ENERGY

Vol.139,2016

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Mcanxixun Information and News Service

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INDUSTRY NEWS 行业动态

Oil（石油）

Oil Prices Slide Again, and the Bottom Is Not Visible

The continuing collapse in commodity prices pushed oil futures to new lows Monday, and analysts predicted that the slide was far from over.

Oil prices fell to their lowest level in 12 years; futures of West Texas intermediate crude closed at $31.41 a barrel, down 5.3 percent. Oil futures, which lost 30 percent last year, have declined every day of the year so far. Brent oil, the main international benchmark, lost 6.5 percent and closed at $31.36 a barrel.

Last year brought a broad-based reassessment in commodities, as the global economy slowed and demand from emerging markets like China, India and Brazil waned. The slump in oil prices deepened last week on renewed concerns about the health of China's economy, which led to a rout in global markets.

The drop in commodities is being felt throughout the energy sector and beyond. Saudi Arabia, for instance, said last week that it was considering selling shares in its state-run oil company, Aramco. Arch Coal, one of the biggest coal producers in the United States, said Monday that it had filed for bankruptcy protection to cut its debt.

Russia's main stock indexes also plummeted Monday in their first day of trading after a lengthy winter holiday, as falling oil prices also cast a pall over the country's energy-dependent economy. Oil and other commodities like natural gas and steel, which make up the bulk of Russia's exports, have fallen sharply on fears of a slowdown in the Chinese economy.

“Every signal that the market is getting now suggest that we are going to continue to have an oil glut for some time to come,” said Jason Bordoff, director of the Center on Global Energy Policy at Columbia University. “Iran is about to re-enter the market, demand numbers and economic indicators look relatively weak, U.S. supply is holding up in a low-price environment much better than people thought, and global inventories are growing.”

In that situation, he said, even geopolitical tensions between Saudi Arabia and Iran, which would have generally spooked energy markets, have not had an impact on the market's perception of risk. In fact, the sharp increase in tensions between the two regional powers makes it less likely they will agree to stabilize oil markets within their membership in the Organization of the Petroleum Exporting Countries.

“In that world, there is almost every indication that you want to be bearish,” Bordoff said.

Most analysts expect more declines before prices recover. Goldman Sachs, which had predicted that oil might reach $200 a barrel during a “superspike” before the 2008 financial crisis, forecast last year that prices might drop as low as $20 a barrel in the current downward cycle.

Morgan Stanley also argued Monday that $20 oil was possible if the United States dollar made rapid gains. Analysts at Barclays cut their outlook for oil and copper prices. They still expect oil to rebound sometime in the second half of the year, but set an average price of $37 a barrel in 2016, down from previous forecasts of $56 to $60.

“Recent price declines for major commodities are now greater than in any crisis of the past 30 years and speculative positioning much more negative than it was even in the depths of the financial crisis,” according to a research note by Barclays. “That suggests that although the price outlook is weaker than it was previously, the road ahead could be a very bumpy one.”

At the same time, the drop in oil is pushing down gasoline prices. The average retail price fell to $1.96 a gallon, according to AAA, down from $2.14 a gallon a year ago.

Separately, coal mining companies have been struggling as demand for coal declines. The drop in energy prices and stricter environmental regulations have made natural gas a much more attractive competitor to coal in the United States.

“With oil prices collapsing, renewables on the rise and coal companies going bankrupt, we are at a key inflection point in the energy transition,” said Michael E, Webber, deputy director of the Energy Institute at the University of Texas at Austin. “Inflection points produce a lot of uncertainty and volatility for investors.”

受中国经济影响，国际油价创 12 年来新低

周一，大宗商品价格的持续下跌致使原油期货降至新低。分析人士预测，这种下降趋势还远远没有结束。

石油价格跌至 12 年来的最低水平，西德克萨斯中质原油(West Texas Intermediate)期货报收每桶 31.41 美元，下挫了 5.3%。原油期货去年下跌 30%，今年到目前为止每天都在下降。主要国际基准布伦特原油(Brent Crude)下滑 6.5%，报收每桶 31.36 美元。

去年，全球经济放缓，中国、印度和巴西等新兴市场的需求减少，大宗商品价格随之广泛受到重新评估。上周，由于中国经济状况再次引发担忧，全球市场下挫，油价下行的趋势进一步加剧。

能源及其他领域感受到了大宗商品价格的下跌。例如，沙特阿拉伯在上周表示，正在考虑出售持有的国有油企沙特阿美公司(Saudi Aramco)的股票。美国煤炭巨头阿奇煤炭公司(Arch Coal)在周一表示，公司已申请破产保护，以削减债务。

油价下降也给依赖能源的俄罗斯经济蒙上阴影，在本周一，也就是经过漫长冬季假期后的第一个交易日，俄罗斯主要股指遭到重挫。中国经济放缓引发的担忧导致石油及天然气、钢铁等俄罗斯主要的出口商品的价格大幅下降。

“市场目前得到的所有信号都说明，在未来一段时间，石油供应会继续过剩，”哥伦比亚大学全球能源政策中心(Center on Global Energy Policy at Columbia University)主任贾森·博尔多夫(Jason Bordoff)说。“伊朗正准备重新进入石油市场，而需求数据和经济指标看起来相对疲软，美国石油供应在低价环境中的表现比人们的预想好得多，全球库存量在不断增加。”

他表示，在这种情况下，沙特阿拉伯和伊朗之间的地缘政治冲突并没有影响市场对风险的感知。这类冲突本来通常会令能源市场紧张。实际上，这两个地区大国之间的矛盾急剧升级，反而使得它们更不可能在石油输出国组织(Organization of the Petroleum Exporting Countries)内部就稳定石油市场达成一致。

博尔多夫表示，“在那个世界中，几乎每个迹象都表明你应该看跌。”

大多数分析人士认为在反弹之前还会进一步下跌。高盛(Goldman Sachs)曾在 2008 年金融危机前预测，油价可能会“暴涨”到每桶 200 美元。而它在去年预计，油价在目前的下行周期内会跌至每桶 20 美元。

摩根士丹利(Morgan Stanley)在周一也提出，如果美元迅速升值，油价达到每桶 20 美元是可能的。巴克莱银行(Barclays)的分析员下调了对油价与铜价的预估。他们仍然认为油价会在今年下半年的某个时候出现反弹，但把 2016 年油价的平均水平设为每桶 37 美元，低于之前预测的 56 至 60 美元。

“主要大宗商品价格近期的降幅比过去 30 年经历的任何危机期间的降幅都要大，投机性头寸甚至比金融危机最严重的时期更消极，”巴克莱的研究报告称。“这说明虽然价格预估要低于之前，但前方的道路会很坎坷。”

与此同时，石油价格的下跌也导致汽油价格下降。根据美国汽车协会(AAA)公布的数据，汽油的平均零售价从一年前的每加仑 2.14 美元跌至日前的 1.96 美元。

另外，随着煤炭需求的减少，采煤公司一直在苦苦挣扎。在美国，能源价格的下降及环境监管的加强使得天然气的吸引力大幅增强，成为煤炭的有力竞争对手。

“随着油价崩溃、可再生能源愈发受欢迎、煤炭公司破产，我们正处于能源转型的关键转折点，”德克萨斯大学奥斯汀分校能源研究所(Energy Institute at the University of Texas at Austin)副主任迈克尔·E·韦伯(Michael E. Webber)说。“转折点会给投资者带来很多不确定性和波动性。”

Oil companies brace for a grim 2016 amid sustained price crash

As a miserable year for the oil industry draws to a close, any relief executives might feel will be tempered by the knowledge that 2016 is shaping up to be even worse.

The collapse in oil and gas prices that began in the summer of last year has already cost hundreds of thousands of jobs, and caused projects worth hundreds of billions of dollars to be cancelled or delayed. Today, the external environment is more challenging than it was a year ago, and the energy companies' ability to cope with tough conditions is diminished.

For oil and gas producers, 2016 will be a year of cost-cutting, restructuring, refinancing when it is possible, and in some cases bankruptcy when it is not. Merger and acquisition activity, which was sluggish this year because of disagreements over valuations, may pick up speed.

Oil and gas producers that have other sources of revenues such as refining and chemicals operations, and that still have access to capital markets, will find life difficult but should be able to survive. Companies that are exclusively focused on production and have weak balance sheets will have done well if they can make it through the year.

The outlook was already dire a year ago. Since then, Brent crude has fallen a further 39 per cent, to about $37 per barrel on Monday, and is trading at close to an 11-year low. Longer-dated oil futures prices have also dropped sharply, making it less attractive for producers to use derivatives to protect their revenues, and raising expectations that crude will stay "lower for longer". Prices for natural gas, which are linked to oil under contracts used in Europe and Asia, have been falling too. In the US, the warm winter weather has helped drive benchmark Henry Hub gas to a 16-year low.

Many of the levers available for responding to weak prices have already been pulled, according to Andy Brogan of Ernst & Young, the accounting firm. "Companies had oil price hedges in place, they had costs they could cut relatively quickly, they had capital expenditures that they could put on the backburner," he says. "A lot of these things are going away."

Oil producers have cut costs through efficiency gains and by driving down the rates they have been charged by their suppliers, the oilfield services companies. ConocoPhillips, the world's largest independent oil and gas producer by market capitalisation, said earlier this month that the cost of land rigs for drilling wells in the US had dropped by 32 per cent over the past year, while the cost of hydraulic fracturing to bring those wells into production had fallen by 38 per cent.

US shale oil producers have also continued the steady improvements in productivity they have achieved in recent years. EOG Resources, for example, said last month it had cut the average time to drill a well in the Eagle Ford shale of south Texas from 8.9 days last year to 7.7 days.

Companies have also been cutting capital spending. BP of the UK said in October it proposed to spend about $19bn this year, down from an original plan of $24bn to $26bn.

Such cuts have helped stabilise the industry's finances. The leading listed oil companies will on average need a Brent crude price of $66 per barrel next year to cover their capital spending, interest payments and dividends from their cash flows, down from $81 this year, according to Wood Mackenzie, the energy consultancy. Before the cost and spending cuts, they would have needed $104 per barrel to achieve that cash break-even.

The break-even level of $66 per barrel, however, still means that at today's oil prices the industry's borrowings are set to rise. The large international oil companies can accept higher debts, but do not want their borrowings to run out of control, and they have started to announce a new round of cost reductions. Royal Dutch Shell, which is trying to win shareholder approval for its proposed takeover of BG Group, said this month it planned a further 2,800 job cuts, about 3 per cent of the combined group's workforce, once the deal goes through.

Falling rates for oilfield services will continue to deliver lower costs for producers as contracts come up for renegotiation. For example, Transocean's Deepwater Champion rig is under contract to ExxonMobil to work in the Gulf of Mexico at a rate of $395,000 per day from November to January, down 41 per cent compared to its previous day rate.

There are, however, limits on how far this cost deflation can go. Charges for oilfield services have to be high enough for providers to stay in business. Dave Lesar, chief executive of Halliburton, argues that rates in the US are already at unsustainably low levels. Companies have been raising productivity, for example by drilling in only

the best areas, but there are signs that in the Eagle Ford and the Bakken of North Dakota, two of the three largest shale oil regions of the US, productivity gains are levelling off.

Nor can companies continue to cut capital spending indefinitely without damaging their revenues. This year companies have typically been focusing on projects that have quick paybacks in production, while slamming the brakes on exploration and longer-term developments, but the natural decline of oilfields means that continued investment is needed to stop output falling.

The prospect of tighter supply in the future is laying the foundations for a recovery in oil prices, and companies that have cut costs will be well-placed to benefit. “If oil goes back to $60, things might start to look a lot better,” says Tom Ellacott of Wood Mackenzie. “The sector should have reset at a lower cost base.”

The one ray of hope in the oil industry’s Pandora’s Box of troubles is that the greater the cuts in exploration and development spending now, the stronger the eventual upturn is likely to be. The task facing oil companies will be to stay in business for long enough to enjoy that rebound when it comes.

坚持：2016 年石油业关键词

石油行业悲催的一年结束之时，行业高管们或许感受到些许安慰，但一想到 2016 年将是更糟糕的一年，那点儿安慰也打了折扣。

石油和天然气价格从 2014 年夏季开始下跌，迄今已剥夺了数十万人的工作岗位，导致价值数千亿美元的项目被取消或推迟。如今，外部环境比一年前更具挑战性，而能源公司应对艰难条件的能力有所降低。

对于油气生产商而言，2016 年将是削减成本和进行重组的一年，如果可能的话还要安排再融资，如果不可能再融资的话，在某些情况下只能破产。由于在估值上难以达成一致，并购活动在 2015 年颇为低迷，但在 2016 年或许会提速。

那些拥有炼油和化工等其他收入来源、并且仍可利用资本市场的油气生产商，将发现日子难过，但生存应该不是问题。那些完全专注于油气生产、而资产负债表疲弱的公司，如果能撑过 2016 年，就算表现不错了。

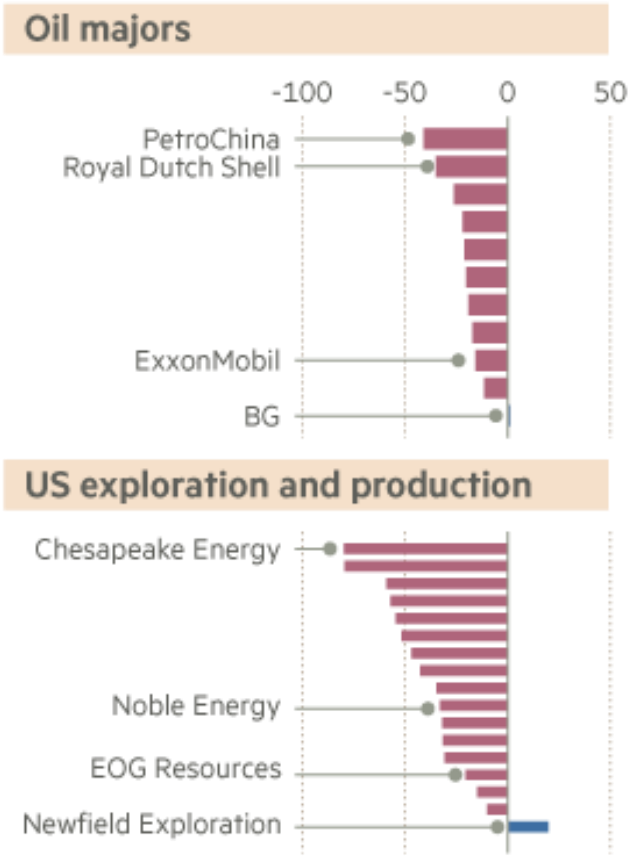
一年前，行业前景已然暗淡下来。自那时起，布伦特原油(Brent crude)又下跌了 39%，2015 年 12 月 28 日跌至每桶 37 美元，接近 11 年低点（编者注：布伦特原油于今年 1 月 12 日已跌至每桶 30.34 美元，西德克萨斯中质原油跌至每桶 29.93 美元）。交割期更长的石油期货价格也大幅下降，使得生产商利用衍生品来保护收入的吸引力变小，并引发了原油将“在更长时期徘徊在低位”的预期。天然气价格也在节节下跌（在欧洲和亚洲采用的合约中，天然气价格是与油价挂钩的）。在美国，暖冬天气帮助把基准的 Henry Hub 天然气价格压低至 16 年低点。

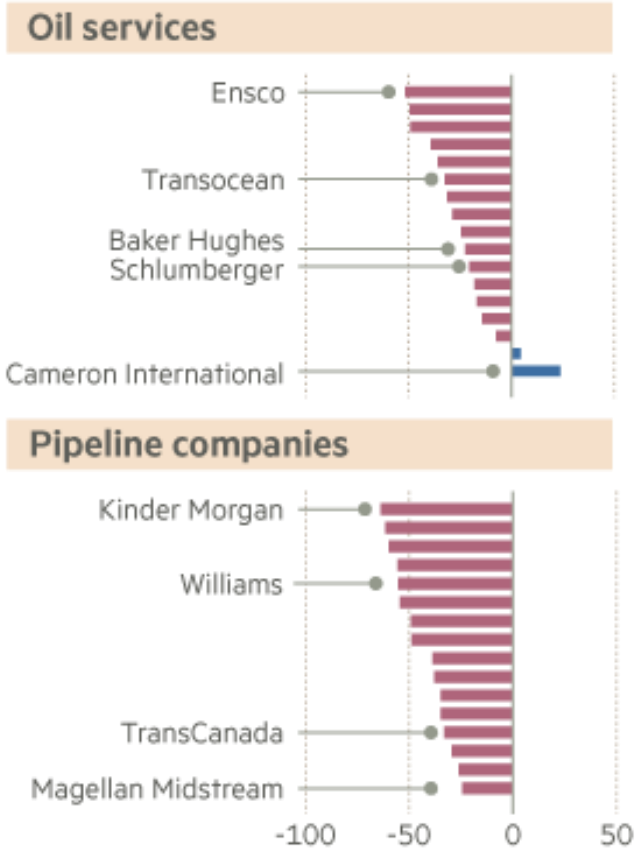
安永会计师事务所(Ernst & Young)的安迪•布罗根(Andy Brogan)表示，应对价格疲软的许多可用手段都已被利用。“企业对油价进行了对冲，它们砍掉了可以较快削减的成本，搁置了一些可以搁置的资本开支，”他说。“这些因素中有很多正开始消失。”

石油生产商已降低了成本，办法是提高效率，并且压低其供应商——油田服务公司的收费水平。2015 年 12 月，全球市值最高的独立油气生产商康菲石油(ConocoPhillips)表示，在美国，过去一年里钻井用的陆上钻机的成本下降了 32%，而通过水力压裂使这些油井投产的的成本下降了 38%。

Oil crash impact

Share price change since Jan 2015, $ terms (%)





Companies named include some of the largest groups by market capitalisation within each subsector (as at Dec 18)

Source: Bloomberg

FT

美国的页岩油生产商也在延续近年实现的生产率稳步提高的趋势。比如，2015 年 11 月，依欧格资源公司(EOG Resources)表示，其在德克萨斯州南部的鹰滩(Eagle Ford)页岩平均每钻一口井的时间已从上一年的 8.9 天缩短到了 7.7 天。

企业还在削减资本支出。2015 年 10 月，英国的 BP 表示，其提议当年资本支出约 190 亿美元，低于原定的 240 亿至 260 亿美元。

诸如此类的削减帮助稳定了行业的财务状况。能源研究公司伍德麦肯兹(Wood Mackenzie)表示，平均而言，主要上市石油公司将需要 2016 年期间的布伦特原油价格达到每桶 66 美元，才能使它们的现金流覆盖资本支出、利息支付和股息派发，这一门槛低于 2015 年的每桶 81 美元。在削减成本和支出之前，令它们达到现金盈亏平衡点的价格是每桶 104 美元。

然而，在每桶 66 美元价格上达到盈亏平衡仍意味着，就当前油价水平而言，行业的借债水平注定将会上升。大型国际油企能够承受更高负债，但它们也不希望借债失控，所以它们宣布了新一轮的削减成本计划。2015 年 12 月，正在争取股东批准其收购英国天然气集团(BG Group)的荷兰皇家壳牌(Royal Dutch Shell)表示，一旦交易获批，该公司打算再裁员 2800 人——约占合并后集团员工总数的 3%。

到了重新谈判合同之时，油田服务收费标准的降低将继续减轻生产商的成本。比如，依照当前合同，Transocean 的 Deepwater Champion 钻机从 2015 年 11 月至 2016 年 1 月在墨西哥湾为埃克森美孚(ExxonMobil)提供服务，每天收费 39.5 万美元，比之前的收费低了 41%。

然而，成本降幅终究是有限度的。油田服务收费必须足够高，才能让提供商维持经营。哈里伯顿(Halliburton)首席执行官戴夫•勒萨(Dave Lesar)辩称，美国的油田服务收费已处于不可持续的低水平。企业

一直在提高生产率（比如仅在最好的区块钻井），但在美国三大页岩油产区中的两个——鹰滩和北达科他州的巴肯(Bakken)——已出现了生产率升势趋缓的迹象。

企业若继续无限期削减资本支出，则必然会损及营业收入。2015 年，企业一般专注于推进生产见效快的项目，同时叫停勘探和更长期的开发项目，但油田的自然衰退意味着，必须持续投资才能阻止产量下滑。

未来供应趋紧的前景为油价复苏奠定了基础，已然降低了成本的公司将置身于有利地位，能够从中获益。“如果油价回到 60 美元，那么局面或许会开始看起来好得多，”Wood Mackenzie 的汤姆•埃拉科特(Tom Ellacott)说，“油气行业本来就应该在更低的成本基础上重启。”

在石油行业装满各种麻烦的“潘多拉魔盒”中，一线希望在于，目前对勘探和开发支出削减得越多，最终的油价反弹就会越强劲。石油企业面临的任务将是苦撑待变，坚持到价格反弹，然后摘取油价反弹的果实。

Brent drops below $30 a barrel

Whooooossshhh.

That’s the sound of Brent crude, the global oil marker, falling below $30 a barrel for the first time since April 2004.

Brent, which started the day in the red only to climb as much as 3.4 per cent, fell 2.8 per cent to $29.99 in late afternoon trading.

Crude’s slide comes after the latest weekly report from the US Energy Information Administration showed inventories of crude at Cushing, a key delivery point, climbed to a record high and gasoline and distillate inventories rose more than expected.

The news also prompted West Texas Intermediate, the US oil marker, to give up its gains for the day.

A glut of supply that has prompted crude to fall more than 70 per cent since mid 2014 has been exacerbated this year amid rising concerns about the health of the Chinese economy and strength in the US dollar.

Some analysts have warned that crude could slide to $20 a barrel.

布伦特原油跌破每桶 30 美元

嗖嗖嗖。

这是全球原油基准布伦特原油(Brent crude)自 2004 年 4 月以来首次跌破每桶 30 美元时发出的声音。

早盘还攀升多达 3.4%的布兰特原油价格尾盘下跌了 2.8%，报收于 29.99 美元/桶。

此番原油价格下滑之前，美国能源情报署(US Energy Information Administration)最新的周报显示，关键交割地点——俄克拉何马州库欣(Cushing)的原油库存已升至创纪录高位，汽油和馏分油库存增加超出预期。

这一消息还使美国石油基准西德克萨斯中质原油(West Texas Intermediate)失去当日之前的涨幅。

在各方对中国经济形势以及美元走强越来越担忧的背景下，自 2014 年中期以来导致原油价格下滑逾 70%的供应过剩问题今年以来加剧。

一些分析师警告称，原油价格可能下跌至每桶 20 美元。

Opec fires warning as Iran surges back into the world’s

oil markets

Iran stormed back into the global oil market yesterday, ordering an immediate sharp increase in production and prompting warnings from fellow Opec members that it risks prolonging the biggest price crash in a decade.

