评测方法评测，结果显示：当现有的柔性电池弯曲1000多次的时候就坏掉了，而锌电池还保持稳定。如果锌电池达到这样的性能，那么未来把它放在衣服里就不会是梦想。锌是一种相对稳定的物质，生产锌电池时，不必准备防护性的生产环境，能够降低生产成本。

ImprintEnergy才刚起步，它的终极目标是穿戴式设备市场，其中既包括消费市场（如耐克FuelBand和Fitbit），也包括医疗健康市场（如植入式监测设备），这种新型电池将令穿戴式设备行业受益匪浅。鉴于穿戴式电子设备还是新兴行业，未来几年才可能成为主流，因此突破性的设计可能会彻底改变该行业。

developed by Imprint Energy , both can be made into a film, and can be recharged, and it has very high storage capacity.

With the company's evaluation method , the results showed that it will be broken when the existing flexible battery bending for 1000 times and zinc batteries still remained stable. If zinc batteries achieve to such performance, then it will not a dream to put it into the clothes in the future. Zinc is a relatively stable material, produce the zinc batteries, needn't prepare protective production environment, which can reduce the production cost.

Imprint Energy has just started, its ultimate goal is wearable equipment market, which includes both consumer market (e.g., Nike FuelBand and Fitbit), including health care market (e.g., implantable monitoring equipment), the new batteries would have benefited a lot from the wearable equipment industry. In view of the wearable electronic devices and emerging industries, in the next few years it will become mainstream, therefore breakthrough design may change the industry.



日本低成本高性能镁蓄电池或将取代锂电

如今广泛应用锂电池，锂是稀有金属，价格较高，耐热性较差。日本日前报告说，他们利用镁开发出一种蓄电池，与锂电池相比，其充电量和放电电压更高，而成本则低得多。

日本京都大学的研究人员在英国《科学报告》杂志网络版上说，镁与锂相比有多种优点，锂的熔点约为180摄氏度，而镁的熔点高达约650摄氏度，因而更为安全，镁的蕴藏量也比锂丰富得多。

开发镁电池面临一些技术困难，此前一直没找到合适的正极材料，同时也缺乏能帮助稳定充电和放电的电解液。

京都大学教授内本喜晴领导研究小组发现，使用一种铁硅化合物作为电池正极，以一种含乙醚的有机溶剂作为电解液，可以制作出镁蓄电池。这种电池的充电量达到锂电池的1.3倍，其放电的电压也比锂电池高了2伏特，并且实现了稳定的充放电，其材料费用却只有锂电池的约10%。

Japan' low cost high performance magnesium lithium battery or will replace the battery

Now widely used lithium batteries, lithium is a rare metal, the price is relative high , and poor heat resistance. Japan has reported that they used magnesium to develop a battery, compared with lithium battery, its charge and discharge voltage is higher, and the cost is much lower.

Japan Kyoto university researchers in the UK online in the journal <Science Reports>, there are many advantages compared with lithium magnesium, the melting point of lithium is about 180 degrees Celsius, and magnesium melting point is up to about 650 degrees Celsius, and thus more security, magnesium reserves are much richer than lithium.

To develop magnesium battery is facing some technical difficulties, as before they haven't find the right anode material, at the same time also lack the electrolyte can help stabilize the charging and discharging .

Kyoto, a professor Neibenxiqing research team has found that to use a silicon iron compound as battery anode, in an organic solvent containing ether as electrolyte, can produce magnesium battery. This kind of battery charging quantity reached to 1.3 times of lithium battery, its discharge voltage is also 2 volts higher than lithium battery , and realize the stable charge and discharge, the material cost is only about 10% of the lithium–

通过改良这种镁蓄电池的电解液，还能进一步增加充电量。该小组正进一步开展研究，缩小镁蓄电池充电和放电时的电压差，减少能量损失。这种电池有望用于电动汽车、太阳能及风力发电等领域。

ion batteries.