Brent crude, the international benchmark, fell below $28 a barrel for the first time since 2003, as Iranian tankers loaded with 50m barrels of crude prepared to set sail following the lifting of US and EU sanctions.

Marking the end of years of economic isolation, the head of Iran's national oil company ordered an increase in output of around 500,000 barrels a day, further straining relations with its regional rival Saudi Arabia, the biggest oil exporter.

Prices have tumbled by almost 75 per cent in the past 18 months as the largest producers have refused to give ground, with supplies and inventories ballooning to near-record levels.

"If Iran does not increase its oil production, neighbouring countries may increase their production by the next six months or one year and take Iran's share," Rokneddin Javadi, Iran National Oil company head, said in Tehran. He predicted prices would stay below $30 a barrel unless there were "a logical consensus to manage the oil market" — a reference to the Saudi-led policy of keeping the taps open to squeeze higher-cost producers.

Sanctions on Iran cut its exports from 2.5m barrels a day in 2011 to a little over 1m b/d . Tehran has assembled a flotilla of 25 supertankers filled with heavier crude and condensate oil it struggled to sell amid sanctions and the market glut.

欧佩克：伊朗可能延长油价崩盘

伊朗昨日大举重返全球石油市场，并下令立即大幅增加石油产量，这促使欧佩克(Opec)其他成员国警告称，伊朗可能延长 10 年来最严重的油价崩盘。

美国、欧盟解除对伊朗的制裁后，满载 5000 万桶原油的伊朗油轮准备起航。国际基准布伦特(Brent)原油价格自 2003 年以来首次跌破 28 美元/桶。

解除制裁标志着伊朗结束多年经济孤立，伊朗国家石油公司(INOC)负责人下令每日增产约 50 万桶，这进一步加剧了德黑兰与其地区竞争对手、全球最大石油出口国沙特阿拉伯的紧张关系。

由于各大产油国拒绝减产，石油供应与库存已膨胀至接近创纪录水平，油价在过去 18 个月已暴跌近 75%。

伊朗国家石油公司负责人罗克尼丁•贾瓦迪(Rokneddin Javadi)在德黑兰表示："如果伊朗不增加本国石油产量，邻国可能在今后六个月或一年时间里增加他们的产量，抢占伊朗的市场份额。"他预计油价将一直低于 30 美元/桶——除非能够达成"一项管理石油市场的合乎逻辑的共识"，此言的矛头指向沙特带头采取的、加大石油产量以排挤成本较高的生产者的政策。

对伊朗的制裁使得该国石油出口从 2011 年的每天 250 万桶降至每天稍多于 100 万桶。德黑兰组建了一支由 25 艘超级油轮组成的船队，满载伊朗在受制裁以及市场供过于求期间难以销售的重油和凝析油。

Cnooc to cut capital spending by 10%

China's Cnooc on Tuesday set out plans to cut capital spending by more than 10 per cent this year and reduce oil production, as it responds to the crude price rout.

The annual forecast by Cnooc's listed unit serves as the first indication of output and investment plans by China's state-controlled oil producers, which also include China National Petroleum Corp and Sinopec.

The listed arm does not represent all of the output by Cnooc's state-controlled parent company, but remains a good proxy for the position of the Chinese industry.

Brent crude was trading at $29 per barrel on Tuesday, having fallen to a 12-year low on Monday, and Li Fanrong, Cnooc's chief executive, said that oil prices of below $30 made operations "very difficult".

Cnooc said it plans to cut capital spending to "no more than" Rmb60bn ($9.1bn) this year, from Rmb67.5bn in 2015.

It intends to produce between 470m and 485m barrels of oil equivalent this year, compared with an estimated 495m last year.

China's state-controlled oil producers expanded aggressively from 2000 because of the country's growing demand for crude, but they are now saddled with high-cost fields overseas.

Mr Li said Cnooc would analyse cash flow on a field-by-field basis and "be more cautious when making major investments".

"In the harsh winter, we pay more attention to whether [a field] can bring cash flow," he added. "I hope we can cut costs faster than the oil price drops, but sometimes that's not realistic."

Production cuts "are more likely to come from overseas projects than [producers'] domestic operations", said Gao Jian, analyst at Chem99.com.

"The pressure to maintain production levels is more likely to come from the companies themselves rather than from the government," he added. "Cutting production would mean worse performance."

Analysts said the falling crude price had one silver lining for certain oil producers, in the form of an improved outlook for their refining arms.

This month, China's National Development and Reform Commission adjusted the formula it uses to set domestic diesel and petrol prices, in order to incentivise refiners.

中海油宣布减产并缩减资本支出

中海油(Cnooc)周二宣布今年削减 10%以上的资本支出并减少石油产量，以此回应原油价格暴跌。

中海油上市子公司的年度预测是反映中国国有控股石油公司产量和投资计划的首个风向标，这些公司还包括中国石油天然气集团公司(CNPC)和中石化(Sinopec)。

上市子公司并不代表中海油国有控股母公司的所有产出，但仍是中国石油业当下处境的较好写照。

布伦特(Brent)原油价格在周一跌至 12 年低点后，周二为 29 美元/桶。中海油首席执行官李凡荣表示，不到 30 美元/桶的油价使经营"非常困难"。

中海油表示，计划将今年的资本支出从 2015 年的 675 亿元人民币缩减至"不超过"600 亿元人民币（合 91 亿美元）。

中海油计划今年生产 4.70 亿至 4.85 亿桶石油当量，去年该公司的产量约为 4.95 亿桶。

自 2000 年开始，中国国有控股石油公司就因国内不断增长的原油需求而大举扩张，但他们现在受到高成本海外油田的拖累。

李凡荣表示，中海油将在逐块油田分析现金流，并且"在进行重大投资时更加谨慎"。

"寒冬时期，我们更加注重（一块油田）能否带来现金流，"他补充说，"希望我们缩减开支的速度能快过油价下跌的速度，但有时这并不现实。"

卓创资讯(Chem99.com)分析师高健表示，减产"更可能来自海外项目，而非（这些油企的）国内业务"。

"保持产量水平的压力更有可能来自企业自身，而非政府，"他补充说，"减产意味着业绩下滑。"

分析师表示，原油价格下跌给某些油企带来一个利好——他们旗下炼油部门的前景将有所改善。

本月，中国发改委(NDRC)调整了国内汽、柴油定价机制，以激励炼油企业。

Oil market could drown in oversupply — IEA

The oil market “could drown in oversupply” as a rise in Iranian output offsets production cuts elsewhere, threatening a further price collapse, the world’s leading energy forecaster has said.

In a stark assessment of the challenges facing the global oil industry, the International Energy Agency warned on Tuesday of an overhang of at least 1m barrels a day for a third consecutive year in 2016.

Production outside the Opec cartel would decline this year, the IEA said. But that would be offset by slower demand growth and higher production from Iran now that sanctions linked to its nuclear programme had been lifted.

“Unless something changes, the oil market could drown in oversupply,” the wealthy nations’ energy watchdog said in its closely watched monthly oil market report.

It said if Iran — a powerful member of the producers’ group — moved quickly to offer its oil under attractive terms and its Opec peers such as Saudi Arabia refused to “stay on the sidelines”, prices could lurch lower.

Oil prices have tumbled almost 75 per cent in 18 months as the largest producer countries have refused to give ground, with supplies and inventories ballooning to near-record levels.

Global oil stocks rose by 1bn barrels in 2015 from the year before and the IEA has forecast a further increase of 285m barrels over the course of 2016.

Overall the IEA expects demand growth to moderate from almost 1.7m b/d in 2015 to 1.2m b/d this year.

IEA：供应过剩将导致油价继续下挫

全球顶尖能源预测机构国际能源署(IEA)表示，石油市场“可能会被供应过剩淹没”，伊朗石油产量的增加将抵消掉其他国家减产的影响，这可能导致油价进一步下挫。

周二，IEA 在这份对全球石油业面临的挑战进行的严峻评估中警告称，今年供应过剩的规模将连续第三年达到每日至少 100 万桶。

IEA 表示，石油输出国组织（Opec，简称：欧佩克）以外国家的石油产量今年将下滑。但石油需求放缓以及伊朗产量增加将抵消掉这一下滑。伊朗受到的与核计划有关的制裁现在已被解除。

IEA 在其受到密切关注的月度石油市场报告中表示：“除非情况发生变化，否则石油市场可能会被供应过剩淹没。”

IEA 表示，如果伊朗（欧佩克的强大成员国之一）迅速采取行动、以有吸引力的条件供应石油，而沙特等其他欧佩克成员国拒绝“离场观望”，油价可能会继续下跌。

油价已在 18 个月内下跌了近 75%，原因是大型产油国拒绝让出市场份额，石油供应和库存急剧增加、逼近历史高点。

2015 年的全球石油库存较上一年的水平增加了 10 亿桶。IEA 预测，2016 年全年，石油库存还会再增加 2.85 亿桶。

IEA 预测，总体而言，石油需求增幅将从 2015 年的每日近 170 万桶降至今年的每日 120 万桶。

Oil prices are at the mercy of geopolitics

Geopolitics and geoeconomics are pounding down on the oil market, and the price seems to have no place to hide.

The latest barrage comes this week from the re-entry of sanctioned Iranian oil to the world market, triggered by Tehran's compliance with the nuclear agreement. The lifting of sanctions, originally expected to happen in March or April, was sped up to bolster support for President Rouhani in Iran's upcoming parliamentary elections. As a result, the returning oil will arrive in an already glutted market at a time of maximum seasonal weakness — and when geoeconomic pressures are mounting.

Oil prices are within hailing distance of where they were at the end of 2003, before China's economic take-off ignited the so-called commodity "supercycle", which drove up the prices of oil and other commodities. But the China of 10 per cent annual growth is no more. The question that now haunts the oil market is whether what we are seeing is China's transition from an industrial to a consumer and services-oriented economy, or whether there are deeper structural problems that mean slower growth and more turbulence of the kind recently seen in the Chinese stock market. The significance for the global economy is enormous, and a weaker world economy means less growth in demand for oil at a time when world supplies are swelling.

The stronger dollar is also buffeting the oil price. A decade ago, when the price was surging and the dollar (in which oil prices are denominated) was weakening, economists talked about how oil moves "co-negatively" with the dollar exchange rate — when the dollar goes down oil prices go up. The opposite is happening today.

The oil price collapses in 1986 and 1998 ended when oil exporters got together and reined in production. But geopolitics is working against a quick settlement this time. Saudi Arabia and the other Gulf countries believe that Iran is seeking to become the dominant power in the Middle East. The nuclear agreement not only provides Iran with billions of dollars that had been sitting in international banks because of sanctions, but also enhances Iran's political position.

The Gulf countries fear this could be further augmented if it leads to some kind of US-Iranian detente. The Ayatollah Ali Khamenei, Iran's supreme leader, says nothing like that will ever happen. But in the face of a resurgent Iran, the last thing that the Gulf countries want to do is cut back their own oil production in order to surrender space for additional Iranian exports into Asia and northwestern Europe.

Today's weak oil prices are having a devastating impact on the global energy industry and are putting enormous stress on oil-exporting countries, and on some regions in the US, Canada, Scotland and elsewhere. Worldwide, projects are being slowed, postponed or cancelled, which will begin to affect availability of supplies two or three years from now. IHS projections show a $1.8tn reduction between 2015 and 2020. Skilled professionals are leaving the industry and many will never return.

This steady stream of negative developments only reinforces the sentiment that is weighing down on the oil price. One can add to this the fear among some that the global industry could run out of places to store the surplus.

What could reverse the collapse? Later this year, or in 2017, the workings of supply and demand are likely to start to bring the market back into balance. But there will be a great deal of wrenching anguish between now and then. Alternatively, the impact of the price collapse could be so devastating that exporting countries that have said they will not restrain production — including Russia and even Iran — could change their position and come to terms with the Gulf countries, who insist that they will not cut by themselves.

Then there is American shale oil. US oil output is down about half a million barrels from last April — not as much as was expected last year, partly because new offshore supplies from the Gulf of Mexico are offsetting the decline in shale. However, further declines in US shale would certainly serve to mitigate the widespread market pessimism.

Ironically, another counterweight to that pessimism could come from the fact that sanctions have been lifted on Iranian oil. The agreement of the nuclear deal removes a big uncertainty that has been hanging over the market. Now the question is exactly how much additional oil the Iranians will — or can — bring back to the market. Iran's finance minister has described the current oil price as representing "an all-out war" for market share. But if the actual volumes turn out to be lower than has been anticipated, or if the Iranians are slower in bringing them back,

then the market would have further reason to moderate its bleak outlook.

The direction of the oil price and, to a considerable degree, the future of highly volatile global financial markets hang on the outcome.

The writer, vice-chairman of IHS, is author of 'The Quest: Energy, Security, and the Remaking of the Modern World'

石油市场“硝烟”浓

地缘政治和地缘经济正在对石油市场狂轰滥炸，而油价似乎无处可藏。

最新的炮火是在本周落下的。由于德黑兰遵守了核协议，曾经受到制裁的伊朗石油重新进入世界市场。制裁原本预计将于 3 月或者 4 月解除，为了在即将开始的伊朗议会选举中增强对伊朗总统哈桑•鲁哈尼(Hassan Rouhani)的支持，这一过程加快了。结果是，伊朗石油将在季节性疲软最严重、且地缘经济压力正在上升的时期，进入一个已经供过于求的市场。

油价已经接近 2003 年末的水平，那时中国的经济腾飞还未催生拉高石油和其他大宗商品价格的所谓大宗商品“超级周期”。但中国经济年增长 10%的情景已成为过去。现在困扰石油市场的问题是，当前我们所看到的情景是中国经济转型——从工业导向型经济向以消费和服务业为导向的经济转变——所致，还是存在更深层的结构性问题，这些问题引起增长放缓，以及更多的市场动荡（类似于中国股市最近经历的）。这个问题对全球经济具有重大意义，而世界经济更为疲弱，就意味着在世界石油供给上升的时候，石油需求的增长会减慢。

美元走强也冲击着油价。10 年前，当石油价格飙升，而美元（石油以美元计价）走弱的时候，经济学家说石油和美元汇率的走势是“负相关”的——美元走低时油价上升。如今，情况正好相反。

1986 年和 1998 年的油价大跌因为石油出口国联合起来控制产量而告终。但这一次地缘政治不利于问题的快速解决。沙特阿拉伯和其他海湾国家认为，伊朗正寻求成为中东地区占据支配地位的强国。核协议不仅为伊朗提供了此前因制裁而冻结在国际银行中的大量资金，还加强了伊朗的政治地位。

海湾国家担心，伊朗地位可能进一步上升，如果核协议使美国和伊朗关系出现某种缓和的话。伊朗最高领袖阿亚图拉阿里•哈梅内伊(Ayatollah Ali Khamenei)表示，像这样的事情永远不会发生。但面对再度崛起的伊朗，海湾国家最不愿意做的事情就是减产，让出空间让额外的伊朗石油得以出口到亚洲和欧洲西北部。

疲软的油价正对全球能源行业产生破坏性影响，也给石油出口国，以及美国、加拿大、苏格兰和其他地区带来了巨大压力。在全球范围内，多个项目被放慢进度、推迟或取消，这将会在两三年后开始影响石油的供应量。IHS 的预测显示，2015 年到 2020 年期间相关投资减少 1.8 万亿美元。高级专业人员正在离开这个行业，许多人永远都不会再干回这一行。

这一稳定的负面发展潮流，只会加剧正在压低油价的市场情绪。除此之外，还有部分人担心，全球石油行业可能会没有地方存储过剩石油。

什么因素可能扭转石油跌势？今年晚些时候或 2017 年，供需因素的运行可能会开始令市场重返平衡状态。然而，从现在起到那时，市场将会经历许多令人纠结的痛苦。还有一种可能就是，油价崩盘的破坏力之大，可能会令那些原本表示不会减产的石油出口国（包括俄罗斯，甚至伊朗）改变立场，与坚称不会独自减产的海湾国家达成协议。

还有就是美国的页岩油。自去年 4 月以来，美国石油产量下滑了约 50 万桶，下滑幅度低于去年的预期，这部分是由于来自墨西哥湾的新增离岸石油供应填补了页岩油产量的下滑。不过，美国页岩油产量的进一步下滑，无疑会起到缓解市场普遍悲观情绪的作用。

讽刺的是，另一个可能会减淡这种悲观情绪的因素是对伊朗石油的制裁解除这件事。核协议的达成，消除了困扰市场的一大不确定性因素。如今，问题变成伊朗到底会（或者到底能够）向市场增加多少石油

供应。伊朗财政部长曾称，目前的油价代表着一场争夺市场份额的“全面战争”就要打响。然而如果伊朗实际恢复的石油供应量低于预期，或者如果伊朗石油进入国际市场的脚步比较慢，那么市场的黯淡前景就有进一步理由缓和一下。

油价的走向取决这一结果，跌宕起伏的全球金融市场未来前景如何，很大程度上也要看这一结果。

Saudi Arabia says $30 oil is ‘irrational’

Saudi Arabia has described the collapse in oil prices to below $30 as “irrational” and expects the market to recover in 2016 even as the country continues to keep production high.

Khalid al-Falih, chairman of state oil company Saudi Aramco, told the World Economic Forum in Davos that current prices would not last, with many smaller producers facing financial difficulties.

“The market has overshot on the low side and it is inevitable that it will start turning up,” said Mr Falih, predicting higher prices by the end of the year.

He reiterated that Saudi Arabia, the world’s biggest oil exporter, would not cut supplies unilaterally or make way for rival producers.

A surge in US shale output over the past five years has contributed to a global supply glut that has pushed oil prices down 75 per cent in 18 months. The sell-off has accelerated this year, with crude dropping 30 per cent as Iran, Saudi Arabia’s regional rival, prepares to re-enter the market after the lifting of sanctions.

While he called the short-term oil outlook “bleak”, Mr Falih said Saudi Arabia, which is considering a stock market flotation of part of Saudi Aramco, would weather the downturn better than many of its rivals.

Saudi Arabia has said it would consider production cuts if other Opec members participated and if the cartel was joined by the largest producers outside the group, such as Russia.

Mr Falih said, however, that in contrast to events such as the global financial crisis, which led Opec to cut its production, the advent of US shale oil had been a structural supply shift.

His comments suggest Saudi Arabia believes cuts may not be able to influence the price even with the help of other countries.

沙特：油价跌破 30 美元是“非理性的”

沙特阿拉伯认为油价暴跌至每桶 30 美元下方是“非理性”的，并预测，即便该国继续将产量维持在高位，石油市场在 2016 年也将回暖。

沙特国有石油集团沙特阿美(Saudi Aramco)的董事长哈立德•法利赫(Khalid al-Falih)在达沃斯世界经济论坛(World Economic Forum)上表示，当前的价格不会持续下去，很多规模较小的产油国正面临财务困境。

法利赫表示：“市场跌得过头了，油价开始掉头向上是不可避免的。”他预测，油价将不晚于今年底走高。

他重申，世界最大石油出口国沙特不会单方面削减供应，也不会对其他产油国退让。

过去 5 年，美国页岩油产量飙升促成了全球石油供应过剩，这推动油价在 18 个月内暴跌了 75%。今年，石油市场上的抛售加快了脚步，原油价格已下跌 30%，原意是沙特在中东的竞争对手伊朗在制裁解除后准备重新进入市场。

法利赫认为石油市场短期前景“黯淡”，但他表示，与很多竞争对手相比，沙特将能够更好地熬过市场的这段低迷。该国正考虑让沙特阿美的部分业务上市。

沙特表示它会考虑减产，前提是石油输出国组织（Opec，简称：欧佩克）其他成员国以及俄罗斯等该

组织之外的大型产油国也减产。

然而，法利赫表示，与全球金融危机（导致欧佩克减产）等事件相比，美国页岩油的出现令供应发生了结构性变化。

他的言论暗示，沙特认为即便有其他国家的帮衬，减产可能也无法影响油价。

Climate Deal's First Big Hurdle: The Draw of Cheap Oil

Barely a month after world leaders signed a sweeping agreement to reduce carbon emissions, the global commitment to renewable energy sources faces its first big test as the price of oil collapses.

Buoyed by low gas prices, Americans are largely eschewing electric cars in favor of lower-mileage trucks and sport utility vehicles. Yet the Obama administration has shown no signs of backing off its requirement that automakers nearly double the fuel economy of their vehicles by 2025.

In China, government officials are also taking steps to ensure that the recent plunge in oil prices to under $30 a barrel does not undermine its programs to improve energy efficiency. Earlier this month, the country's top economic planning agency introduced a new regulation, effective immediately, aimed at deterring oil consumption.

For the climate accord to work, governments must resist the lure of cheap fossil fuels in favor of policies that encourage and, in many cases, require the use of zero-carbon energy sources. But those policies can be expensive and politically unpopular, especially as traditional fuels become ever more affordable.

"This will be a litmus test for the governments — whether or not they are serious about what they have done in Paris," said Fatih Birol, executive director of the International Energy Agency.

So far, there is no sign that the world's two largest energy consumers — the United States and China — are wavering. With those two countries staying the course, albeit in the early days since the signing, there is optimism among backers of the accord that the momentum is too strong to stop. And despite the recent turmoil in energy markets, renewable industries are prospering.

"The trend toward much greater penetration of low-carbon energy driven by policy and technological advancements is going to continue," said Jason Bordoff, director of the Center on Global Energy Policy at Columbia University and a former top aide to President Obama. Despite the lower fuel costs, he added, "technological alternatives and policy drivers that are reducing demand for fossil fuels are already really starting to take a bite."

A few days ago, the Energy Department projected that total renewable power consumed in the United States this year will increase by 9.5 percent, and the longer-term outlook appears bright as costs continue to plummet and after congressional action last December extended federal tax credits for new wind and solar projects.

Utility-scale solar power generation alone is expected to increase by 45 percent by 2017, according to the Energy Department. Administration officials express an ambition to make wind power the source of more than a third of the American electricity supply by 2050.

In China, the world's biggest greenhouse gas emitter, the government implemented a new rule that no matter how low world crude oil prices may fall, the price of gasoline and diesel will continue to be set as though the world price of oil were still $40 a barrel. The goal is to prevent gasoline and diesel from becoming so cheap that China's citizens would start consuming it indiscriminately.

China's heavily state-owned refining industry will also not be allowed to keep the extra profits from buying crude oil cheaply and selling gasoline and diesel as though the crude oil still cost $40 a barrel. Instead, the Chinese government will take the extra refining profit margin and put the money into a special fund for energy conservation and pollution control.