Through improving the electrolyte of magnesium battery, it can also further to increase the charge. Further research, the team is narrow the charging and discharging voltage difference of magnesium battery , to reduce the energy loss. The battery is expected to be used in electric vehicle, solar and wind power and other fields.

瑞典高抗拉强度的碳纤维EV锂电池材料

瑞典皇家理工学院组成一支研究小组，成员由来自瑞典皇家理工学院的三名教授组成，包括化学工程教授GöranLindbergh、光纤和聚合物技术教授MatsJohansson和航空和车辆工程教授DanZenkert。此外，参与该项研究计划的还包括瑞典SwereaSICOMP和吕勒奥技术研究所（LuleInstituteofTechnology）。

他们正在探索研制可用于电动汽车的碳纤维锂电池电极材料，该材料具有非常高的抗拉强度和极限拉伸强度（ultimatetensilestrength，UTS），并且还具有非常强的锂离子集成能力。碳纤维材料常被用作锂离子电池中的结构电极。碳纤维锂电池电极材料将被用于电动汽车的多功能锂离子结构电池，多功能锂离子结构电池能够将电池储能物质集成到汽车车身中。

瑞典皇家理工学院（KTH）的MatsJohansson表示，以上电动汽车碳纤维锂电池结构电极材料研发项目主要研究目的是为了提升电池的机械特性，实现电池不仅可以存储能量而且还可以被设计集成为结构的一部分等功能。通过利用以上电动汽车碳纤维锂电池结构电极材料可以将汽车的发动机盖设计为电池的一部分。

Swedish Tech: High Tensile Strength Carbon Fiber as a Kind of Material for EV Lithium Battery

Swedish Royal Institute of Technology sets up a research team composed of three professors, including chemical engineering professor GO ranLindbergh, professor Mats Johansson in fiber and polymer technology and aviation and vehicle engineering professor DanZenkert. In addition, SICOMP and Lulea Institute of Technology joined it.

They are exploring the electrode materials for EV. One material is UTS (ultimate tensile strength) which has a very strong ability to integrate lithium ions. Carbon fiber is often used as a structural electrode in the lithium ion battery. The electrode material, i.e. Carbon fiber will be used in the multifunctional lithium-ion battery which can integrate the energy storage substances into the car body.

Mats Johansson in Swedish Royal Institute of Technology (KTH) said that the development project of the carbon fiber in EV was aimed to improve the mechanical characteristics of the battery and realize an integrated structure in the energy storage. Through the carbon fiber as a material of the electrode, then the cover of the car engine can be designed into a part of the battery.

美国RANGE研究计划

美国高级项目研究所能源所推出了名为RANGE的研究计划，该计划的目的是为了推动电动汽车储能介质革命性进步。2013年，美国高级项目研究所能源所分别向四个不同的研究项目授予了总额高达875万美元的项目奖金。以上四个研究项目分别由斯坦福大学、加州大学圣地亚哥分校、亚利桑那州立大学和宾州州立大学领导完成。其中，

USA The RANGE research plan

America Advanced Research Projects Agency – Energy (ARPA –E), has introduced a research program called the RANGE, the purpose of the plan is to promote the Energy storage medium revolutionary progress of electric vehicle. In 2013, ARPA –E has conducted up to total $8.75 million award to four different research projects respectively. The above four projects are leading handled respectively by Stanford university university of California, San Diego ,Arizona State University and Penn State University leading to complete. Among them, the above four

以上四个研究项目的研究目的均为研发多功能结构汽车用电池。

英国伦敦帝国学院研发项目协调人EmileGreenhalgh表示，以上多功能结构电池复合材料不仅可以存储并释放电能，与此同时还可以承载机械载荷。其所具备的特性在2005年被来自美国陆军研究实验室的研究人员正式实验证实。