But across the globe, the picture is not entirely rosy for zero-emission technologies.

Several nuclear power plants, which emit virtually no greenhouse gases, have closed in the United States in recent years, and few are under construction in part because of the competition of cheap natural gas.

Low oil prices also jeopardize the development of alternative fuels to replace petroleum in transportation and industry, including the advanced biofuels that once looked so promising. Cheap oil also reduces the price of diesel, the primary competitor of renewables in spreading electricity generation to impoverished rural areas of Africa and Southeast Asia.

And if governments' support wanes, the alternative fuel industries could take a hit.

In Spain, the development of renewables has slowed to a crawl since the government started weakening support in 2009 because of an economic downturn. In Britain, analysts warn that the wind and solar industries could collapse as the government shifts subsidies away from renewables; two global wind developers recently canceled projects there. And in the United States, when an important tax credit lapsed briefly in 2013, installations of new wind farms all but ceased, falling 92 percent for the year.

Ultimately, supporters of the climate accord say that low oil prices can cut both ways in the march to renewables.

"It's a double-edged sword," said Amy Myers Jaffe, executive director for energy and sustainability at the University of California, Davis. She noted that low oil prices were cutting investments in drilling, which meant fewer emissions of methane, a powerful greenhouse gas, at well sites, and "it has clearly not slowed down the switch toward renewable energy."

But at the same time, Ms. Jaffe said, low gasoline prices make driving more attractive, and in larger vehicles as well.

"It's crippling for electric cars," she said, "because the thing that made you think about buying an electric car was it was so painful for you to fill up your car with gasoline that was so expensive."

全球减排协议面临新挑战：廉价石油

世界各国领导人签署削减碳排放的全面协议还不到一个月，全球对转向可持续能源的承诺就遭遇了第一个重大挑战：油价的大幅下跌。

受低油价驱动，美国人基本不愿使用电动车，而是偏爱油耗高的卡车和越野车。然而，奥巴马政府依然毫不动摇地推行新标准，要求到 2025 年，汽车生产商将机动车的燃油经济性提高将近一倍。

在中国，政府官员正在努力确保新近跌至每桶 30 美元以下的油价无损其节能项目的展开。在本月初，中国负责经济规划的最高部门出台了一项立即生效的新措施，旨在遏制燃油消费。

气候协议要想奏效，各国政府必须抵抗住廉价化石燃料的诱惑，采取鼓励乃至要求使用零排放能源的政策。然而，这些政策也许成本极高，在政治上也难受欢迎，特别是当传统燃料变得愈发便宜的时候。

"这将是检验各国政府的试金石，看他们是否在认真对待巴黎气候会议的成果，"国际能源署(International Energy Agency)署长法提赫·比罗尔(Fatih Birol)表示。

迄今为止，作为世界上最大的两个能源消费国，美国和中国还没有显示出任何动摇的迹象。尽管目前距离气候协议的签署还没过去多长时间，但当这两个国家坚持向前，气候协议的支持者就依然态度乐观，相信这股势头锐不可当。而且，尽管能源市场近期出现波动，可持续能源产业仍在蓬勃发展。

"受政策和科技进步驱动，使用更高比例低碳能源的势头将持续下去，"哥伦比亚大学全球能源政策中心(Center on Global Energy Policy at Columbia University)主任贾森·博尔多夫(Jason Bordoff)表示。他曾是奥巴马总统的高级幕僚。他还称，虽然燃料成本走低，但"科技取代和政策驱动，依然在减少化石燃料的需求方面初具成效。"

几日前，美国能源部预测本国今年的可再生能源的总消耗量将上升 9.5%。长远来看，前景也显得颇

为光明，一是新能源成本在继续下降，二是去年 12 月国会决定延长风能和太阳能项目的税收抵免。

根据能源部的数据，到 2017 年，单是电网规模的太阳能发电量就将增加 45%。奥巴马政府的官员显现了雄心，决意到 2050 年用风能来满足美国逾三分之一的供电需求。

作为世界上最大的温室气体排放国，中国政府发布了一项新规定，要求无论国际原油价格下跌多少，国内的汽油和柴油售价都将维持在国际油价每桶 40 美元的水平。这一举措是为了防止汽油和柴油价格一泻千里时中国人开始盲目消费化石燃料。

此外，中国的炼油业绝大部分被国有企业占据，它们不允许保留获得的额外利润——这些利润来自于低价购入原油但依然按照原油价格每桶 40 美元来销售汽油和柴油。中国政府会将这部分额外利润投入一个特别基金，用于能源保护和污染控制。

不过，纵观全球，零排放技术的前景并非一片光明。

核电站几乎不排放温室气体。不过近年来，美国关停了多家核电站，正在建设的也寥寥无几，一部分原因是来自廉价天然气的竞争。

低油价还损害了替代燃料在运输和工业领域取代石油的发展，包括一度看来很有希望的高级生物燃料。石油价格低迷还压低了柴油的价格，而在非洲和东南亚一贫如洗的乡村地区普及电力的过程中，柴油是可再生能源的主要竞争对手。

此外，一旦政府的支持力度减弱，替代燃料行业就可能会遭遇重创。

在西班牙，自从政府因经济下行而于 2009 年开始减少对可再生能源的支持后，该领域的发展几近停滞。在英国，分析人士警告，随着政府逐步取消对可再生能源的补贴，风能和太阳能行业或许会崩塌；两家国际风能开发商近期就取消了在英国的项目。而在美国，当一项重要的税收抵免政策在 2013 年短暂失效后，新风电场的安装工作几乎都停止了，当年装机容量下滑了 92%。

到头来，支持气候协议的人士称，低油价可能对转向可再生能源的进程有利有弊。

“这是把双刃剑，”加州大学戴维斯分校(University of California, Davis)能源与可持续项目的执行主管埃米·迈尔斯·贾菲(Amy Myers Jaffe)说。她指出，低油价减少了钻探领域的投资，而这意味着油井数量和温室效应很强的甲烷气体的排放都有所下降，而且“显然它并没有减缓向可再生能源的转型”。

然而，贾菲也表示，与此同时，低油价又让开车变得更有吸引力了，对较大的机动车也是如此。“这对电动汽车造成了重创，”她说。“你之所以会考虑买辆电动车，是因为油价太高了，给车加满油实在是太痛苦了。”

New Energy（新能源）

New Low For Wind Energy Costs: Morocco Tender Averages $US30/MWh

The North African country of Morocco has achieved a new low for wind energy costs, securing average bids of just $US30/MWh from its tender for 850MW tender of large-scale wind energy projects, with the lowest at around $US25/MWh.

The pricing – revealed by its energy ministry at a ministerial round table at the International Renewable Energy summit in Abu Dhabi on Saturday – sets a new low for wind energy pricing in the world, and is boosted by the remarkable wind energy resource sourced from Atlantic trade winds, and some concessional finance.

Abderrahim El Hafidi, vice minister of energy and environment, described the result as “extraordinary” and

“amazing” and said it pointed to a “real revolution” in the means of producing energy. Some bids in the US have been in and around $US25/MWh, although these have been boosted by a 30 per cent production tax credit.

Until a decade ago, Morocco sourced all its energy needs from fossil fuels, but recently set a 52 per cent renewable energy target by 2030. Apart from wind farms (it already operates Africa’s largest wind farm, pictured above), it is also investing in large-scale solar farms – a mix of solar PV, solar tower with storage, and parabolic trough technologies.

El Hafidi did not identify the lowest bidder, although reports in December said a consortium led by Italy’s Enel Green Power, and including Morocco company Nareva Holdings and turbine builder Siemens had made the lowest bid, without specifying the price at the time.

Other bidders include Spain’s Acciona, France EDF, in partnership with Qatar Electricity and Water Company (QEWC), Morocco’s Fipar Holding of Morocco, and Alstom Wind; Saudi Arabian firm ACWA, in co-operation with Gamesa, and France’s Engie (the owner of the Hazelwood brown coal power station) and Vestas.

It is the second time in two years that the IRENA summit has witnessed another step change in the costs of renewable energy technologies.

Last year, ACWA Power won a bid for 200MW of large scale solar PV with a price of US58.40/MWh. That was then the lowest in the world, although it has since been beaten by tenders in Chile.

Until a decade ago, Morocco sourced 98.9 per cent of its energy needs from imported fossil fuels, with oil trading at the time at around $US100/MWh.

“Things have changed a lot,” El Hafidi said. In 2009, wind and solar was much higher than fossil fuels, particularly coal, which was seen as cheap and abundant.

“Now, we have wind projects cheaper than coal. The $30/MWh bid compares to coal which is 80/MWh.” (As one observer noted following the tender result, even if the coal were free, a coal fired plant could not match those costs.)

“Isn’t that amazing that we can have confidence in renewable energy for the future of our energy and for the future of the planet,” El Hafidi said. “This is real. It is not a claim.”

Adnan Amin, the executive director of IRENA, said the Moroccan pricing achievement “indicates remarkable change and the pace of that change” in the cost of renewable energy technologies.

Amin said there was a level of cynicism about the nature of the Paris climate deal, but those views misunderstood the nature of the transformation taking place.

“Here, we have (proof that) the majority of the solution is here. The question is how do we make it happen.”

The price of $30/MWh translates into $A43/MWh -and is well below the record price bid for a wind farm in Australia, which was set at $A77/MWh in the latest tender conducted by the ACT government. That, though, was for a fixed price over 20 years, so represents a first year price well below that.

Steve Sawyer, the head of the Global Wind Energy Association, said that low prices reflected the strong wind conditions in Morocco.

“It doesn’t mean that wind will be 3c/kWh ($30/MWh) everywhere. It won’t be. But there are a lot of place where it will be. he point to the Brazil, China, and parts of US where that could happen.”

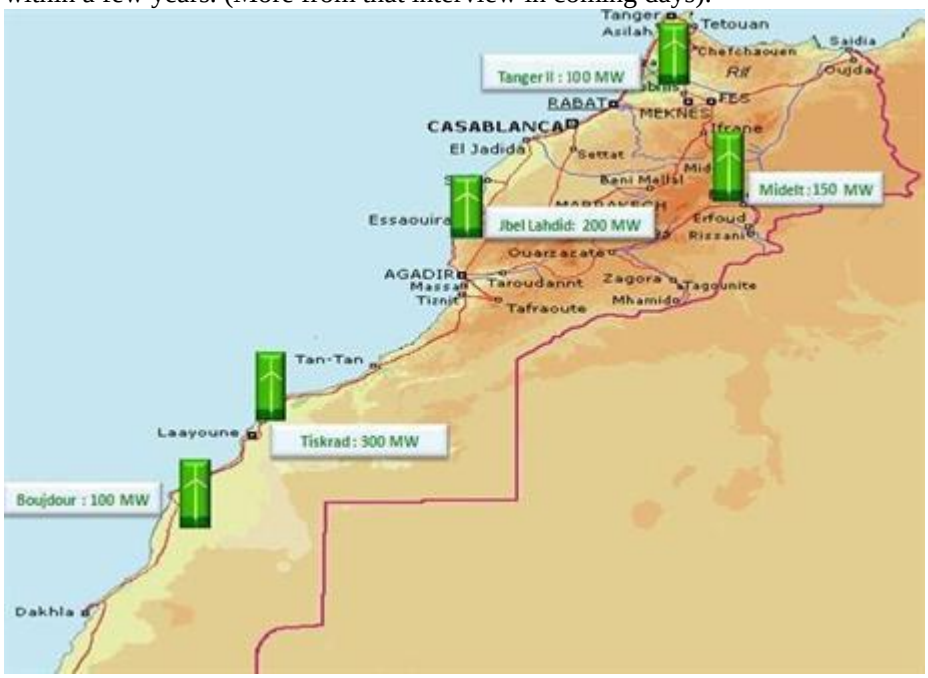
The 850MW wind tender is part of Morocco’s ambitious target of sourcing 52 per cent of its electricity needs from renewable energy, a target that was increased from 42 per cent during the Paris climate talks.

It has also started generation from the 150MW Noor concentrated solar power plant (parabolic trough) – the first in north Africa. Subsequent stages will include another parabolic trough plant, a 150MW solar tower power plant with storage, and a large solar PV array.

The Noor plant, also being built by ACWA Power, is expected to be officially inaugurated in coming days.

El Habidi said the first stage of the solar parabolic trough plant would deliver electricity at around three times the cost of coal, but it was a critical first step towards storage and flexibility, which was crucial for high levels of renewables.

Indeed, ACWA Power' president and CEO Paddy Padmanathan, told RenewEconomy on the sidelines of the summit that solar thermal technology woud fall into "single figures" – meaning below 10c/kWh, or $100/MWh) within a few years. (More from that interview in coming days).



The 850MW Morocco tender includes five projects — the 150MW Tanger 2 in the northern part of the country, 300MW at Tiskrad, Laayoune, 200MW at Jbel Lahdid,100MW near Boujdour, and 100MW at Midelt.

Commissioning of the wind plants is expected between 2017 and 2020.

风能成本创新低：摩洛哥招标平均价 30 美元/兆瓦时

北非国家摩洛哥的风能成本已经取得了一个新低，其 850MW 大型风力发电项目招标的平均投标报价只有 30 美元/兆瓦时，最低值约为 25 美元/兆瓦时。

星期六，在阿布扎比召开的国际可再生能源峰会的部长级圆桌会议上，摩洛哥能源部长透露的定价创下一个世界风能定价新低，并受到了来自大西洋信风可观的风能资源和一些优惠融资条件的推动。

能源与环境部副部长 Abderrahim El Hafidi，描述这一结果是“非凡的”和“惊人的”，说它意味着能量生产的一个“真正的革命”。美国的一些报价已在 25 美元/兆瓦时上下，不过这些受惠于 30%的生产税收抵免。

直到十年前，摩洛哥所有的能源需求来自矿物燃料，但最近设定了至 2030 年实现 52%可再生能源的目标。除了风电场，摩洛哥还投资了大型太阳能场－包括太阳能光伏、储存太阳能塔，和弧型集热槽技术。

El Hafidi 没有确定最低的投标人，尽管十二月的报告中提到，由意大利 Enel Green Power 公司领导的一个集团，包括摩洛哥公司 Nareva Holdings 和涡轮制造商西门子公司作出了最低投标价，但当时没有指出具体价格。

其他竞标者包括西班牙的安迅能公司、法国的 EDF 公司与卡塔尔水电公司（QEWC）合作，摩洛哥 Fipar Holding of Morocco 公司和 Alstom Wind 公司；沙特 ACWA 公司，与 Gamesa 公司合作，和法国的 Engie

公司（黑兹尔伍德褐煤发电站所有者）和维斯塔斯公司。

这是两年来的第二次，国际可再生能源机构峰会见证了可再生能源技术成本的又一步飞跃。

去年，ACWA 电力公司以 58.40 美元/兆瓦时价格竞得 200MW 大型太阳能光伏发电站。这是那时世界上的最低价，尽管此价格后来在智利被投标者打破。

直到十年前，摩洛哥 98.9%的能源需求来自进口矿物燃料，当时石油贸易折合成本 100 美元/兆瓦时。

El Hafidi 说：“事情已经发生了很大变化，2009 年，风能和太阳能比例比矿物燃料，特别是比被视为廉价和蕴藏丰富的煤要高得多。”

“现在，我们的风电项目比煤更便宜。30 美元/兆瓦时的报价，而相比之下煤的成本是 80 美元/兆瓦时。”（作为一个观察者注意到以下的招标结果，即使煤炭是免费的，一个燃煤电厂也无法达到那些成本。）

El Hafidi 说：“是不是很神奇，我们对于我们能源未来和地球的未来的可再生能源对有信心。这是真的。这不是一个断言。”

国际可再生能源机构执行董事 Adnan Amin 说，摩洛哥定价结果在可再生能源技术的成本方面“显示了的显著变化和改变的步伐”。

Amin 说，有一个关于巴黎气候协议性质的冷嘲热讽，但这些观点误解了这个转变的发生的本质。

“在这里，我们有（已证明）解决方案在这里。问题是我们如何使之成为现实。”

30 美元/兆瓦时的价格换算成 43 澳元/兆瓦时-是远低于在澳大利亚的风电场报价记录，该记录是由澳大利亚政府组织的最近招标中设定的 77 澳元/兆瓦时。尽管那是 20 年内的固定价格，第一年的价格远低于此。

全球风能协会首脑 Steve Sawyer 说，低廉的价格反映了在摩洛哥的强风条件。

“这并不意味着发电成本 3C /千瓦时（30 美元/兆瓦时）的风无处不在。并不是这样。但在许多地方会有这样的风。他指出，巴西、中和美国部分地区会有这样的风。”

850MW 风电招标项目是摩洛哥实现 52%电力需求通过可再生能源填补的远大目标的一部分，在巴黎气候谈判期间提出的目标 42%的基础上进一步提升。

150MW Noor 集中太阳能发电厂太阳能发电厂（弧型集热槽）已开始发电-北非第一家。后续阶段将包括又一座弧型集热槽太阳能电厂，一座存储太阳能塔，和一个大型的太阳能光伏阵列。

Noor 电厂，也由 ACWA 电力公司承建，预计将在未来几天内正式揭牌。

El Habidi 说，弧型集热槽太阳能厂的第一阶段发电成本约是煤发电成本的三倍，但它是一个朝着存储和灵活性的关键的第一步，这对于高等级的可再生能源是至关重要的。

的确，ACWA 电力的总裁兼首席执行官 Paddy Padmanathan，在会议场外对 reneweconomy 网讲，太阳能热温技术在几年后会落入“个位数”－意味着低于 10C /千瓦时，或 100 美元/兆瓦时。（更多的关于那次采访内容几天后奉上）。

摩洛哥的 850MW 招标包括五个项目，在该国的北部 150MW Tanger 2 项目，阿尤恩地区 300MW 项目，在 Jbel Lahdid 200MW 项目，布支杜尔附近 100MW 项目，在米德勒特 100MW 项目。

风电厂的调试预计在 2017 年至 2020 年间。

Offshore Wind Developers Convinced Of UK Government Support

Offshore wind energy developers DONG Energy and Vattenfall are both “optimistic” that the UK Government will back offshore wind farms.

According to news from The Guardian, Danish wind energy giant DONG Energy is reportedly set to commit a further £6 billion in the UK by 2020, being convinced that the UK Government is serious about supporting the development of wind power within its borders. Swedish power company Vattenfall is similarly “optimistic” about the UK Government’s willingness to support wind development, and as has already been reported, is set to move forward with the 100 MW Aberdeen Offshore Wind Farm.

In December, Donald Trump — who had filed against the construction of the Aberdeen Offshore Wind Farm, saying that it was a blight on the landscape, near the planned Trump International Golf Club — had his Supreme Court appeal unanimously dismissed, allowing the Vattenfall-backed project to continue.

DONG Energy — which is in the midst of a number of projects being developed within the UK — was understandably skittish over the recent energy policy decisions made by the UK Government. However, according to Brent Cheshire, DONG Energy’s UK division chairman, those fears have since been allayed.

“It was a concern that it took as long as it did [for ministers to recommit to offshore wind] but we have now got it. I think there is the clarity we need to commitment to new investment,” he explained.

“We are optimistic about offshore wind and although we still think there may be potential investment opportunities onshore we are more cautious about that,” added a Vattenfall spokesperson.

海上风电开发商深信英国政府的支持

海上风能开发商 DONG 能源公司和 Vattenfall 都抱有“乐观”态度，即英国政府将支持海上风电场。

根据英国卫报的消息，丹麦风能巨头 DONG 能源公司据报道承诺到 2020 年在英国进一步投资 60 亿英镑，同时深信英国政府很认真的支持其境内的风电发展。瑞典电力公司 Vattenfall 公司也同样是“乐观”的，对于英国政府支持风电发展的愿意，同时已经被报道，计划推进 100 兆瓦的阿伯丁海上风力发电场。

去年十二月，唐纳德特朗普 - 曾投票反对阿伯丁海上风电场的建设，称这将对景观产生破坏，靠近规划的王牌国际高尔夫俱乐部 - 他在最高法院的起诉被一致驳回，这允许 Vattenfall 公司支持的项目继续进行。

DONG 能源 – 处于一批正在英国范围内进行开发的项目之中 – 对于英国政府最近做出的能源政策决策表现的有一点易于激动。然而，根据 DONG 能源公司英国分部总裁 Brent Cheshire 的说法，这些担心现在已经消除。

“这是一个问题，它确实花费了较长的时间[部长们重申致力于海上风电]，但我们现在已经得到了它。我觉得这是我们需要致力于新投资的清晰度，“他解释说。

“我们对海上风电保持乐观，尽管我们仍然认为有可能存在潜在的岸上投资机会，我们对此更加谨慎，” 一位 Vattenfall 公司发言人补充说。

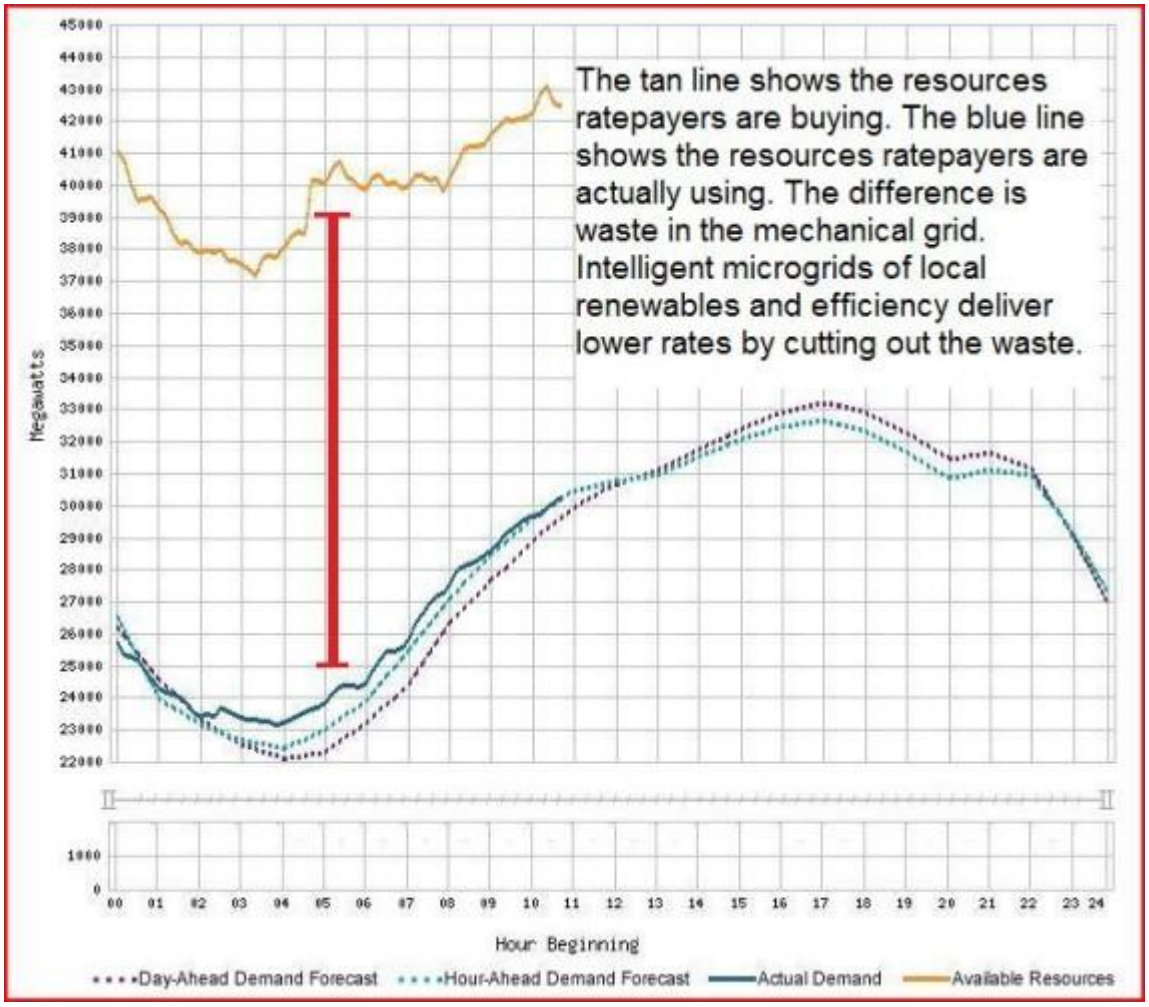
We Don’t Need Storage Today To Integrate Renewables

Today, storage is not widely used. Despite moderate renewable energy integration, places like Denmark and Germany use very little storage. In countries like Uruguay, even higher levels of renewables are used with little storage.