在2005年的材料研究学会讨论会上，一篇技术文章向人们介绍了多功能发电材料和储能材料的三个应用实例：锂离子结构电池、质子交换膜燃料结构电池和结构电容器。以上新型的技术应用都经过了精心的设计，其中采用的应用材料不仅可以存储释放电能，而且还可以承载结构负载。因此实现了多功能设计目的并大幅降低了整体的重量。

英国多功能锂离子结构汽车电池

多功能锂离子结构汽车电池，目前已经吸引了众多的项目研究。英国伦敦帝国学院的研究人员和沃尔沃汽车技术研究人员组成了一支研究团队。研究目的是为了研发一种多功能锂离子结构汽车电池原型，该电池采用的是碳纤维材料和聚合物树脂，这样一来该电池不仅可以存储、释放电能，而且其结构强度高且重量轻，因此又可以用来设计制造集成到汽车零部件中。该研究项目总经费为340万欧元（约合470万美元）。项目研发人员计划利用复合材料替换掉备胎舱中的金属底板。沃尔沃汽车公司目前正在努力研究设计将该备胎舱复合材料应用到原型车中以进行试验研究。

沃尔沃汽车研究小组已经研发出了两种多功能复合材料组件并进行了实验研究，为该技术的后续研究打下了基础。其中，已经研发出的两种多功能复合材料组件分别为后备箱盖和充气罩，这两种新组件均在沃尔沃S80车型中进行了实车实验。

structures of the research objective of is to research the multi-function car battery.

Imperial college London, research and development project coordinator Emile Greenhalgh said , the above multi-functional structure cells composite material is not only can store and release electricity, at the same time it also can carry mechanical load. Its characteristics have confirmed officially by researchers from the U.S. army research laboratory experiments in 2005.

Materials research society symposium in 2005, a technical article has introduced the three applications of multi-function power materials and energy storage materials to the people: lithium ion battery structure, structure of proton exchange membrane (PEM proton exchange membrane) fuel battery and capacitor structure. The above new technology application are the elaborate design, which USES the application of the material is not only can store up to release energy, but also can bear load structure. Therefore it realizes multi-function design objectives and greatly lower the whole weight.

The multi-function car battery lithium ion structure

Multi-function car batteries, lithium ion structure has attracted numerous research projects. Imperial college London researchers and Volvo technology researchers have formed a research team. The purpose is to research a kind of multi-functional lithium ion battery structure prototype, the battery is carbon fiber materials and polymer resin, so that the battery is not only can store and release electricity, with its high strength and light weight structure, and thus can be used to design and manufacture of integrated into car parts. The project total funding is 3.4 million euros ($4.7 million). Project developers plan to use the metal composite material to replace the spare cabin floor. Volvo car company is trying to study to design the spare tire capsule in composite material applied to the prototype for experimental study.

Volvo cars research team have developed two kinds of multifunctional composite components and have carried on the experimental study, have made a foundation for the further research of this technology. Among them, have developed two kinds of multifunctional composite component trunk lid and gas mask respectively, the two new components have carried on the real vehicle experiment on Volvo S80 .

储能进入分布式光伏是必然趋势

ENERGY STORAGE ENTER INTO THE DISTRIBUTED PHOTOVOLTAIC (PV) IS INEVITABLE TREND

文/莫小聪 The text/Mo

在国家能源局年初拟定的计划目标中，分布式光伏发电装机为8吉瓦，首次超过大型光伏电站的装机规模。但在第一季度分布式光伏启动比较缓慢，尤其是我国政策配套和相关环节还没有完全展开，市场对整个分布式光伏的接受，还处于一种摸索和思考的状态，但这恰恰给储能市场提供了一个难得的机遇，因为储能进入分布式光伏市场已是产业发展必然趋势。

分布式发电必须解决储能

目前，我国对分布式光伏发电并没有明确的界定，分布式光伏一般包括离网、并网发电系统以及多能互补的微电网。储能是分布式光伏的必然选择，表现为在无电和弱网架地区发展分布式光伏、微电网，没有储能这些地区的供电很难解决。另外，储能是城市分布式发电与电网进行友好交互的一个关键设备。