How so?

To understand, we need to look at how the grid works.

A system operator balances generation vs demand. Operators look at day-ahead demand curves. The expected vs actual demand can be plotted. You can see plots of day-ahead and hour-ahead demand here:



The operator plans the day-ahead generation to match predicted demand and holds some in reserve for unplanned outages. The generation is a mix of sources. If the sources are variable renewables like wind or solar, the prediction is based on forecasts. For now, in the majority of the world, flexible sources exist to compensate for variable renewables. Why? Take a look at that graph. Reserves are higher than demand. The total available generation must be higher than the annual peak demand in summer. That means there are a large number of power plants idle most of the year. That's why up to 40% renewables can be accommodated without any major changes.

We need to plan a major shift in energy infrastructure to renewables. What do we need to increase renewables integration? We need finance sources and approval streamlining. We need to reduce solar BOS costs.

We need better solar and wind forecasting to help match load and reduce reserves. Increased NREL funding can speed implementation of improved, taller wind turbines. Increases in transmission can reduce curtailment and allow connection from high-resource areas to load centers. Improved grid practices like "Energy Imbalance Markets" can allow neighboring ISOs to share power and resources more effectively and closer to real time, in 15-minute updates.

But what about those arguments about how solar and wind are not available for long times? Let's suppose we assume a very crude model of demand vs generation. Assume there are 2 weeks with no solar or wind on average everywhere. About 4% of generation. Now assume those two weeks are powered by the mothballed and shutdown FF power plants. How much carbon emissions is that? That is an overly simplified and certainly incorrect scenario. But it illustrates the point. Existing FF power plants can be used as reserves at low capacity factor. We wouldn't need 100% FF for those two weeks, either. We have dispatchable renewables like hydro, geothermal, and biomass.

Just as we do today, we can hold some wind and solar in reserve, as overcapacity. Added dispatchable renewables

like geothermal, hydro, and biomass combine to meet demand. When you look at it that way, storage is useful, but not critical.

The vast majority of Tesla storage will be used for utilities to replace gas peakers.

It will be at least a decade before meaningful amounts of grid storage will be needed to implement renewables. I think we need to shift the conversation from what energy will look like in 35 years, to what it takes to integrate renewables right now.

Demand management and transmission will be used to integrate renewables before storage becomes a bottleneck, for example, so advancing those markets and associated infrastructure is important now.

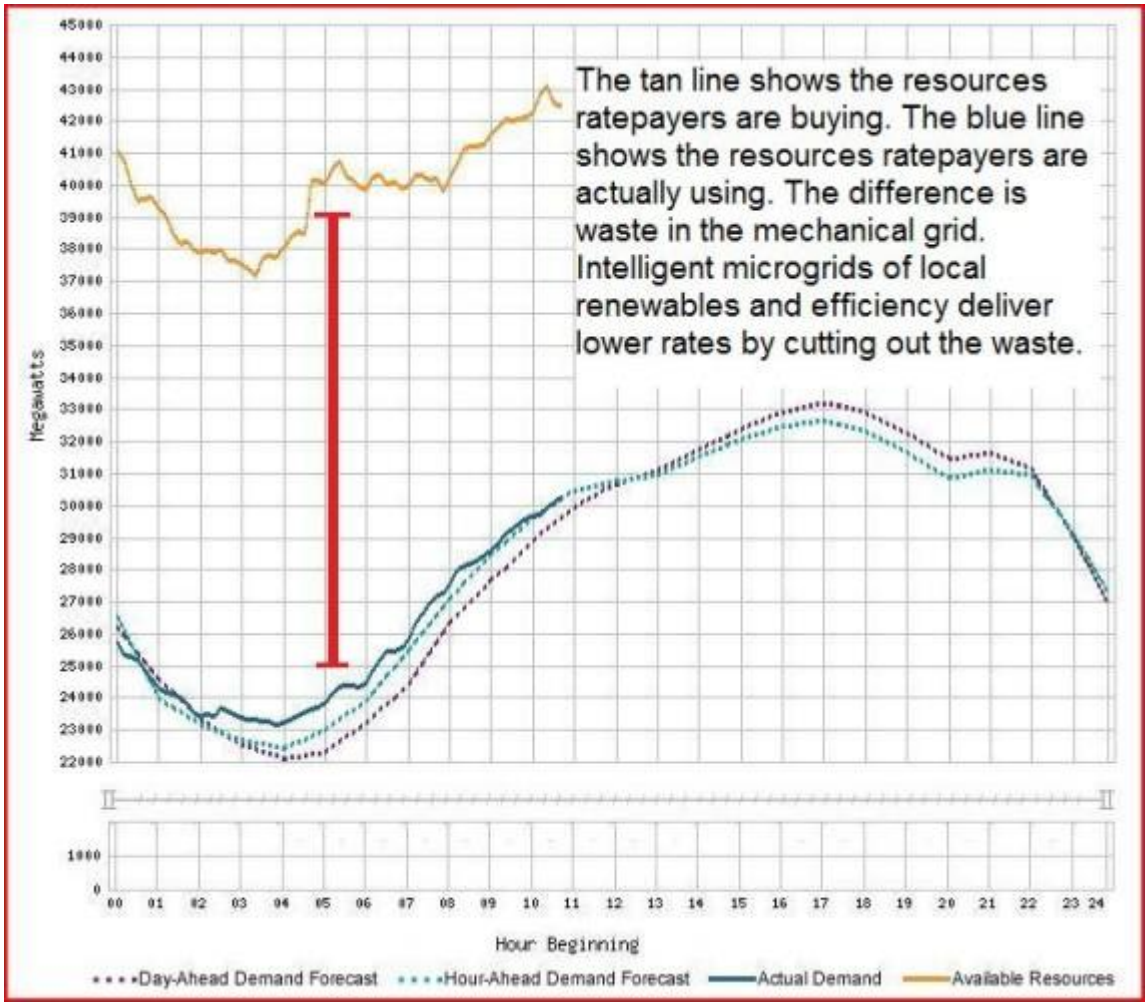
我们不需要储能来整合可再生能源

今天，储能没有被广泛使用。尽管可再生能源有适度的整合，但丹麦和德国等国家使用的储能相当少。像乌拉圭等国，甚至使用了更高水平的可再生能源，这些国家储能更少。

怎么会这样？

为了理解，我们需要看看电网是如何运作的。

一个系统运营商平衡了产出与需求。运营商关注于日前需求曲线。可以绘制出预期与实际需求（曲线）。在这里，你可以看到一天前和一个小时前的市场需求图：



运营商计划提前一天的发电量以满足预期的需求，并拥有一定的储备，预防计划外的中断。发电是各种资源的组合。如果资源是可变的可再生能源，如风能或太阳能，所述预测是基于预报。目前，在世界上

大多数的地区，灵活的资源存在来弥补可变可再生能源。为什么？看看那个图。储量高于需求。总体的可获得发电量必须高于夏季的年度需求高峰。这意味着有大量电厂在一年中的大部分时间闲置。这就是为什么高达 40%的可再生能源可以在没有任何大的变化的情况下被容纳。

我们需要计划可再生能源的能源基础设施建设的重大转变。我们究竟需要怎样增加可再生能源的整合？我们需要资金来源和审批精简。我们需要降低太阳能的 BOS 成本。

我们需要更好的太阳能和风能预测，以帮助匹配负载和减少储备。增加可再生能源实验室的资金可以加速性能改善的更高的风力涡轮机的实施。增加的传输可以减少削减，并允许资源丰富的地区与负荷中心进行连接。像“能量失衡市场”的改善电网做法可以让邻近的 ISOs 更有效的分享电能和资源，以及更贴近 15 分钟进行更新的实际时间。

但就太阳能和风能是如何不适用于长时间的一些争论，又是怎么回事呢？让我们设想，我们假设需求和产出的一个非常粗糙的模型。假设在每一个地方平均有 2 个星期没有太阳能或风能可见。大约为产出的 4%。现在假设这两个星期由被封存和关闭的 FF 电厂供电。那这样会有多少碳排放量？那是一个过于简化、肯定不正确的情况。但它说明了这一点。现有 FF 发电厂可以在低容量因子下用作储备。对于那两个星期我们不需要 100%FF，无论怎样。我们拥有可调度的可再生能源，像水能、地热能和生物质能。

正如我们今天所做的，我们可以因产能过剩，而进行一些风能和太阳能的储存。增加可调度的可再生能源（像地热、水电和生物质）的结合，以满足需求。当你看到这样的说法，存储是有用的，但不是关键。

特斯拉存储的绝大多数将用于公用事业，以取代天然气峰化器。

这将是至少十年，对于实现可再生能源需要具有实际意义数量的网格存储之前。我认为，我们需要转移关注点，从 35 年后能源看起来将是什么样子，转移到需要采取什么的措施整合那时的可再生能源。

需求管理和输送将被用于在存储成为瓶颈之前整合可再生能源，因此推动这些市场和相关基础设施现在是重要的。

Kauai Utility Uses IT Strategy To Help Achieve Renewable Energy Goals

The utility on the island of Kauai has selected Workspot, a cloud-based workforce solution to allow employees to work remotely and to use their own mobile devices in the field. Today, it is not uncommon to hear about utilities investing in solar power and perhaps even energy storage, but we don’t hear as much about their IT choices. Kauai Island Utility Cooperative (KIUC) has about 151 employees and over 30,000 electricity accounts. It also wants to develop much more renewable energy in the near and long-term future. Stephen Tangalin, a Network Specialist for KIUC, answered some questions for CleanTechnica.

You want to produce at least 50% of the island’s electricity by 2023 from solar, biomass, and hydropower. Will one of those be emphasized over the others, or will they all generate about 1/3 of the renewable energy?

We are making huge strides in solar, and are actively pursuing other technologies. The cost to fully implement renewable energy technologies is an important factor.

What imported fossil fuels do you use currently to generate electricity?

Diesel and naphtha.

By investing in more renewable energy, there is a concern with extra employee mobility. Is that because they will need to be in the field more at the sites with renewable energy technology?

Yes, we are experiencing an increased demand for secure connectivity to internal utility resources.

You say there are 1,400 miles of 57.1 kV transmission and 12.47 kV distribution lines owned and maintained by

the co-op. Will adding renewable energy require increasing that amount considerably?

We will try to locate new projects near existing substations as much as possible, however location and size of project will determine additional requirements.

What are some of the advantages of using the cloud-based Workspace system?

Zero footprint, zero maintenance, and reduced complexity.

Were your employees previously able to remotely access your IT systems?

Yes, however, we had zero BYOD allowance.

What are the benefits of using the Bring Your Own Device approach?

Increased productivity and appreciation from our user community.

How is using the cloud solution and BYOD approach helping you achieve your renewable energy goals?

The solution allows IT to quickly provide KIUC's workforce with mobility options on-demand.

Was there a training process for using the cloud technology and how was that managed?

Yes, Workspot's dedicated customer success team provided complete management and training guidance, and they set clear goals to achieve and progressively ensured our success. Workspot's team went the extra mile with the creation of a custom KIUC training video.

Is there another renewable energy goal for the utility looming after 2023, like achieving 75% by 2033?

The State of Hawaii has a goal of 100% by 2045.

That was the last question and answer, but it would also be very interesting to know what IT systems are being used on other Hawaii islands by each utility as well, and how they relate to the state's renewable energy goals.

考艾岛公用事业使用“IT 策略”实现可再生能源目标

考艾岛上的公用事业已经选定了 Workspot，这是一个允许员工使用自己办公室的移动设备远程工作的基于云计算的劳动力解决方案。如今，听到关于公用事业投资太阳能，甚至是储能，都不新鲜，但我们没有听说过他们的“IT 策略”选择。考艾岛公用合作社（KIUC）拥有约 151 名员工和超过 30000 的电力账户。它还希望在不久的将来开发更多的可再生能源。KIUC 网络专家 Stephen Tangalin 回答了一些关于清洁技术的问题。

到 2023 年，你想用太阳能、生物质能和水电生产至少 50%的岛屿电力。那么这三种能源之一将异军突起吗？或他们都将产生约三分之一的可再生能源吗？

我们在太阳能方面取得了巨大的进步，并在积极追求其他技术。全面实施可再生能源技术的成本是一个重要因素。

你现在使用的是什么进口矿物燃料发电？

柴油和粗汽油.

通过投资更多的可再生能源，引起人们对更多员工流动性的关注。这是因为在该领域他们需要更多有可再生能源技术的网站吗？

是的，我们对内部公用事业资源的安全连接需求正在增长。

你认为合作社拥有和保持了 1400 英里的 57.1 kV 和 12.47 kV 输电线路。增加可再生能源将需要大量增加输电线路吗？

我们将尽可能地在现有变电站附近寻找新的项目，但项目的位置和规模将决定补充技术条件。

使用基于云计算的工作空间系统的优点是什么？

零占用，零维护，降低复杂度。

以前你的员工能远程访问你的信息技术系统吗？

是的，但是，我们没有 BYOD 津贴。

使用“自带设备”方法的好处是什么？

提高生产力和得到我们用户群体的赞赏。

如何利用云计算解决方案、BYOD 方法帮助你实现可再生能源目标？

该解决方案允许 IT 快速地为考艾岛公用合作社的劳动人员提供按需移动的选项。

有没有云技术的使用培训，以及如何管理培训？

有的，Workspot 的专注客户成功团队提供完整的管理和培训指导，并设定明确的目标去实现，逐步确保了我们的成功。Workspot 的团队为了创作一个定制的 KIUC 培训视频付出额外的努力。

2023 后是否有另一个公用事业的可再生能源目标逐渐出现，例如到 2033 年完成 75%？

夏威夷州的目标是到 2045 年完成 100%。

这是最后一个问题和答案。知道 IT 系统在别的夏威夷群岛的每个公用事业被用来做什么，以及它们如何与国家的可再生能源目标协调，也是很有趣的。

Denmark Plans Wind Energy Investment In Iran

Another European country has expressed intentions to support the development of the renewable energy sector in Iran.

The Iranian Energy Minister recently reported that Denmark has expressed an interest in developing a wind turbine manufacturing facility in the Middle Eastern country. Minister Hamid Chitchian told media agencies that Denmark is looking to build a manufacturing hub in Iran from where it can export the wind energy equipment to other countries in the region.

Chitchian had earlier revealed that Iran is looking to develop 5 GW of solar and wind energy capacity by 2018. Following fruitful multilateral negotiations regarding Iran’s nuclear energy program, several countries, mainly from Europe, offered their assistance in developing renewable energy infrastructure throughout Iran.

Last year, the Iranian news agency, Mehr, reported that a German company is planning to set up 1.25 GW of solar power capacity in various provinces of the country.

A consortium of Iranian, Indian, and South Korean companies also announced plans to develop an energy park in the Khuzestan province in a $10 billion project consisting of 1 GW of solar power capacity. Also, German companies are expected to begin building wind farms in Iran from next year. Azerbaijan and Spain have also expressed interest in setting up renewable energy projects in Iran.

丹麦计划在伊朗投资风能

另一个欧洲国家已经表示了支持伊朗可再生能源领域的发展的意愿。

伊朗能源部的部长日前报道称，丹麦已经表示有意在这个中东国家中开发风力涡轮机制造工厂。部长哈米德•奇珍告诉媒体机构，丹麦将在伊朗建造一个制造中心，其能够从这个制造中心向该地区的其他国家出口风能设备。

奇珍早些时期曾透露，伊朗希望在 2018 年以前开发 5GW 的太阳能和风能容量。继有关伊朗核能源计划富有成效的多边谈判之后，好几个国家，主要来自欧洲，在整个伊朗开发可再生能源基础设施的过程中提供了援助。

去年，伊朗新闻社，梅尔日报道称，一家德国公司预计在该国多个省份建设 1.25GW 的太阳能发电能力。

伊朗、印度和韩国公司组成的一个集团也宣布计划，在胡齐斯坦省以一个由 1GW 太阳能发电能力组成的价值 100 亿美元的项目中开发一个能源公园。此外，德国企业预计从明年开始在伊朗修建风电场。阿塞拜疆和西班牙也对在伊朗建设可再生能源项目表达了兴趣。

Natural Gas（天然气）

Pakistan ready with last part of LNG pipeline link to Iran

Pakistan is ready to complete the short final pipeline spur that would enable it to import natural gas from Iran once sanctions are lifted, according to the head of one of Pakistan's state energy companies.

"In the very near future we expect delegations from the two countries to meet," said Zahid Muzzafar, the chairman of Oil and Gas Development Company, which is government-controlled, but has publicly traded shares on the Karachi and London exchanges.

"Once we get the right signals from the international community and our own government's decision we are all set to build that pipeline," Mr Muzzafar said, referring to the expected lifting of international sanctions related to Iran's nuclear programme that have restricted its oil and gas exports since 2011. Final clearance is expected this month.

The pipeline spur would run from Pakistan's port city of Gwadar, where it has nearly completed its first liquefied natural gas (LNG) intake plant, to Iran's border 80 kilometres away. Pakistan has a rapidly growing need for natural gas and is also building a pipeline from Gwadar to the middle of the country as part of a network of pipelines that will include supply via Turkmenistan–Afghanistan–Pakistan–India Pipeline, or Tapi.

Pakistan has long-term aims to be an energy transit country uch as Turkey, which connects central Asian oil and gas supplies to Europe and the rest of the world via pipelines that include the one that terminates at the Mediterranean port of Ceyhan. Pakistan's strategy would link supplies in central Asia, including Turkmenistan, as well as Iran – which rivals Russia as the world's largest holder of gas reserves, to the huge markets in China and India, as well as serving its own growing demand.

Mr Muzzafar said additional supplies from Iran can be linked into the system that is being developed currently, which includes a US$2.5 billion project to complete the LNG terminal at Gwadar and pipeline it 700km to Pakistan's mid-country, terminating at Nawabasah.

First LNG cargo was bought on the spot market from Qatar. Pakistan has tendered for 60 cargoes over five years. Mr Muzzafar said, and the first successful bidders were Gunvor, a Russian-owned trading house, and Royal Dutch Shell.

The China-Pakistan Economic Corridor, a $46bn multi-pronged mega project, plans to link Gwadar, Khuzdar and other western Pakistan areas via roads, rail and pipelines to Dera Ghazi Khan, Dera Ismail Khan and Peshawar in the east, and onto the western Chinese city of Kashgar, 3,000km away.

巴基斯坦准备好与伊朗连接的最后一部分天然气（LNG）管道

据巴基斯坦国有能源公司的一位负责人表示，巴基斯坦准备完成令其能够在制裁解除之后从伊朗进口天然气的最后的短线管道支线。

“我们预计，这两个国家的代表团在不久的将来会举行会面，”石油和天然气开发公司的董事长扎希德•穆扎法尔表示。该公司虽然是政府控股公司，但是其在卡拉奇和伦敦交易所拥有公开交易的股票。

“一旦我们从国际社会以及我们自己的政府决策中获得正确的信号，我们就准备好修建这一管道，”穆扎法尔表示，他指的是预计对自 2011 年以来与伊朗核计划有关的限制其石油和天然气出口的国际制裁的解除。最后的许可预计在本月颁布。

管道支线将从巴基斯坦的港口城市瓜达尔开始，在该城市中，其第一个液化天然气（LNG）进气工厂几乎已经完成，一直到达八十公里以外的伊朗边境。巴基斯坦对天然气具有快速增长的需求，并且其还建设了一条从瓜达尔到该国中部的管道，作为通过土库曼斯坦-阿富汗-巴基斯坦-印度管线或 Tapi 供应的管道网络的一部分。

巴基斯坦的长期目标是成为一个像土耳其一样的能源过境国，其通过包括一条接气站在地中海杰伊汉港口的管道将中亚的石油与天然气储备物资与欧洲及世界其他地区连接在一起。巴基斯坦的战略将令中亚的储备物资，包括土库曼斯坦以及伊朗——它们的竞争对手是世界上拥有最多天然气储量的俄罗斯，与中国和印度的巨大市场相连，以及满足其日益增长的需求。

穆扎法尔表示，从伊朗获得的额外储备能够与目前正在开发的系统连接在一起，该系统包括一项价值 25 亿美元的项目，完成瓜达尔的 LNG 接气站以及修建其到巴基斯坦中部地区的长约 700 公里的管道，终止于 Nawabasah。

第一批 LNG 货物是从卡塔尔的现货市场中购买的。巴基斯坦在过去的五年中已经出让了 60 批货物。穆扎法尔表示，第一位成功的投标人为俄罗斯国有贸易公司贡沃尔和荷兰皇家壳牌公司。

中国-巴基斯坦经济长廊，一个价值 460 亿多管齐下的大型项目，其计划通过公路、铁路及管道将瓜达尔、胡兹达尔和其他巴基斯坦西部地区与东部的德拉加齐汗、德拉伊斯梅尔汗及白沙瓦连接在一起，并且与 3000 公里之外的到中国西部城市喀什相连。

California’s mammoth methane leak shows climate risks of natural gas

The methane leak from a gas well in green-minded California underlines the need for tougher global curbs on natural gas, writes Mark Brownstein of the Environmental Defense Fund

California is still reeling from the impact of a huge leak that began late last year of natural gas and methane, a highly potent greenhouse gas (GHG). The leak prompted a state of emergency and calls for a crackdown on the fossil fuel industry.