全球范围看，储能最大的两个需求，最早源于电力辅助服务，目前最大的需求是分布式光伏。美国、欧洲、日本分布式的发展，带动了储能发展。分布式新能源并网比例越高，必然会带来电网调度调节困难，需要配合储能缓解电网调度压力，支持电网上新能源。

如果储能问题能得到解决，无论是欧洲光伏协会，还是全世界的各大预测机构，都认为到2030年，离网和微电网的光伏应用能够占到整个光伏发电市场的30%，而不是现在示范的一个阶段。

但目前正是由于储能问题尚未解决，从我国电网角度看，新能源并网都是风电、光伏与火电打捆，调动传统火电调节新能源并网。实际上造成一是成本高，二是进一步加剧了电网对传统火电机组的依赖。发展新能源需要上更多的火电厂，这与发展新能源的初衷形成悖论。

In the plan goal drawn up by the beginning of the national energy administration , distributed photovoltaic power installed is 8 gw, for the first time in more than a large size of photovoltaic power station. But in the first quarter of distributed photovoltaic was started slowly, especially a complete set of policies and related issues has not fully expandedin China, to accept the whole distributed photovoltaic market, also is in a state of exploring and thinking, but it provides a rare opportunity for energy storage market, because it is the inevitable development trend in industry for energy storage has entered into the distributed photovoltaic market .

Distributed Generation Must Solve Energy Storage

At present, our country is still have not clear definition of distributed photovoltaic, the distributed photovoltaic power generation generally include off-grid and grid-connected power generation system and the micro grid can complement each other. Energy storage is the inevitable choice of distributed photovoltaic, in the absence of electricity and weak rack area distributed photovoltaic (pv), micro power grid development, no energy storage power supply in these areas is difficult to solve. In addition, the distributed power generation and power grid energy storage is a key equipment for a city to have friendly interaction .

Seeing from the global, the world energy storage's two biggest demand, from the earliest power auxiliary service, the biggest demand is distributed photovoltaic (pv). The development were distributed on the United States, Europe, Japan , driving the development of the energy storage. Distributed the higher proportion of new energy grid, will bring power scheduling adjustment difficulties inevitably, it is need to cooperate with energy storage alleviate the pressure of the power grid scheduling, support for new energy on the grid.

If storage problems can be solved, both the European photovoltaic association, or each big forecasters all over the world, believed that by 2030, off-grid and micro grid photovoltaic applications can account for 30% of the entire photovoltaic power generation market, rather than a stage now.

But it is because of energy storage problems unsolved at present, from the perspective of the power grid in our country new energy grid is wind power, photovoltaic and thermal power baling, transfer the traditional thermal power regulating new energy grid. Actually it is the high cost,

微电网储能利用方式滞后

实际上，微电网是分布式发电里与储能结合得最为紧密的。过去我国微电网做的都是直流主线，所有的电源先给蓄电池充电，然后蓄电池再通过独立的电池向外送电，解决村庄的用电问题，这种直流主线的方式到去年都还在用，这是已经发展了几十年，仍然在沿用直流主线这样低水平利用方式。

而目前国际上最先进的利用方式，是将这种离网光伏电站储能是做成交流总线。交流总线是一个典型的SMA实例，它的能源的汇聚点不是在蓄电池、直流侧，而是在交流侧。

这不仅提高了利用效率，而且不受供电半径的限制。以往的直流总线都是通过蓄电池，加一个独立用电器，且供电半径小于500米。

比如，希腊Kythnos海岛独立微网示范项目，微电网通过48伏/1000安铅酸蓄电池组和三台SMA的Sunny-Island5048（48伏/5千瓦电压源双向逆变器）建立三相交流微电网。该系统根据频率平衡微网的供用电，使微网稳定运行。值得注意的是，该系统通过无线通信网控制到每一户的负载设备，完全做到了智能化的管理系统，而且蓄电池的用量只有48千瓦时，如果按我国直流系统设计，需要200千瓦时的电池容量。