In October 2015, a massive natural gas storage facility operated by SoCalGas in Southern California’s Aliso Canyon sprung a leak approximately 400 feet (121 metres) underground, resulting in a major health risk for nearby residents.

So far, 2,600 families have temporarily fled their homes because of the sickening smell of the gas, and 2,700 more families have applied for relocation.

Although the impact to the community located next to the facility is apparent, it’s hard to comprehend the size of the leak and the damage it is causing to the climate because methane is invisible to the naked eye. Recent infrared video released by EDF, however, displays the invisible methane as billowing black smoke covering the San Fernando Valley like a never-ending dumpster fire. More than a million YouTube views later, the image is hard to ignore or deny.

Initial estimates showed the leak was pumping out about 62 million cubic feet of methane each day, which is equal to the daily near-term climate damage caused by 7 million cars. The leak from the Aliso storage well

accounts is equivalent to a quarter of the state's total GHG emissions. By reducing the pressure underground, the utility has been able to cut the leak rate by almost half, but it's still creating serious environmental harm every day that it continues.

Over the years, California has been trailblazer in renewable energy and other environmental initiatives, including a 50% renewable energy goal by 2030 and efforts to cut its GHG emissions to 1990s levels by 2020. This one leak, however, will amount to a big increase in California's GHG emissions, putting a big dent in those efforts.

Turning point?

Aliso Canyon is a dramatic example of a problem that's happening every day across the US at every stage of the oil and gas supply chain, from wellheads to the local utility lines under city streets. A series of scientific studies that have looked at methane emissions across the country's natural gas supply chain lead to a single conclusion: leaks, equipment failures, and malfunctions are a major reason why the oil and gas industry is the largest industrial source of methane pollution in the US.

Certainly, most leaks in the US aren't as big as Aliso Canyon. But they add up. More than 7 million tonnes of methane are emitted from the nation's natural gas infrastructure each year. Most leaks go undetected because no one is required to look for them.

Fortunately, the US may be at a turning point with methane. Last year, the Obama administration made methane reductions a key part of its climate initiative. Academic researchers – including many sponsored by EDF – are conducting groundbreaking research to quantify methane leak rates and develop leak detection technology and policies. EDF's partnership with Google Maps allows people to see street-level methane leaks from gas infrastructure in cities across the country.

Carbon footprint

But, the problem isn't just limited to the US. A recent report showed that worldwide, oil and gas emissions released approximately 3.5 trillion cubic feet (Tcf) of natural gas into the atmosphere in 2012. That's the same near-term climate impact as emissions of 40% of total global coal combustion.

Because natural gas burns cleaner than coal, it has been touted as a cleaner energy alternative. Yet the thousands of small methane leaks occurring at all stages of the oil and gas supply chain undermine the climate advantage natural gas can provide -- the 7 million tonnes of methane that leaks from the US oil and gas supply chain each year has the same 20-year climate impact as 160 coal-fired power plants.

It is now understood that we must fix the methane problem. That's a critical first step. But we can't fix what we don't measure. Therefore, one of the most basic and logical requirements of a long-term solution is requiring regular and systematic monitoring of natural gas infrastructure. This is relevant not just for large, catastrophic leaks like Aliso Canyon, but also for the thousands of smaller, less dramatic leaks across the supply chain that add up to massive amounts of leaked methane.

US climate policy

If the US is to answer the clarion call of the Paris climate Agreement, it must reduce its methane emissions, not just from large disasters such as Aliso Canyon, but also from the thousands of silent, invisible and undetected leaks across the country's natural gas infrastructure. Because of its potent warming power and the cost-effective solutions available to reduce oil and gas methane emissions, tackling this pollution is one of the greatest opportunities to reduce the warming we're feeling today.

A 45% reduction in global oil and gas methane emissions will have the same impact on the climate over 20 years as closing one-third of the world's coal plants. As other countries take their own steps to follow up on Paris commitments, they should also take note of the GHG reduction opportunity methane presents.

We are hopeful that the enormity of Aliso Canyon will spur meaningful action in Washington DC and energy producing states in the US. Because without sensible and strict rules and regulations, this will happen again. And

without comprehensive methane policies for new and existing natural gas facilities, millions of tonnes of climate-harming methane will continue to leak each year.

加州甲烷泄漏凸显天然气气候风险

颇具绿色思维的加州发生了甲烷泄漏，这一事件加强了采取全球性措施遏制天然气的必要性。

时至今日，加利福尼亚仍然没有摆脱去年底天然气大泄漏造成的影响，泄漏出的甲烷是一种强烈的温室气体，事故不仅导致当局宣布进入紧急状态，还让人们看到了取缔化石能源产业的必要性。

2015 年 10 月，南加州燃气公司位于加州南部阿里索峡谷的一口储气井在地下约 400 英尺（121 米）的地方发生泄漏，周边居民的健康受到巨大威胁，超过 2000 户家庭被迫疏散。

南加州燃气公司表示，泄漏仍将持续几周，周边社区仍处于恐慌。加州州长杰瑞·布朗宣布进入紧急状态，并要求州政府官员对州内其他天然气储存设施制定新规。

除了迫在眉睫的健康威胁之外，泄漏对气候的影响不可估量。甲烷是一种非常强烈的温室气体，进入大气的头 20 年，它的温室效应是二氧化碳的 84 倍。减少全球油气产业的甲烷排放已经被国际能源署列为 2020 年实现全球温室气体排放增长拐点的五大具体措施之一。

尽管泄露对储气井附近社区的影响显而易见，但由于肉眼看不见甲烷，其泄露的规模和对气候的影响难以估量。不过，美国环保协会最近发布的一段视频中，甲烷燃烧冒出的滚滚黑烟却清晰可辨，笼罩了整个圣费尔南多山谷，就像一场永不熄灭的垃圾站火灾。这段视频在网上获得了上百万的点击量，其影响已无法被忽视也无法被否认。

关于甲烷泄漏量的初步估计是每天约 6200 万立方米，相当于 700 万辆汽车每天造成的短期气候破坏。从总量上看，阿里索储气井的排放相当于加州温室气体排放总量的四分之一。目前，通过降低地下压力，南加州燃气公司已经将泄漏速度降低了将近一半，但在泄漏持续期间，每天仍会造成严重的环境损害。

过去这些年，加州一直是可再生能源和其他环境行动的开拓者，包括 2030 年可再生能源占比达到 50% 的目标，以及 2020 年让温室气体排放回落到 90 年代水平的目标。但是，这次的泄漏让加州的温室气体排放量大幅增加，过去的努力大打折扣。

拐点？

阿里索峡谷泄漏事件是一个典型的例子，集中反映了时刻存在于美国油气供应链各个环节（从井口到城市街道下的供气管道）的一个突出问题。对美国全国天然气供应链的甲烷排放进行的一系列科学研究获得了同一个简单结论：泄露、设备故障和设备失灵是导致油气产业成为美国最大甲烷工业污染源的主要原因。

当然，美国大多数的泄漏规模没有阿里索峡谷这么大，但累计总量惊人，美国天然气设施每年的甲烷泄漏总量高达 700 万吨。因为没有进行调查的要求，大多数泄漏不为人知。

值得庆幸的是，美国可能正处在解决甲烷问题的拐点上。去年，奥巴马政府将减少甲烷泄漏列为其气候行动的一个关键部分。学者们（包括许多美国环保协会资助的学者）正在进行突破性的研究，对甲烷泄漏速度进行量化并完善泄漏探测技术和政策。其中，美国环保协会与谷歌地图的合作可以让人们看到全国各城市天然气基础设施的泄漏情况，具体细化到街道。

碳足迹

但是，问题并不限于美国。最近的一份报告显示，2012 年全世界油气泄漏造成约 3.5 万亿立方米天然气被排入大气，其短期气候影响相当于全球煤炭燃烧排放的 40%。

由于天然气燃烧比煤炭更加清洁，它一直被视作较为清洁的替代能源。然而，油气供应链各个环节成千上万的小型甲烷泄漏让天然气的气候优势不复存在。美国油气供应链每年泄漏 700 万吨甲烷，其影响与 160 座燃煤电站运营 20 年造成的气候影响不相上下。

现在我们必须解决甲烷问题。这是关键的第一步。但是，如果不进行计量，我们无法确定其规模。因

此，解决问题的长久之计，同时也是最基础也最符合逻辑的要求之一就是对天然气基础设施进行常态和系统的监控。这不仅仅针对阿里索峡谷这样的大规模泄漏，还包括供应链上成千上万规模较小、不引人注目的泄漏，它们的总量很惊人。

美国气候政策

如果美国要响应巴黎气候协议的号召，就必须减少甲烷排放，不仅包括像阿里索峡谷这样的大规模泄漏，也包括全国天然气基础设施各个环节悄无声息、无法看到、不为人知的成千上万起小规模泄漏。由于甲烷的温室效应强大，解决甲烷排放办法成本低廉，消除这一污染将是遏制目前变暖趋势的最佳机遇之一。

减少全球 45%的油气甲烷排放，对气候的积极影响相当于将世界三分之一的燃煤电厂关闭 20 年。其他国家在采取措施兑现巴黎气候协议承诺时，也应该注意甲烷带来的温室气体减排机遇。

我们希望阿里索峡谷的悲剧能够激发美国联邦政府和那些能源生产州采取有力的行动。如果没有合理严格的规章制度，这一悲剧还会重演。如果不对新建和现有的天然气设施制定全面的甲烷政策，每年还会有数百万吨甲烷泄漏从而破坏气候。

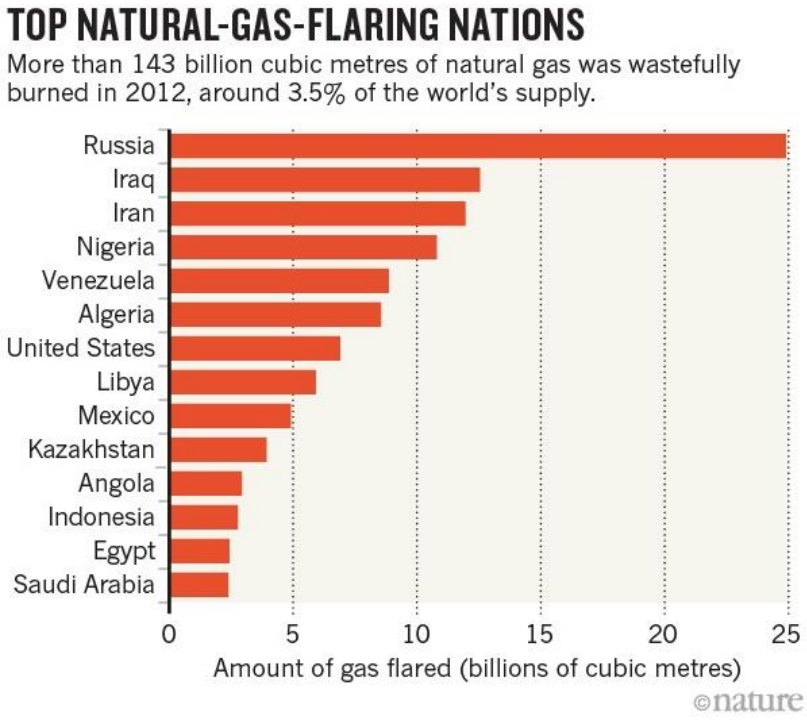
'Flaring' wastes 3.5% of world's natural gas

Satellite measurements track burned gas by country as policymakers seek to reduce emissions.

Around 3.5% of the world’s natural-gas supply was wastefully burned, or ‘flared’, at oil and gas fields in 2012, according to the latest estimates from satellite data1.

The United States has the greatest number of flares, but Russia leads the world in the total volume of flared natural gas (see chart, 'Top natural-gas-flaring nations'). In 2012, the 143 billion cubic metres of gas flared led to the emission of more than 350 million tonnes of carbon dioxide, around 10% of the annual emissions of European Union member states.

Estimates for later years have yet to be published. But a preliminary analysis suggests that the overall volume of gas flared has remained fairly constant, says Christopher Elvidge, a remote-sensing specialist who leads a team at the US National Oceanic and Atmospheric Administration (NOAA) in Washington DC that collects gas-flaring data.



Flaring is common in oil and gas fields because producers deem it faster and cheaper to burn natural gas than to capture and use it, typically because they lack pipelines to economically transport the gas to market. But official data on the extent of the practice are scarce.

In a 25 December paper, the NOAA researchers report tracking flares using an instrument aboard a NASA weather satellite that takes images of Earth in infrared and visible light1. (Previously, the team had used images from a US Air Force defence satellite, but a degradation in the satellite's orbit made it impossible to collect accurate global data on gas flaring).

"Flaring is an unproductive waste of a valuable, non-renewable resource and a significant source of carbon dioxide and methane emissions," says Bjørn Håmsø, who manages the Global Gas Flaring Reduction Partnership at the World Bank in Washington DC.

The World Bank aims to end routine gas flaring at oil production sites around the world by 2030, in an initiative launched last year. Some 45 governments, organizations and oil companies had signed up to the plan by the end of the international climate negotiations in Paris.

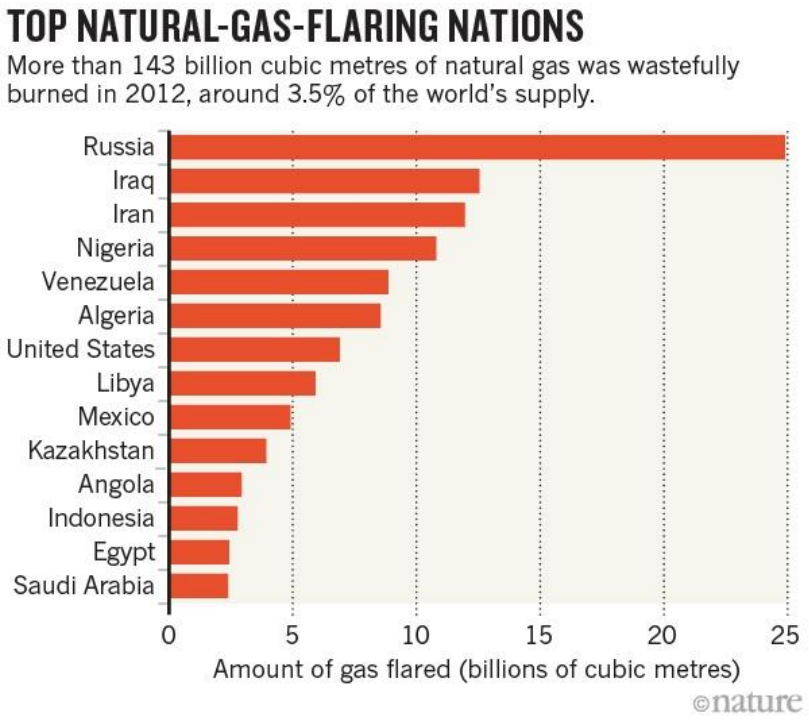
High-quality national estimates, with detail on how much natural gas is being burned off where, will help governments to implement policies to reduce flaring and track progress, Håmsø says. Estimates for subsequent years are expected to be published in the next few weeks.

"突然爆发"浪费了 3.5%的全球天然气

卫星测量在政策制定者想要降低排放时按国家追踪了燃烧废气。

据卫星数据的最新估计显示，在 2012 年的石油及天然气领域，全球大约有 3.5%的天然气储备被浪费燃烧了，或是"突然爆发"。

美国拥有最多次数的突然爆发，但是俄罗斯在突然爆发的天然气总量方面占据领先地位（见下图，"天然气突然燃烧国家排行榜"）。在 2012 年，1430 亿立方米的天然气的突然爆发造成了超过 3.5 亿吨的二氧化碳的排放，大约为欧盟成员国年度排放量的 10%。



今年几年的评估预计尚未公布。但是，初步的分析表明，天然气突然燃烧地总量一直保持得相当稳定，在美国华盛顿特区的美国国家海洋和大气管理局（NOAA）领导一组研究小组收集废气燃烧数据的遥感专家克里斯托弗•埃尔维奇表示。

突然燃烧在石油和天然气领域非常常见，因为生产者认为燃烧天然气比捕获及使用它更加快速及廉价，通常是因为他们缺乏经济性地向市场运输天然气的管道。但是有关该实践的程度的官方数据非常稀少。

在 12 月 25 日的文章中，NOAA 的研究人员的报告利用 NASA 以红外线和可见光拍摄地球图片的气象卫星上的一个仪器追踪了突然爆发。（此前，该研究小组已经利用了美国空军国防卫星拍摄的图像，但是卫星轨道的降低令其无法收集天然气燃烧的全球精确的数据）。

“燃烧是对一种宝贵的不可再生的资源非生产性的浪费，并且是二氧化碳和甲烷排放量的重要来源，”在华盛顿特区世界银行管理全球天然气减少燃烧伙伴关系的比约•汉姆桑表示。

世界银行在去年推出的一项倡议中表示，其目的是到 2030 年结束世界各地石油生产基地常规天然气的突然燃烧。大约有 45 个政府、组织及石油公司在巴黎举行的国际气候谈判结束之前签署了该计划。

高品质的国家估计，其中包含有关该国有多少天然气被燃烧掉的详细数据，将有利于政府实施政策以减少燃烧以及跟踪进度，汉姆桑表示。有关今后几年的估计预计会在接下来的几个星期内公布。

Minerals（矿产）

Chinese steel imports push mills to brink of ‘catastrophe’

Union leaders have warned the government that Britain’s steel industry faces “catastrophe” unless ministers block Chinese attempts to achieve “market economy status” at the WTO later this year.

The warning came as Britain’s biggest steelmaker said it was cutting more than 1,000 jobs, prompting recriminations that the UK was failing to stand up for the steel industry in the face of a deluge of cheap Chinese imports.

Tata Steel said 750 positions would go at its Port Talbot plant, the UK’s biggest steelworks by output and workforce, along with 100 jobs at mills in Trostre, Corby and Hartlepool and 200 support roles.

The decision underlines the evisceration of Britain’s steel industry, which during the past year has either shed or outlined plans to cut more than 6,000 jobs from a workforce that was 30,000-strong at the start of 2015.

It also feeds into a roiling debate over China’s place in the global economy as Beijing pushes for market economy status at the World Trade Organisation.

英国工会：中国钢材令英国钢铁业面临“灾难”

英国工会领导人警告政府，如果政府官员们不能阻止中国在今年晚些时候获得世界贸易组织(WTO)“市场经济地位”，英国钢铁业将面临“灾难”。

发出这一警告之际，英国最大钢厂宣布将削减 1000 多个工作岗位，此举引发指责称，面对中国低价倾销的洪流，英国政府未能维护钢铁业的利益。

英国以产量和员工队伍计最大的钢厂塔塔钢铁公司(Tata Steel)表示，塔尔博特港钢厂将裁减 750 个岗

位，特罗斯特尔钢厂、科比钢厂和哈特尔浦钢厂将裁掉 100 个岗位以及 200 个辅助岗位。

这一决定突显了英国钢铁业遭到的重挫，2015 年初时钢铁业就业总人数为 3 万人，过去一年该行业已裁减或宣布计划裁减 6000 多个工作岗位。

该决定还为围绕中国在全球经济中的地位的激烈辩论提供了素材，北京正争取在世贸组织获得市场经济地位。

Trident security fears scupper steel deal with China

Ministers blocked Sheffield Forgemasters, the troubled steelmaker, from reaching a rescue deal with Chinese investors on national security grounds.

The company, which announced on Tuesday it was shedding up to 100 jobs, had been in talks with an unnamed Chinese state-owned group when it was informed before Christmas that the government would oppose the deal.

The Ministry of Defence, in particular, was against it because Sheffield Forgemasters makes parts for the submarines that carry the Trident nuclear missiles: its pressure cylinders surround the reactors on the vessels.

The revelation illustrates the limits to the UK's "access all areas" policy towards China, even as George Osborne has enthusiastically pursued Chinese investment into British infrastructure. For instance, the chancellor has welcomed a multibillion-pound investment into a proposed nuclear power station at Hinkley Point.

Mr Osborne has also raised hopes of Chinese involvement in an array of projects including the High Speed 2 rail link, saying there is a "powerful free trade doctrine" underpinning relations between the UK and Beijing.

Sheffield Forgemasters revealed it was laying off workers as it recorded its first loss for more than a decade, blaming a slowdown in the oil and gas sector, and the global collapse in steel prices.

The announcement is the latest bad news for the British steel industry, which is shedding thousands of jobs amid a global supply glut.

The group told the Financial Times it was still seeking external investment but could not comment further.

"Seeking external investment to restructure the business has always been fundamental to securing Forgemasters' future and is part of a long-term strategy," said Graham Honeyman, chief executive.

"This process will continue and until any talks with potential investors have reached a conclusion, all details of those discussions will remain confidential."

One person familiar with the talks said any agreement with the Chinese had been more likely to be a "technology transfer deal" than an equity sale.

英政府阻止一项英中救助协议

英国政府以国家安全为由阻止了陷入困境的钢铁企业——谢菲尔德铸锻集团(Sheffield Forgemasters)与中国投资者达成救助协议。

周二，谢菲尔德铸锻集团宣布正在裁减多达 100 个工作岗位。该集团早已在与一家未披露名字的中国国有集团进行谈判，但在圣诞节前夕被告知英国政府将反对这项交易。

英国国防部(Ministry of Defence)尤其反对该交易，因为谢菲尔德铸锻集团为携带三叉戟(Trident)核导弹的潜艇制造部件——包裹潜艇反应堆的压力容器。

这一事件显示了英国对华"开放所有领域"政策的局限性，即便财政大臣乔治•奥斯本(George Osborne)一直在积极寻求中国对英国的基础设施进行投资。例如，奥斯本已经对中国在拟议中的欣克利角(Hinkley

Point)核电站投资数十亿英镑表示欢迎。

奥斯本还为中资企业参与包括 2 号高铁(High Speed 2 rail link)在内的一系列项目燃起希望。他表示，英中关系拥有一种“强大的自由贸易理念”作为支撑。

谢菲尔德铸锻集团透露之所以会裁员，是因为十多年来首次出现了亏损，并将此归咎于石油和天然气产业低迷，以及钢材价格的全球性暴跌。

这份声明是对英国钢铁业的最新打击，由于全球供应过剩，英国钢铁业正裁掉数千个工作岗位。

谢菲尔德铸锻集团对英国《金融时报》表示，该公司仍在寻求外部投资，但无法进一步置评。

首席执行官格雷厄姆•霍尼曼(Graham Honeyman)表示：“寻求外部投资以重整业务一直是保障公司未来的根本，也是一项长期战略的一部分。”

“这一进程将会持续，直到与潜在投资者的谈判得出结论，讨论的所有细节将会保密。”

一位知情人士表示，与中国投资者达成的协议更接近于“技术转让协议”，而不是股权转让。

Clean Energy（清洁能源）

Carbon trading in China unlikely to go national by 2017

China’s aim is to cover 4 billion tonnes of emissions (of carbon dioxide equivalent, or CO2e) in its national carbon market from “early 2017”, making it by far the world’s biggest greenhouse gas trading market. China intends that all the provinces will be covered under the scheme from the outset.

We argue that this grand goal is subject to China’s legislative process and technical capacity from private sectors, and major issues need to be addressed before a functional nationwide market is plausible. We expect Chinese carbon regulators will miss the target and a national market covering all provinces will not take shape in the next 24 months.

At this point, it’s worth posing the question why a rollout of China’s carbon trading scheme matters. Firstly, it has almost become a cliché that carbon emissions will only drop when China cuts coal consumption, a step that echoes the nation's more urgent combat against air pollution.

In addition, in the aftermath of the Paris climate agreement, the roll-out of the national scheme can also enhance the transparency of China’s climate change policy implementation, which will inevitably scrutinised by the international community before a ‘global stocktake’ of countries emissions in 2018.

And thirdly, if we look at China’s economic development during the last 30 years, it is evident that the country’s most competitive and proliferating sectors are those driven mainly by market forces and competitions instead of state controls.

China’s plans for a national carbon trading scheme came under sharper focus at UN climate talks in Paris, and the main news to come from the China pavilion was comments from a top climate change official that the national carbon market will start early 2017. Specifically, the market will cover all the provinces and nearly 10,000 companies from six sectors and 15 sub-sectors.

Another Chinese official also said in Paris that the carbon market has to be “tight” to be meaningful to China’s emissions reduction pathway. But we are asking: how likely is it for Chinese authorities to launch a tight carbon market covering 10,000 companies by 2017?

Is political support sufficient for a successful scheme?

Globally, China’s political support for carbon markets is only matched by the EU. The prospect of a national

carbon market has drawn media attention since June 2013, when the first pilot started in Shenzhen. To launch its national scheme by early 2017 China has less than 18 months to finish all of the building blocks to implement a meaningful carbon market.

While there is no doubt that all relevant regulatory bodies support the establishment of a national scheme – especially since President Xi Jinping backed it in September –a heavy of workload needs to be completed to process legislative formation after the grand target is announced.

To begin with, any scheme in China requires an official legislation to be enforceable. Although a draft regulation was leaked in September 2015 right before President Xi's visit to the US, it was rather abstract and lacked detailed market specifications. Generally speaking, the carbon legislative process is at best murky to outsiders, even without a tentative timeline.

Theoretically, the legal effect of the carbon market depends on the exact form of the legislation adopted, and there is no guarantee that carbon legislation will be in the same form as the drafted regulation. Draft carbon regulation is vague on how the carbon market will operate and when it will be implemented.

However, two certainties can be highlighted.

The legislative process is likely to be lengthy as it involves various regulatory bodies, probably spearheaded by the National Development and Reform Commission (NDRC), and with involvement of the Ministry of Finance to the China Securities Regulatory Commission. In addition, any uncertainties or structural changes within any of the relevant government bodies may inevitably delay the law-making process.

From an optimistic perspective, however, the authorities may go swiftly through the legal formation process, which will clearly be the biggest political impediment to a 2017 national carbon market.

Nevertheless, the legislative process is by no means the only political challenge faced by the authorities. One top climate change bureaucrat in the NDRC has said the cap of the national scheme will be more stringent than the country's overall emission intensity reduction targets for 2020 and 2030.

This sounds reasonable, and is similar to the case in the EU ETS in which covered sectors (power generation, heavy industry) also face higher reduction targets than sectors outside the carbon market (such as transport and agriculture). In reality, it is rather complicated to set both the stringency of the overall market and to distribute allowances among the 15 sectors slated to be covered by the market.

Since 2014, the NDRC has demanded companies in more than 10 sectors to start submitting emissions data. Once again, the actual implementation on the ground and compiled data reported to the central government are both outside of public scrutiny.

Experience from other mature carbon markets such as EU ETS has proven that without sufficient quality of historical emissions data, the market is prone to be over-allocated. In sum, the allocation process – key element in any carbon scheme – is subject to many uncertainties.

Therefore, many questions marks are yet to be answered about how a high level market will be set, though the political support is here to stay.

Market distortion?

It is well-known that in China government policies are subject to abrupt changes that are often in force immediately after publication. As a policy-derived market, carbon is especially vulnerable to this.

Already offsets buyers in Tianjin swallowed a bitter pill in May when local authorities unexpectedly issued a notice that scrutinised eligibility of carbon offsets in the local pilot two months ahead of the compliance deadline.

There is speculation that some companies purchased ineligible offsets before the notice, though no subsequent official announcement regarding the offsets submitted for compliance was made to the public after the compliance deadline.

Presumably, the national carbon market will display more political certainties than the current fragmented pilots to market players.

Before the national scheme goes operational, however, no one can ascertain that similar drama won't be repeated in the run up towards the scheme's launch. This uncertainty can substantially jeopardise market confidence and thus deter interest in the carbon sector.

From the pilot schemes, another lesson is to take official words – even those inked on papers – with a grain of salt.

One case in point regards auctions in the existing pilots. Despite being mentioned in several pilots as a supplementary source of allowance allocation, only the Guangdong pilot held auctions during the second compliance year, and even there the auctioned volumes were watered down from previous announcements due to poor market reception.

Since such underlying risk is ingrained in the overall political environment in China, we foresee little to be changed in the Chinese national scheme.

We expect to see relevant announcements from Beijing to justify the environmental integrity of offset projects and clarify the issues of double-counting and forestry credits in the national scheme.

No doubt, further policy decision making will also take into account the interest of relevant bodies such as the country's renewable and forestry sectors.

For now, it is worth noting that some – if not many – of the existing offset projects in the pipeline are already facing the risk of being 'stranded', or in broader terms, rendered close to worthless because of potential oversupply and eventual market regulation.

中国恐难在 2017 年前推行全国性碳交易计划

中国旨在“2017 年初”将 40 亿吨碳排放纳入全国性碳市场机制下，并建立全球规模最大的温室气体排放交易市场。中国打算自计划之初就将所有省份都纳入进来。

我们认为，中国国内立法进程和私营部门技术能力将限制这项宏伟的计划。

要保证全国性碳市场的正常运转，必须先解决一些主要的问题。

我们预计，中国的碳排放监管当局将无法实现原计划，一个覆盖全部省份的全国性碳交易市场在未来 2 年将无法建成。

此时此刻，我们有必要提出这样一个问题：中国碳交易计划的实施究竟有何重要意义？

首先，只有降低煤炭消费，中国的碳排放量才会降低，这已经成为老生常谈。同时，减少煤炭消费也与中国治理空气污染的努力有着密切的关联。

另外，在巴黎气候协议签署之后，全国性碳交易市场的推出也可以提升中国气候变化政策执行的透明度，在 2018 年全球各国“盘点”碳排放量之前，这一点无疑将受到国际社会的密切关注。

第三，如果我们观察中国过去三十年的经济发展历程，不难发现中国最富竞争力、发展最快的行业是那些主要由市场力量和竞争驱动的行业，而非国家管控的行业。

中国建立全国性碳交易市场的计划在巴黎联合国气候会谈期间得到了更加密切的关注，从中国代表团方面传出的最重要的消息就是中国主管气候变化事务的官员表示中国的全国性碳交易市场将于 2017 年初正式启动。

具体而言，这一市场将覆盖中国所有省份以及来自 6 个行业、15 个子行业的近万家企业。

巴黎峰会期间，另外一位中国官员也表示，碳交易市场机制的设计必须‘严谨’，否则将无益于中国实现减排。

但我们要问，中国到 2017 年推出一个覆盖万家企业、设计严谨的碳交易市场的可能性有多大？

政策支持是否足够？

从全球范围来看，中国政府对碳交易市场的支持只有欧盟与之媲美。

中国首个碳交易市场试点项目于 2013 年 6 月在深圳启动，全国性碳交易市场的前景自此吸引了媒体关注。

若要在 2017 年初正式推出全国性碳交易计划，中国现在只有不到 18 个月的时间来准备市场所需的全部要件。

各有关监管机构都毫无疑问地支持全国碳交易项目的建设，尤其是国家主席习近平去年九月对此表示支持之后，各部门愈发全力支持。但要完成这项宏伟计划所必须具备的立法条件，还有大量的工作需要完成。

首先，中国任何新政策都需要相应的官方立法才能生效。早于 2015 年 9 月习近平主席访美，坊间已经传出立法草案的一些消息，但这些传闻太过抽象，缺乏关于碳市场的具体内容。

总体来说，碳交易立法流程甚至连一个初步的时间表都没有，对于局外人来说更是无法看透。

从理论上说，碳交易市场所采用法律的具体形式决定着其法律效力，并且无法保证碳交易最终立法与草案形式相同。

碳交易监管立法草案对于碳交易市场运作的方式及启动时间语焉不详。

不过，有两个确定的要点值得注意。

首先，碳交易相关立法估计会旷日持久，因为这一过程牵涉各类监管机构，可能由国家发展改革委员会（NDRC）牵头，从财政部到证监会的一众监管机构都会参与。

另外，相关政府机构中任何不确定性或者结构性的变化都可能拖延立法进程。

不过从乐观的角度估计，中国官方有可能快速完成立法，克服这个有可能阻碍 2017 年之前全国性碳市场落地的最大政治障碍。

尽管如此，立法绝非当局面临的唯一政治挑战。发改委负责气候变化事务的一位高级官员曾表示，全国碳交易计划的排放总量将比中国 2020 年和 2030 年总排放强度降低幅度更为严格。

这听起来很合理，并且与欧盟碳排放交易体系的做法相近——被后者纳入体系中的相关行业（发电、重工业）都面临着比碳市场之外的行业（例如交通和农业）更高的减排目标。但是为了落实这个体系，监管机构既要设定市场总体尺度，又要在市场涵盖的 15 个行业之间分配配额，同时完成这两项工作事实上十分复杂。

自从 2014 年以来，发改委已经要求 10 个行业的企业开始提交排放数据。但这一政策的实际执行情况以及向中央政府汇报的数据汇编都并不在公众监督之内。

欧盟碳排放交易体系等其他成熟碳市场的经验已经证明，没有充足的历史排放数据，市场容易发生配额过度的情况。总体来说，对于任何碳排放交易计划都至关重要的排放权分配过程变数很多。

因此，虽然高层的政治支持不会动摇，对于如何设计一个高水平的市场，仍然存在很多问题。

市场扭曲？

众所周知，中国政府的政策在发布之后往往会受到外力的影响。作为一个受到政策驱动的市场，碳排放交易市场尤其容易受到外部因素干扰。

天津的碳抵消交易买家就曾在去年五月吞下苦果：当时地方监管机构突然发布通知称，要在合规截止日期两个月之前检查地方试点项目中碳排放抵消是否合格。

据猜测，一些企业在通知发布之前曾购买不合格的抵消碳排放。不过在合规截止日期之后，地方监管机构也没就有关碳排放抵消的合规性发布后续官方声明。

可想而知，对于市场参与者来说，全国碳排放交易所将比目前各自为战的地方试点项目体现出更多的政治确定性。

在全国性碳排放交易落地之前，没人能够确保在项目启动之前的准备工作中不会重演类似的闹剧。这种不确定性会严重损害市场信心，并影响投资者对碳排放市场的兴趣。

投资者从试点项目中学到的另一教训是，对官方口径总要保留一丝怀疑的态度，即便是白纸黑字也不

能全信。

现有试点项目中的拍卖机制便能充分说明这一点。虽然多地的试点项目都提到会将拍卖作为一种配额分配的补充来源，只有广东在第二个合规年度举行了拍卖；而即便是在广东，由于市场反响冷淡，拍卖的排放量也较之前公告的有所缩水。

此类潜在风险根植于中国政治的整体环境，因此我们认为全国碳排放交易项目在这一方面与此前的试点项目无异。

我们预计，中央政府会发布有关公告，阐明抵消项目的环境正当性，并澄清全国性计划中的重复计算和森林碳交易额度等问题。

毫无疑问，进一步的决策还会将可再生能源产业、林业等相关利益团体纳入考量。

至于眼下，值得一提的是现存一些——如果不是很多——抵消项目还未问世就已经面临“搁浅”的风险。从广义上说，它们由于潜在的供给过剩以及迟早会到来的市场监管几乎失去了全部价值。

US renewable standards cut emissions, boost jobs, slash bills - report

The US state renewable portfolio standards (RPS) have effected a multitude of benefits, from cutting greenhouse gas emissions to reducing water consumption, according to a report from the US NREL and Lawrence Berkeley Laboratory.

The study estimated RPS policies brought about US$2.2 billion in benefits from reduced greenhouse gas emissions and a further US$5.2 billion from reductions in air pollution in 2013.

The two US government-backed laboratories are undertaking a multi-year analysis of the costs and benefits of the 29 RPS programmes in place in the US. The programmes in place across the US require utilities or other electricity providers to meet a minimum amount of their load with eligible forms of renewables and have been a key driver of renewable energy deployment in the US in recent years.

In 2013, the study said RPS compliance measures resulted in the deployment of 98TWh of renewable electricity generation, representing 2.4% of nationwide electricity generation in that year and resulting in a 3.6% reduction in total fossil fuel generation.

This meant some reductions in key pollutants, including 59 million metric tons of greenhouse gas emissions and 43,900 metric tons of nitrogen oxides. Water withdrawal was also brought down by some 830 billion gallons and overall consumption by 27 billion gallons, the study found.

RPS programmes also appear to have had some clear social impacts, including 200,000 renewable energy-related jobs in 2013 and a US$20 billion boost to GDP. Consumers also saved US$1.2 billion through reduced wholesale electricity prices and US$1.3-1.7 billion from reduced natural gas prices.

However, the report authors are at pains not to describe these latter impacts as “net social benefits” as they represent resource transfers from one industry to another.

The impacts and benefits identified in the report were also said to be highly regional, with the economic benefits from air pollution reductions concentrated primarily in the Mid-Atlantic, Great Lakes, Northeast and Texas, where emissions from coal-fired power stations are greatest. Similarly, water reductions were greatest in California and Texas, which regularly experience drought.

“Our goal was to estimate the magnitude of RPS benefits and impacts at a national-level, using established methodologies, while recognising that individual states can perform their own, more-detailed assessments,” said NREL’s Jenny Heeter, one of the report’s authors.

The NREL and Berkely Lab teams will now undertake a study evaluating the future costs and benefits RPS programmes, considering scheduled increases to each state's requirements as well as potential policy revisions.

美国可再生能源标准减少排放、促进就业并削减账单

根据美国国家可再生能源实验室(US NREL)和劳伦斯·伯克利实验室(Lawrence Berkeley Laboratory)的一份报告，美国国家可再生能源配额制(RPS)具有众多好处，从减少温室气体排放到减少水消耗。

该研究估计 2013 年 RPS 政策从减少温室气体排放带来二十二亿美元收益，从减少空气污染带来另外五十二亿美元。

这两个美国政府支持的实验室正在对美国二十九个 RPS 计划的成本和收益进行为期多年的分析。这些计划遍布美国各地，需要公共部门或其他电力供应商满足最低的可再生能源量，还是近几年美国可再生能源部署的一个主要推动力。

2013 年，该研究表示，RPS 措施部署 98TWh 可再生能源发电，占该年全国发电量的 2.4%，使总化石燃料发电削减 3.6%。

这意味着主要污染物的部分削减，其中包括五千九百万公吨的温室气体排放量以及 43,900 公吨的氮氧化合物。该研究发现，也减少约八千三百亿加仑的用水量，以及两百七十亿加仑的总消耗。

RPS 计划似乎还有一些明显的社会影响，其中包括 2013 年二十万个可再生能源相关就业岗位以及两百亿美元提振 GDP。消费者还通过降低批发电价节省十二亿美元，通过降低的天然气价格节省十三至十七亿美元。

然而，该报告作者努力形容这些近来的影响并非“净社会效益”，由于其代表从一个行业向另一个行业的资源流转。

据说该报告认定的影响和利益还极具区域性，空气污染减少的经济利益主要集中在大西洋中部、五大湖、东北和德克萨斯州，在那些地方燃煤发电站的排放量最大。同样，用水减少最明显的是在加州和德克萨斯州，两地经常遭遇干旱。

该报告的作者之一 NREL 的珍妮·希特(Jenny Heeter)表示：“我们的目标是估计在国家层面 RPS 的利益和影响的程度，使用既定方法，同时认识到各个国家可以执行自己更详细的评估。”

NREL 与 Berkely Lab 团地目前将开展一项研究，评估 RPS 计划的未来成本及收益，考虑到每个州各自要求以及潜在政策修订。

Coal（煤炭）

Obama vows to overhaul coal mining on public lands to 'invest in the future'

Pledge comes amid collapse in coal price but president says management of oil and coal should ‘better reflect the costs they impose’ on taxpayers and planet

Barack Obama promised an overhaul of coal mining on public lands on Tuesday, delivering a major blow to the ailing industry.

In his final State of the Union address, the US president said he would push for changes to the leasing of public lands for oil, coal and gas leases at cut-rate prices, saying: “Rather than subsidize the past, we should invest in the

future."

The move follows a listening tour last year by Sally Jewell, the interior secretary, during which she explored leasing programmes on public lands and the collapse of the coal mining industry due to low prices.

Environmental groups had planned major campaigns around the government's leasing programme for 2016, arguing that continued fossil fuel extraction on public lands was undermining Obama's efforts to fight climate change.

After insisting in his first term on an "all of the above" energy policy that promoted expansion of oil, gas and coal, Obama now appears to agree with scientists who say catastrophic climate change cannot be avoided without strict limits on fossil fuel extraction.

"I'm going to push to change the way we manage our oil and coal resources, so that they better reflect the costs they impose on taxpayers and our planet," he said in the speech.

The overhaul comes amid collapsing global prices for coal – which have had a big impact on the government's lease programme. The government had to put off lease sales involving some 2bn tonnes of coal over the last year because companies were unwilling to buy.

The White House said in an email it would provide further details in the coming weeks, adding: "The President underscored the need to accelerate our transition to low-carbon economy by changing how we manage our oil and coal resources."

Campaign groups have long accused Obama of having a blind spot when it came to the mining of fossil fuels on public lands.

A report by the Center for American Progress found that oil, coal and gas produced on public lands were responsible for more than 20% of all greenhouse gas emissions.

Half of those emissions were from coal – which increasingly is mined in the vast deposits of the Powder River Basin in Montana and Wyoming.

Up until last year, Jewell, the interior secretary, had acknowledged that there was no concrete strategy to address the climate impact of mining for fossil fuel on public lands, saying: "It's something we need to think about."

Campaign groups said the move was an encouraging first step – but argued that Obama should really ban all fossil fuel production on public lands to have maximum impact on climate change.

"The issue of fossil fuel extraction on public lands is going to be a key fight over the coming months. Our government needs to get out of the business of climate destruction," May Boeve, the director of 350.org said.

As expected, Obama did not come with a list of promises for his last year in office – and did not even mention important initiatives that are already in the works, such as new rules for plugging methane leaks from oil and gas wells.

The White House has been sitting on the rules for six months.

But it was significant that, as during other high-visibility moments during the second half of his presidency, Obama took care to thread mention of climate change throughout the State of the Union address.

Once again, he mocked Republicans who continue to reject the science behind climate change, saying: "You'll be pretty lonely, because you'll be debating our military, most of America's business leaders, the majority of the American people, almost the entire scientific community, and 200 nations around the world who agree it's a problem and intend to solve it."

Obama also embraced climate change as an issue of national security and global concern – saying it was "one of many issues where our security is linked to the rest of the world".

奥巴马发誓要整顿公共土地上的煤矿以“投资于未来”

正值煤炭价格崩溃之时，抵押到来，但奥巴马总统说，石油和煤炭的管理应该“更好地反映他们施加的费用”，对于纳税人和星球。

美国总统奥巴马在上周二承诺对于公共土地的煤矿进行全面检查，给与了境况不佳的该行业重大打击。

在他国情咨文的最后叙述中，这位美国总统说，他将推动以较低的价格租赁用于石油、煤炭和天然气勘探开采的公共土地出租的改变，他说：“与其补贴过去，我们应当投资未来。”

这一行动跟随内政部长 Sally Jewell 去年的一个倾听之旅，在此期间，她探讨了公共土地的租赁项目和由于价格低廉带来的煤炭开采业崩溃。

环保组织围绕政府的 2016 年租赁计划曾策划大规模的运动，认为在公共土地上继续化石燃料的开采正在破坏奥巴马应对气候变化的努力。

在坚持他的第一个任期关于“上述所有”的能源政策之后，即促进石油、天然气和煤炭的扩大，奥巴马现在似乎同意科学家说法，如果不对化石燃料的开采进行严格限制，灾难性的气候变化无法避免。

“我要推到改变我们管理我们石油和煤炭资源的方式，使他们更好地反映它们给纳税人和我们这个星球带来的成本，”他在演讲中说。

彻底检查，正值全球煤炭价格崩溃之际- 这已经对政府的租赁计划产生重大影响。政府不得不推迟租赁销售，在过去一年中涉及到大约 20 亿吨煤，因为公司不愿购买。

白宫在一封电子邮件中说，将在未来几周提供进一步的细节，并说：“总统强调，必须通过改变我们如何管理我们的石油和煤炭资源，加快我国向低碳经济转型。”

活动组织长期以来一直指责奥巴马有一个盲点，当它涉及化石燃料在公共土地上开采时。

美国进步中心的一份报告发现，在公共土地上产出的石油、煤和天然气分别负责所有的温室气体 20％以上的排放量。

这些排放的一半是来自煤炭 - 它越来越多地被开采出来，在具有巨大储量的蒙大拿州和怀俄明州粉河盆地。

直到去年，内政部长 Jewell，曾承认，目前没有具体的战略，以解决公共土地上的化石燃料开采对气候的影响，他说：“这是我们需要思考的东西”。

活动团体称，此举是一个令人鼓舞的第一步 - 但认为，奥巴马确实应该制止公共土地上所有化石燃料的生产对气候变化的最大影响。

“公共土地上化石燃料开采的问题，将是未来几个月内的主要斗争。政府需要摆脱破坏气候的企业，”350.org 的主任 May Boeve 说。

正如预期的那样，奥巴马对于他去年的政府工作没有附带承诺清单 - 甚至没有提到已经运行的重要举措，如用于石油和天然气井堵漏甲烷泄漏的新规则。

白宫在这些规则上已经停滞了六个月。

但显著的是，在他总统任期的第二个阶段，在其他高度关注的时刻，奥巴马在整个国情咨文的表述中小心翼翼地提到了气候变化。

再一次，他嘲笑共和党人继续拒绝气候变化背后的科学，他说：“你会很孤独，因为你将会质疑我们的军队、大多数美国商界领袖、多数美国民众、几乎整个科学界，和世界各地的 200 个国家，他们同意这是一个问题，并打算解决这个问题。“

奥巴马还接受了将气候变化作为国家安全和全球关注的一个问题 - 说这是“关联我们的安全与世界其他地方的许多问题之一”。

Roundtable: What are the benefits of China's ban on new coal mines?