这种利用水平可靠性非常高，蓄电池不容易过放，蓄电池运行五六年还是完好无损。

国家需要出台储能政策

实际上，截至目前国家还没有光伏发电加储能的政策，目前的光伏发电补贴价格是按照直接并网的模式制订的，没有考虑储能，储能对于分布式光伏非常重要，国家应该及时出台相关政策。

由于分布式光伏储能行业存在太多不确定因素，难以计算收益率，没有形成融资杠杆，银行和企业家也未大规模介入。国家应该对电价政策进行相应修改，使得投资人可以计算收益率，形成有保障的、能保底的策略。到那时，真正的春天就到了。

当然，储能行业不能只是等着政策，业内的企业需要一起努力，共同探索出有益的商业模式，只是长期的恐怕还不够，现在储能处于一个过渡期，还需要在过渡期找到临时的商业模式，帮助储能产业和分布式发电中间找到一个连接点。

second is further exacerbated the grid dependence on traditional thermal power unit. On the development of new energy needs more coal-fired power plants, which was paradox with the purpose of new energy development.

The Micro Grid Energy Storage Using Method is Lagging Behind

In fact, the grid in the distributed generation and energy storage combined the most. In the past the DC micro power grid in our country is the main line, all the power is sending to the storage battery, and then sending out through independent batteries, solve the problem of the village using electricity, this way of DC line is still using in the last year, it is has developed for several decades, still exists such low utilization method in DC line

And at present the most advanced use way, is a kind of off-grid photovoltaic power station store is made by AC bus. Ac bus is a typical examples of SMA, it isn't in the focal point of the DC side energy storage battery, but on the AC side.

This is not only improving the use efficiency, and it is not restricted by power supply radius. Previous DC bus was through by storage battery, adding an independent electrical appliances, and power supply radius is less than 500 meters.

比如，希腊Kythnos海岛独立微网示范项目，微电网通过48伏/1000安铅酸蓄电池组和三台SMA的Sunny-Island5048（48伏/5千瓦电压源双向逆变器）建立三相交流微电网。该系统根据频率平衡微网的供用电，使微网稳定运行。值得注意的是，该系统通过无线通信网控制到每一户的负载设备，完全做到了智能化的管理系统，而且蓄电池的用量只有48千瓦时，如果按我国直流系统设计，需要200千瓦时的电池容量。，

For example, Greek Kythnos island piconets demonstration projects independently, micro power grid through the 48 v / 1000 a lead-acid storage battery and three SMA Sunny - Island5048 (48 v / 5 kw bi-directional voltage source inverter) to establish three-phase AC micro grid. The system, according to a power supply frequency balance piconets and stable operation. It is important to note that the system by wireless communication network control to every household load equipment, intelligent management system was complete, and the dosage of the storage battery is only 48 KWH, if as the DC system design as in our country, that will need 200 KWH battery capacity.

The utilization level of reliability is very high, the storage battery is not easy to discharge, battery run five or six years is still intact.

Country Needs the Policy of Energy Storage

In fact, the country has not photovoltaic power generation and energy storage policy so far, the price of photovoltaic power generation subsidies is established according to the pattern of direct interconnection without considering energy storage, energy storage is important for distributed photovoltaic, countries should publish relevant policy in time.

Due to there are too many uncertain factors for the distributed photovoltaic energy storage in industry, it is difficult to calculate the yield, there are not massive intervention for the financing leverage, bank and entrepreneurs . Countries should be to make corresponding changes to your electricity price policy, allowing investors to calculate the yield, forming a guaranteed, strategy can be guaranteed. By then, the real spring is coming.

Energy storage industry, of course, it can't just wait for the policy, the industry of the enterprise needs to work together to jointly explore the beneficial business model, just long time isn't enough, I'm afraid, energy storage now is in a transition period, also need to find temporary business model in transition period, help to find a connection point among distributed generation and energy storage industry .