Experts tell John McGarrity what are the likely impacts of China's recently-announced ban on new coal mines

On the final day of 2015, China's central government said it would suspend the approval of new mines, with the ban starting in 2016, cutting coal's share of national energy consumption to 62.6% in 2017, down from 64.4% currently.

We asked experts on China's energy and climate polices the following question: How will this ban help China meet its CO2 and renewable energy targets, and reduce other types of pollution from the mining, transportation and use of coal?

Alvin Lin, China climate and energy policy director, Natural Resources Defense Council

The government's ban on approving new coal mines is a reflection of energy policy catching up with the reality that China's coal use is on an accelerating downward trend, as its economy shifts decisively away from heavy industry, wind, solar, natural gas and nuclear replace coal-fired power. The government is targeting at least 20 gigawatts (GW) of wind and 15 GW of solar projects next year, and is determined to improve grid integration and dispatch of renewables. Expanding coal mines now is a poor investment, and makes no sense given China's expansion of renewable power and slowing growth for demand in electricity.

Even the king of coal, Shanxi province, has in the past few years recognised that coal is not the future, and is seeking to transform itself into a leader in solar energy with the opening of a new national solar PV demonstration base in Datong last June, constructed on top of coal mine subsidence land. The base will install 3 GW of solar PV projects in the next three years, generating clean electricity to be sent east to Beijing.

The ban on new coal mines is a start to re-balancing China's energy structure, but of course, China is still producing and consuming over 3.6 billion tonnes of coal per year, and state-owned enterprises (SOEs) are continuing with plans to build already-approved coal mining and coal power bases and coal chemical plants, including in Xinjiang, Inner Mongolia and Shanxi. The next step will be for government and industry to re-evaluate the wisdom of these projects, given that China will need to control coal consumption even more strictly in the next five years if it is to solve its air pollution problem and re-balance its economy to a greener path.

Deng Shun, analyst, ICIS Energy

Expansive development has led to China suffering quite severe air, water and soil pollution. The central authorities are aware of this and, as marked by the September 2013 action plan on air pollution, have decided to make major cuts in coal consumption so as to alleviate worsening environmental issues. Later the National Energy Administration and other government bodies followed suit with their own measures to cut coal use and push forward with cleaner sources of energy, such as natural gas, hydropower and nuclear. This ban on new coal mines is due to the oversupply of coal – the aim is to prevent new mines opening and close existing inefficient mines in order to re-balance supply and demand. We believe these measures will help reduce China's coal consumption and CO2 emissions.

Dabo Guan, University of East Anglia

China's coal consumption increased at an annual rate of 8.8% over the 2000–2013 period, and reached a consumption peak in 2013 of 422 million tonnes. In 2014, Chinese coal consumption actually decreased 2.9%, and is expected to further decrease another 4%-5% in 2015. China's coal stock has been keep at a very high level of 300 million tonnes or above for over four years. Due to weak consumption, China doesn't need new coal mines. Furthermore, China is contemplating a coal cap at 420 million tonnes right now. Chinese economic growth will be mostly powered by the newly added capacity from natural gas and renewables in the future.

Hu Tao, director, China Programme, WWF

This ban on new coal mines is mainly for economic reasons rather than climate change concerns. China is facing an over-supply of coal. Prices have fallen sharply since the start of the decade. It's because of slowing demand for coal; and fast growing capacity of coal mining. However, China's poor air quality is likely to be part of the reason for the ban, as the government aims to sharply reduce sulphur dioxide, nitrous oxide and other pollutants to improve ambient air quality.

The ban will have positive impacts for the environment, decreasing the use of coal and increase the share of renewables in the energy mix; and reduce carbon emissions, which would fulfil two of China's commitments targets outlined in its Intended Nationally-Determined Contribution to UN climate talks. The ban is unlikely to be hugely relevant to coal-to-gas plants, which had they been built, would have made a big increase in China's emissions. But these aren't economically feasible (because of low energy prices), nor environmentally-friendly (because of high CO2 output and water shortages). So I don't think this ban will make much of a difference as these projects wouldn't likely happen anyway.

Lauri Myllyvirta, energy campaigner at Greenpeace

The rapid in fall in demand for Chinese coal appears to have taken coal mining and coal power companies completely by surprise. China's current coal mining capacity exceeds output and consumption by one billion tonnes – more than the total coal output of world's number two coal producer, the US – and another billion tonnes of coal mining capacity are still reported to be under construction. This demonstrates the massive overhang of projects that China still has in industry as a result of the investment boom seen in the past ten years.

In light of this, the practical significance of ceasing coal mine approvals appears limited within the next years. Much more is needed to resolve the enormous overcapacity issue. The symbolic and political significance of the announcement, by contrast, is high.

As China prepares its all-important 13th five-year plan, the fact that the country's top energy regulator seems to have accepted the reality that coal demand growth is not coming back, is very important. In particular, it seems hard to reconcile the ban on new approvals with the western large scale coal bases outlined in the 12th five-year plan. We highlighted these bases as the biggest threat to the global climate in our 2013 report "Point of No Return".

Hao Tan, senior lecturer, University of Newcastle, Australia

The ban on new coal mines makes both economic and ecological sense. China's coal industry continued to struggle financially in 2015, with over 80% of coal mining companies being in loss. Similarly, as in industries such as steel and cement, China's coal industry suffers from major oversupply, especially in face of the rapid growth of energy production based on other sources such as wind, solar and nuclear. This ban, therefore, seems to be a part of the policy package to reduce the excessive capacity which is now the number one task in the country's economic strategy for 2016.

Locally, to limit the use of coal, especially that for coal-fired heating, is urgently needed to tackle the severe smog problem. The new policy on coal reflects a latest effort by agencies of the central government, which take greater responsibilities for those challenges than local governments, and which seem convinced that certain administrative measures at the national level are necessary rather than leave those to local governments or to distorted 'market forces'.

The policy is certainly a good step forward. However, the government should consider tougher measures on coal if its environmental and economic goals are to be achieved, such as to make a more radical cut to the existing coal producing capacity, and to accelerate its energy pricing reform to better reflect the environmental and social costs of coal.

Jianli Guo, head of economics research, China coal science research institute

Oversupply of coal production capacity is the main reason why the government has halted approval of new

mining projects. The coal mining industry has about 1.5 billion tonnes of surplus. Currently, China is entering into a post-industrialisation era, all the conventional industries face an over-capacity problem.

So, how to reduce supply so that the overproduction gap is wiped out? The closure of old and small mines, and a removal of the practice where supply contracts are overfulfilled, would cut around 35% of this surplus production.

The destruction of existing coal mines will reduce the ecological impact due because output will be concentrated in fewer mines and production made more efficient.

专家对话：中国煤矿禁令将如何有益于气候及环境

能源及气候专家告诉约翰•麦克加里蒂中国近期发布的煤矿禁令将会产生怎样的影响。

2015 年的最后一天，中国政府宣布 2016 年起将停止审批新建煤矿，借此将煤炭在能源消费中的比重由目前的 64.4%下降到 62.6％。

中外对话就此发问中国能源及气候政策专家：该禁令将如何有助于中国实现二氧化碳减排目标和可再生能源发展目标，并且降低煤炭开采、运输和使用过程中产生的其他污染？

林明彻，美国自然资源保护委员会中国气候与能源政策主任

政府颁布禁令禁止新煤矿开发的审批反映出能源政策正逐步贴近中国煤炭产业的现状。随着中国经济的重工业转型，风能、太阳能、天然气、核能逐步取代燃煤发电，中国的煤炭产业呈加速下滑的趋势。下一年度政府的目标是使风能和太阳能装机容量分别达到至少 2000 万千瓦和 1500 万千瓦，并扩大可再生能源的并网与输配。鉴于中国正大力发展可再生能源发电，再加上用电需求已呈下行趋势，如今扩大煤炭开采可以说是一项不合理、甚至是糟糕的投资。

即使是煤炭大省山西省也在过去几年认识到发展煤炭产业是没有未来的。去年六月，山西省开始在采煤沉陷区建设大同市国家先进技术光伏示范基地，试图转型为太阳能领域的领头羊。该基地将在未来三年启动装机容量为 300 万千瓦的太阳能光伏项目，并将向北京输送清洁电力。

此项禁令是中国调整其能源结构的开端。当然，中国煤炭年生产量和消费量仍然超过 36 亿吨，国有企业仍计划在新疆、内蒙古、山西等省建设已获批准的煤炭开采、燃煤发电、煤炭化工等项目。未来五年，为了控制空气污染，加快经济结构调整，实现绿色转型，中国必须加大力度控制煤炭消费。因此，政府和产业部门接下来要做的就是重新对上述项目进行评估。

邓舜，安迅思煤炭行业分析师

由于近年来的粗放发展，中国的大气，土地和水资源污染情况已经较为严重，中央已经意识到这一点，从 2013 年 9 月国务院发布《大气污染防治计划》开始，中国就正式下决心要大幅减少煤炭消费量，以便控制和治理日益严重的环境问题。此后，国家能源局等多部门也发布了多项减少煤炭消费量、转而大力发展天然气、水力和核能等清洁能源发电的措施。

此次中央宣布禁止新建煤矿，主要是现时中国煤炭行业供需失衡，中央希望通过严禁新产能和淘汰现有落后产能来恢复行业的供需平衡。

我们认为以上这些措施将有助于减少中国煤炭消费量以及二氧化碳的排放量。

谭浩，澳大利亚纽卡斯尔大学纽卡斯尔商学院高级讲师

新煤矿开发禁令从经济和生态角度都具有重大意义。做出这一决定有经济方面的原因。2015 年，中国煤炭工业仍举步维艰，超过 80%的煤炭开采公司处于亏损状态。与钢铁、水泥行业类似，中国煤炭行业面临着严重的产能过剩，特别是在风能、太阳能、核能等其他能源产量快速增长的情况下，煤炭行业的形式更加严峻。2016 年国家经济战略的头号任务就是降低过剩产能，而此项禁令似乎正是该政策的一部分。

同时，促成这项禁令颁布的原因似乎还有人们对于煤炭造成的环境影响的日益关注。中国的煤炭生产面临着两个重大瓶颈。中国承诺在 2030 年前达到碳排放上限，意味着未来煤炭在国家能源结构中的占比将会大幅减少。需要限制局部地区的煤炭使用,尤其是要限制燃煤供暖，从而应对严重的雾霾问题。这项煤

炭新政反映了中央政府各部门最新的努力，相较于地方政府，中央政府需为此承担更多的责任，并且与通过地方政府或扭曲的“市场”解决问题相比，通过国家行政措施解决问题似乎更有必要。

此项政策无疑是一项正确的举措。但要实现环境目标和经济目标，政府应当考虑采取更为严厉的禁煤措施，比如大幅削减现有的煤炭生产能力，加快能源价格改革，从而更好地反映煤炭生产的环境成本和社会成本等。

柳力，绿色和平能源活动家

随着能源密集型产业增速放缓，可再生能源迅猛发展，煤炭需求随之锐减。只要实现可再生能源占比目标，就从根本上保证了中国将超额完成二氧化碳减排目标和非化石燃料目标。

煤炭产量锐减完全归因于需求侧，这让煤炭开采和燃煤电力公司始料未及。目前令人难以置信的是，中国煤炭开采能力相较于其产量和消费量高出约 10 亿吨，超过了世界第二大产煤国美国的煤炭总产量。据悉，仍有数十亿吨的煤炭产能正在建设中。这表明，过去十年的投资热潮使中国一些行业产能过剩，导致中国仍存在大量的过剩工程项目。

就这点而言，停止煤矿审批的现实意义在未来几年内显得十分有限。国家还需花更大力气解决巨大的产能过剩问题。相比其实际意义来说，这一决定有着更为突出的象征意义与政治意义。

中国正着手准备落实“十三五”计划。中国的高层能源管理机构已经认识到，煤炭需求增长已经一去不复返。这一点十分关键。特别是，这一针对新建煤矿审批颁布的禁令与“十二五”规划大力发展西部大型煤炭基地的目标难以调和。在我们 2013 年撰写的报道《无路可退》中，曾重点将这些基地列为全球气候的最大威胁。

随着新煤矿审批的终结，新的五年计划似乎有必要放弃进一步开发西部煤炭基地的计划。由于这些基地大多数位于极度缺水和生态敏感的地区，即使矿藏的利用率和寿命远低于预期，矿山建设也可能带来十分严重的影响。从长远来看，无论从经济还是政治的角度，不再开发新的矿坑，减少搁浅资产的进一步积累，都将有助于中国从煤炭向其他能源的转型之路。

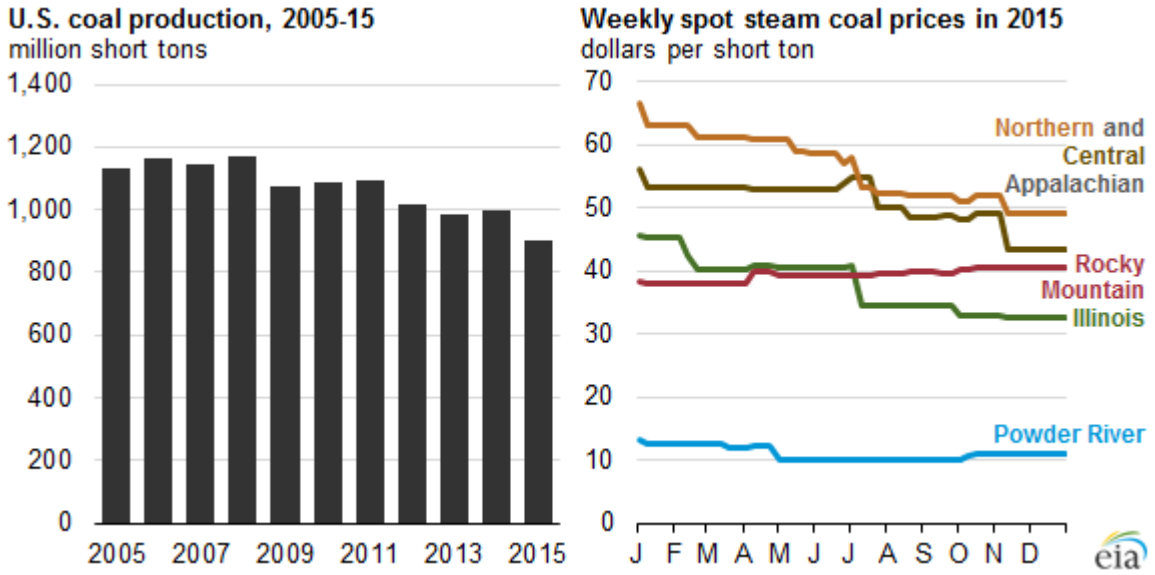
郭建利，煤炭科学研究总院经济研究所所长

十三五，中国宏观经济进入了后工业化阶段，传统工业行业都面临产能过剩，大规模投资拉动经济的时代已经结束了。以煤为例，据我们推算，到十二五末，煤炭产能已达到 55-56 亿吨，而实际的需求却只有 40 亿吨左右，加上约 2 亿吨进口煤，产能已严重过剩。我们认为，环保、生态当然也是考虑之一，但是此举更主要的目的是产业结构调整。

我们认为，十三五期间，优化存量首先要淘汰落后产能。再有，就是遏制住超产现象，2014 年 8 月，国务院已经颁布了相关规定，加起来总共约能削减产能 10 亿吨。几项措施加起来，希望能够实现产需的平衡，解决产能过剩的问题。

对存量的调整也将减少对生态的影响，因为通过产业结构调整，使产业集中度和生产效率大幅提高，具有安全、绿色、高效特点的煤炭科学产能比重进一步增加，这将使得煤炭产业单位产出对环境的影响逐步减小。

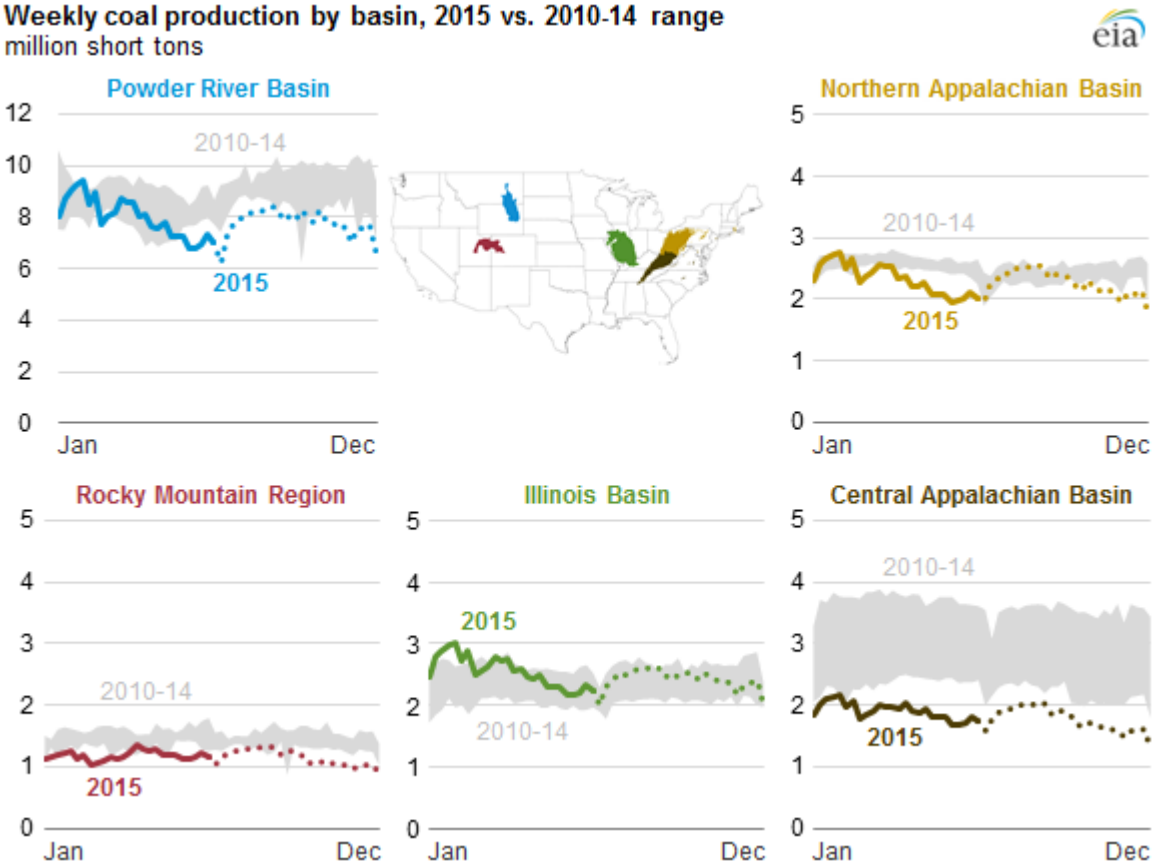
Coal production and prices decline in 2015



Source: U.S. Energy Information Administration, Coal Data Browser

Note: Production data for 2015 include estimated December 2015 production.

Since reaching a high point in 2008, coal production in the United States has continued to decline. U.S. coal production in 2015 is expected to be about 900 million short tons (MMst), 10% lower than in 2014 and the lowest level since 1986. Regionally, production from the Appalachian Basin has fallen the most. Low natural gas prices, lower international coal demand, and environmental regulations have contributed to declining U.S. coal production.



Source: U.S. Energy Information Administration, Weekly Coal Production, based on Mine Safety and Health

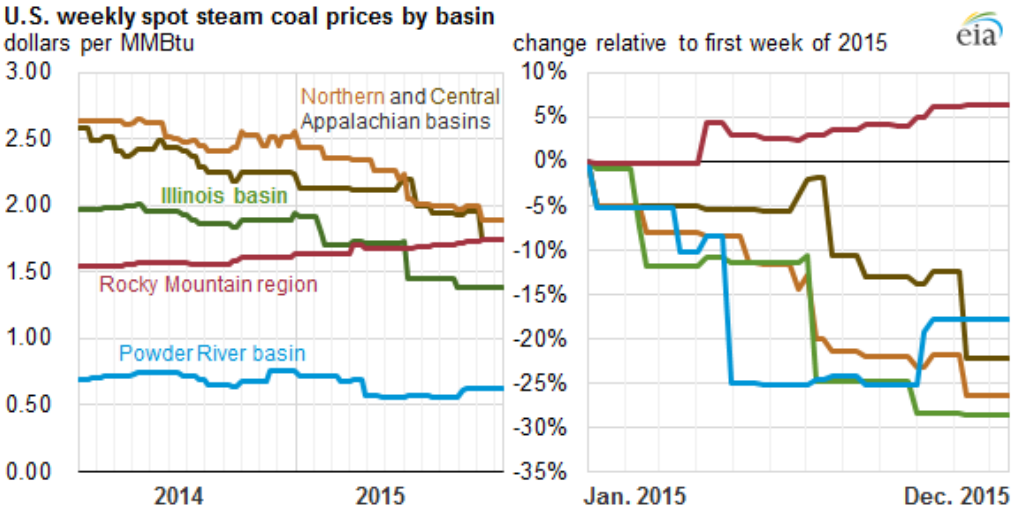
Administration data

Note: Data for July 2015 through December 2015 are EIA estimates.

The United States has five major basins or regions that produce coal. The largest decline in coal production was in the Central Appalachian Basin, largely because of its difficult mining geology and high operating costs. Coal production in the Central Appalachian Basin in 2015 was 40% below its annual average level over 2010-14. In three other main areas, the Northern Appalachian Basin, Rocky Mountain region, and Powder River Basin, production in 2015 was 10% to 20% below their corresponding regional annual average levels over 2010-14. By contrast, coal production from the Illinois Basin in 2015 was 8% higher than production levels over 2010-14.

In the United States, almost all coal is used to generate electricity. Recently, coal's share of electricity generation has fallen as its market share of natural gas and renewables increased. The average daily natural gas spot price at the Henry Hub, a key natural gas benchmark, fell from $4.38 per million British thermal units (MMBtu) in 2014 to $2.61/MMBtu in 2015, resulting in greater natural gas-fired electricity generation. In April 2015, natural gas-fired electricity generation surpassed that of coal-fired generation on a monthly basis for the first time in history, and it did so again in each of the months from July through at least October, the latest monthly data available. The most recent Short-Term Energy Outlook estimates that 2015 power sector coal consumption will be about 764 MMst, the lowest level since 1988.

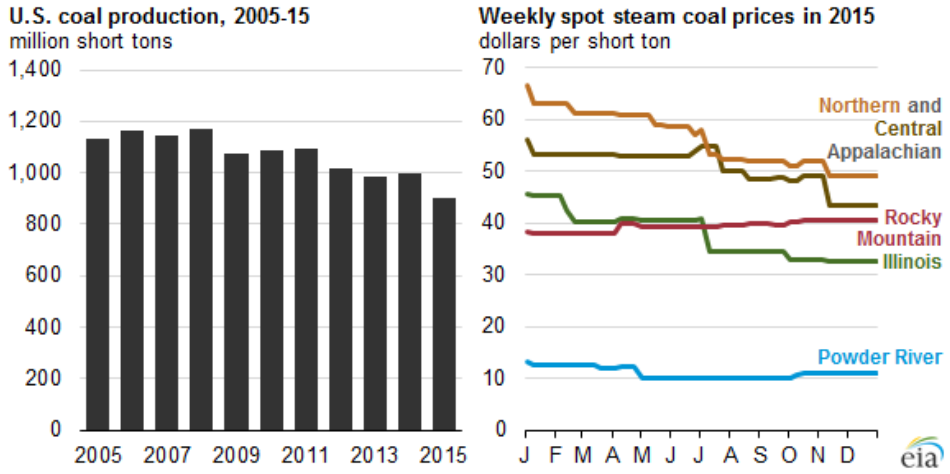
U.S. coal exports also declined in 2015, especially to major coal export destinations such as Europe and China. Although 15.7 MMst of coal was exported to the United Kingdom and Italy in 2014, only about half that volume is expected in 2015, when complete data are available. China, the world's largest coal consumer, is traditionally a large market for international coal trade, and China imported 8.3 MMst from the United States in 2013, about 7% of total U.S. coal exports that year. In 2014, U.S. coal exports to China decreased to 1.8 MMst, and the 2015 total is expected to be less than 0.5 MMst. Based on U.S. Census Bureau data through September 2015 and estimates for the remainder of the year, EIA expects the United States to export a total of 77 MMst of coal in 2015, a 21% decline from the previous year.



Source: U.S. Energy Information Administration, Coal Data Browser

With the exception of the Rocky Mountain region, steam coal prices in major basins experienced double-digit percentage declines in 2015. Central Appalachian coal continued to be economically challenged compared with natural gas for electricity generation, and average steam coal spot prices dropped by another 22% in 2015, following a decline of 13% the year before. Coal prices in the Powder River, Illinois, and North Appalachian basins, which had remained largely unchanged during 2014, decreased 18%, 26%, and 29%, respectively, in 2015.

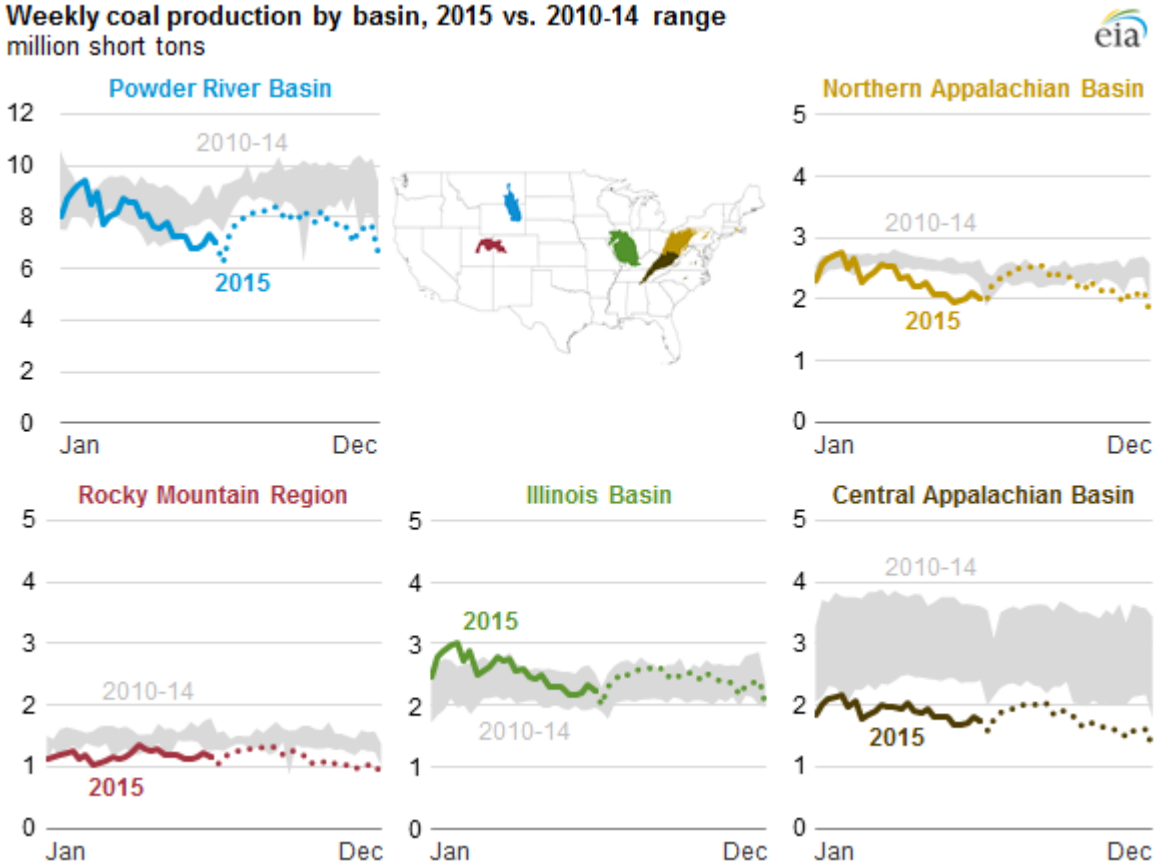
2015 年煤炭产量和价格均有下降



来源：美国能源信息管理局，煤炭数据浏览器

注：2015 的生产数据，包括 2015 年十二月的估算产量。

由于 2008 年达到最高点，煤产量在美国继续下降。2015 年美国煤炭产量预计约为 9 亿吨（MMST），低于 2014 年产量的 10%，是 1986 年以来最低水平。从区域角度来看，阿巴拉契亚盆地产量下降最多。低廉的天然气价格、国际煤炭需求量降低以及环境法规的约束促进了美国煤炭产量的下降。



来源：美国能源信息管理局，煤炭周产量，根据矿山安全和健康管理数据

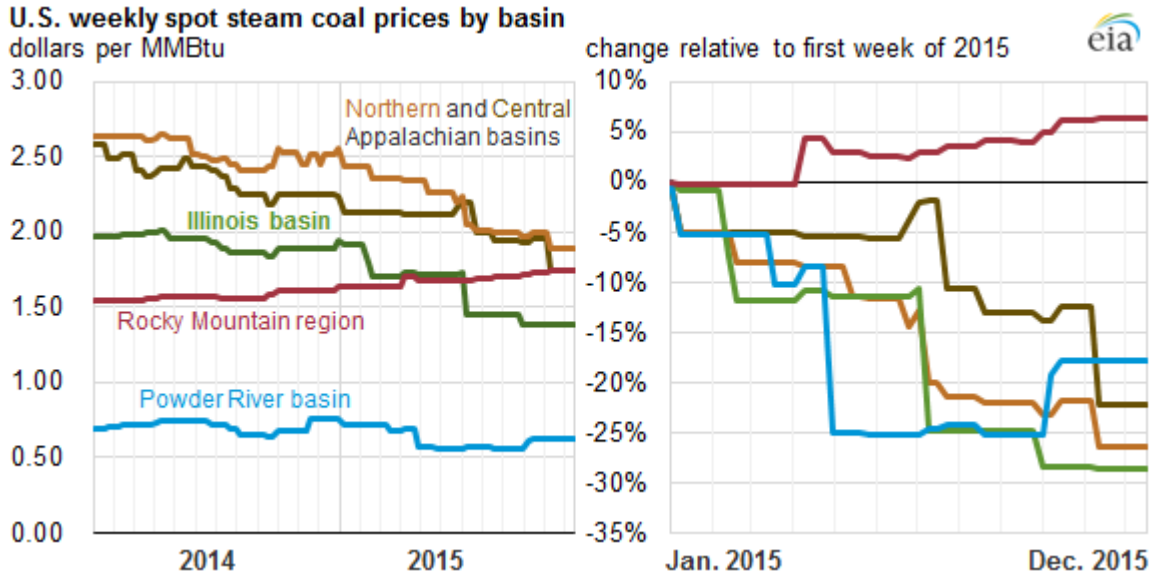
注：2015 年 7 月至 2015 年 12 月的数据是美国能源情报署估计的。

美国有五个主要的盆地或地区生产煤。煤炭产量下降幅度最大的是阿巴拉契亚盆地中部，很大程度上是因为其难以开采的地质和高昂的操作成本导致的。2015 年阿巴拉契亚盆地中部煤炭产量低于 2010 年到 2014 年年平均水平的 40%。在其他三个主要产煤地区，阿巴拉契亚盆地北部，洛矶山地区以及粉河盆地，

2015 年的煤炭产量低于 2010 年到 2014 年其相应的区域年平均水平的 10%到 20%。相比之下，2015 年伊利诺斯盆地煤产量高于 2010 年到 2014 年生产水平的 8%。

在美国，几乎所有的煤都是用来发电的。近年来，随着天然气和可再生能源的市场份额增加，用于发电的煤的份额已经下降。亨利中心的天然气价格是权威的价格基准，在亨利中心平均每天的天然气现货价格从 2014 年的 4.38 美元每百万英制热量单位（MMBtu）下跌至 2015 年的 2.61 美元/MMBtu，这导致了天然气发电规模的壮大。最新的月度数据显示，2015 年四月，天然气的月发电量在历史上首次超过燃煤的月发电量，而且至少从七月至十月都是如此。最近的短期能源展望预计 2015 年电力部门的煤炭消费量将约有 764 MMST，达 1988 年以来最低。

2015 年美国的煤炭出口量也有所下降，尤其是向欧洲和中国等主要煤炭出口目的地。虽然 2014 年有 15.7MMST 的煤炭出口到英国和意大利，当所有的数据可用的时候，可预计出 2015 年只约有 2014 年一半的量。中国是世界上最大的煤炭消费国，从传统意义上讲，是一个大型国际煤炭贸易市场，2013 年中国从美国进口了 8.3 MMST 煤炭，占当年美国煤炭出口总量的 7%左右。2014 年美国向中国出口的煤炭下降到 1.8MMST，2015 年出口总额预计将低于 0.5MMST。根据美国人口普查局 2015 年九月的数据和今年剩余时间的估计，2015 年美国能源情报署预计美国出口共 77 MMST 的煤，比上年下降了 21%。



来源：美国能源信息管理局煤炭数据浏览器

除了洛矶山地区，主要盆地的锅炉用煤价格在 2015 年内经历了两位数百分比的下降。阿巴拉契亚中部的煤炭发电在成本上仍然受到天然气发电的挑战，2015 年平均蒸汽用煤现货价格又下降了 22%，继一年前下降了 13%以后。在粉河、伊利诺斯州和阿巴拉契亚盆地北部地区的煤炭价格在 2014 年基本上保持不变，在 2015 年分别下降了 18%、26%和 29%。

Coal India output to hit record 550 million tonnes in fiscal 2016: Anil Swarup, secretary

Increased output by Coal India has resulted in savings of about Rs 17,000 crore and the state-run miner is set for a record production of 550 million tonnes (MT) this fiscal, a top official said.

Coal India is the single largest producer of dry fuel in the world and the government has set a target of doubling its production to 1 billion tonnes by 2020.

"Increased production of coal has resulted in decline in imports and a resultant saving of about Rs 17,000 crore in

only first nine months of the fiscal," C ..

Swarup said coal imports, which fell down to about 132 MT in April-December period of the current fiscal from about 155 MT in the same period a year ago, are likely to fall further on the back of increased output.

"Coal India is likely to hit a record production in the range of 540 MT to 550 MT in the current fiscal," Swarup said.

He said the coal behemoth, which could hardly manage an increase of 31 MT of coal between 2010 and 2014, recorded an increase of about 32 MT in the last fiscal and has an "incredible" growth rate of 9.8 per cent.

He said increased production has not only resulted in enhanced energy production but also made available coal stock for 24 days with power plants, fro ..

The state-owned firm accounts for over 80 per cent of the domestic coal production.

Power and Coal Minister Piyush Goyal had earlier said that coal shortages will be a thing of the past and India will not need to import dry fuel by 2017, except to meet requirements of power plants located near coastal areas.

India had imported 212.103 MT of coal worth over Rs 1 lakh crore last fiscal.

部长阿尼尔•斯瓦鲁普称：印度煤炭产量在 2016 财政年度将达 5.5 亿公吨

一位高级官员称，印度煤炭增加的产量已经产生了 1700 亿卢比的储蓄，并且国营矿商已经为本财年设定了一个创纪录的 5.5 亿公吨（MT）的产量。

印度煤炭是世界上最大的干燃料生产商，并且政府已经设定了将其产量到 2020 年番一翻至 10 亿吨的目标。

“煤炭提高的产量已经导致进口量的下降，并且导致所得储蓄在本财政年的九个月内达到了 1700 亿卢比”……

斯瓦鲁普表示，在本财年四月-十二月期间与去年同期的 155MT 相比下降至 132MT 左右的煤炭进口量很有可能在产量增加的背景下进一步下跌。

“印度煤炭很有可能在本财政年度达到创纪录的 540MT 到 550MT 左右，”斯瓦鲁普表示。

他表示，这个在 2010 至 2014 年间几乎无法管理 31MT 的煤炭增量的煤炭业的商业巨兽在上一财政年度创下了 32MT 左右的增长纪录，并且达到了 9.8%的“惊人的”增长速率。

他表示，增加的产量不仅能够产生加强型的能源生产，而且能够为电厂提供 24 天的可用煤炭库存，从……

国有公司在国内煤炭产量中占到了 80%。

电力及煤炭部部长皮尤什•戈亚尔早期曾表示，煤炭短缺将成为过去的事情，并且印度到 2017 年将不再需要进口干燃料，除非为了满足沿海附近区域的电厂的需求。

印度在上一财政年度进口了 201.103MT 的煤炭，价值超过 1 亿卢比。

Obama administration halts new coal leases on federal land

WASHINGTON — The Obama administration is halting new coal leases on federal lands until it completes a comprehensive review of fees charged to mining companies and coal mining’s impact on the environment.

Interior Secretary Sally Jewell said Friday that companies can continue to mine coal reserves already under lease. The coal leasing program has not been significantly changed in more than 30 years and needs to be modernized to ensure a fair return to American taxpayers and to account for climate change, Jewell said.

“It is abundantly clear that times are different than they were 30 years ago, and the time for review (of the coal leasing program) is now,” Jewell told reporters in a conference call.

Officials also need to take into account new scientific data available on the impact of fossil fuels on the environment and on climate change, Jewell said.

Roughly 40 percent of the coal produced in the United States comes from federal lands. The vast majority comes from Wyoming, Montana, Colorado, Utah and New Mexico.

It’s unclear what impact the moratorium will have on U.S. coal production, given the declining domestic demand for coal and the closure of numerous coal-fired power plants around the country. Coal companies have already stockpiled billions of tons of coal on existing leases.

Even so, environmental groups cheered the announcement. The groups have long said the government’s fee rates for coal mining on federal land encouraged production of a product that contributes to global warming.

The administration held a handful of public hearings last year to get feedback on the adequacy of the fees charged companies for coal mined on federal lands. The government collects a 12.5 percent royalty on the sale price of strip-mined coal, a rate that was established in 1976. The money is then split between the federal government and the state where the coal was mined. Coal companies also pay a $3 fee annually for each acre of land leased.

Sen. Maria Cantwell, D-Wash., said taxpayers are being shortchanged on royalties that do not reflect the true costs of mining, both in terms of the economic value derived by mining companies and mining’s impact on the environment. Getting royalty rates right is especially important “given how much coal comes off federal land,” said Cantwell, the top Democrat on the Senate Energy and Natural Resources Committee.

“I’m glad to see the president take this action. We need to stop the sweet deal (mining companies) have been getting,” Cantwell said.

Government auditors for years have questioned the adequacy of the royalty rate and whether it provided an appropriate return to the government, although they did not make specific recommendations to raise it. Industry groups counter that any increase in royalty rates will hurt consumers and threaten high-paying jobs.

President Barack Obama said during the State of the Union address that he would push to change the way the federal government manages its oil and coal resources.

Jewell and other officials said Friday that reviews of the federal coal program have occurred twice before — once in the 1970s and again in the 1980s — and pauses on the approval of new mining leases accompanied each review.

Rep. Rob Bishop, R-Utah, chairman of the House Natural Resources Committee, said the moratorium on coal leases shows that Obama’s repeated claim to support an “all-of-the-above” energy agenda “was an election-year lie.”

The administration “should be putting our nation on the path of continued energy strength — not undermining our energy security at the bequest of radical environmentalists who wish to keep our resources under lock and key,” Bishop said. “Unfortunately, the president’s bid to solidify his legacy with the extreme left will come at the expense of America’s energy needs and will make the lives of people more expensive and more uncomfortable.”

House Speaker Paul Ryan, R-Wis., said coal on federal land “belongs to all Americans” and Obama is “denying people access to their own abundant, low-cost energy source.”

奥巴马政府暂停了联邦土地上新的煤炭租契

华盛顿——奥巴马政府将暂停联邦土地上新的煤炭租契，除非在其完成了有关就矿业公司及煤炭开采对环境造成的影响所收取的费用的全面审查之后。

内政部长萨莉•朱厄尔于周五表示，企业能够根据已经获得的租契继续开采煤炭储量。朱厄尔表示，煤炭租契计划在 30 多年内并没有发生显著地变化，并且需要进行现代化的改造以确保美国纳税人获得合理的回报，并且需要考虑气候变化。

“显然，时代与三十年前不一样了，现在是时候审查（煤炭租契计划）了，”朱厄尔在一次电话会议上告诉记者。

朱厄尔表示，官员们还需要考虑到现有的有关化石燃料对环境及气候变化所造成的影响的新的科学数据。

美国生产的煤炭中有 40%的煤炭来自于联邦土地。绝大多数来自怀俄明州、蒙大拿州、科罗拉多州、犹他州和新墨西哥州。

鉴于国内对煤炭的需求量有所下降以及全国各地有众多燃煤电厂相继关闭，暂停会对美国煤炭的生产造成什么样的影响目前尚不清楚。煤炭企业已经根据现有租契储备了数十亿吨的煤炭。

即便如此，环保组织对这一公告表示欢迎。该组织长期以来一直表示，政府对于联邦土地上的煤炭开采所收取的费率鼓励了这一有助于全球变暖的产品的生产。

奥巴马政府去年召开了一系列的公开听证会，以获得有关其为联邦土地上开采煤炭的企业所收取的费用是否充分的反馈。政府对条带开采的煤矿的销售价格收取 12.5%的版税，该费率始建于 1976 年。该经费在联邦政府及开采煤炭的州政府之间划分。煤炭企业还需要为每英亩租赁的土地每年支付 3%的费用。

华盛顿 DC 的参议员玛丽亚•坎特维尔表示，纳税人在没有反映出真实的采矿价值的特许权使用费方面受到了欺骗，无论是在矿业的经济价值方面，还是采矿对环境所造成的影响方面。“鉴于有多少煤炭脱离了联邦土地”，更正特许权使用费是非常重要的，参议院能源和自然资源委员会的最高民主党人坎特维尔表示。

“我很高兴能够看到总统采取这一行动。我们需要停止（矿业公司）一直以来获得的甜蜜的交易，”坎特维尔表示。

多年来政府审计师一直都质疑税率是否足够以及其是否能够为政府提供相应的回报，虽然他们并没有提出具体提高它的建议。行业组织反驳称，特许权使用费的增加将损害消费者，并且威胁高薪职业。

美国总统奥巴马在国情咨文期间表示，他将推动改变联邦政府管理其石油及煤炭资源的方式。

朱厄尔和其他官员于周五表示，联邦煤炭项目的审查曾经发生过两次——一次是在 20 世纪 70 年代，另一次是在 20 世纪 80 年代——并且每次有关新的采矿租契的批准都伴随着一次审查。

众议院自然资源委员会的主席 R-犹他州的众议员罗布•毕晓普表示，煤炭租契的暂停显示出，奥巴马一再声明支持“上述所有的”能源纲领“是一个选举年的谎言”。

政府“应该让我们的国家继续走在持续的能源增强的道路上——而不是根据那些希望将我们的资源加以严密管理的环保主义者的意愿来破坏我们的能源安全，”毕晓普表示。“不幸的是，总统通过极左来巩固他的执政的赌注将以美国能源需求为代价，并且会令人们的生活更加昂贵以及更加不舒适。”

R-威斯康星州的众议院议长保罗•瑞安表示，联邦土地上的煤炭“属于全美国人”，而奥巴马“将剥夺人民获得自己丰富且低成本的能源的权利。”

Electricity（电力）

Can We Move Forward To The Future Of Electric Power?

RSecently, utility efforts to defeat solar have been exposed in several Western states. SolarCity has allied itself with Renew American Prosperity (RAS), an advocacy group funding Checks and Balances, a group dedicated to holding utility regulators accountable. Other solar companies have allied with The Alliance for Solar Choice (TASC), a 12-member lobby group spearheaded by Sunrun (SolarCity was part of this alliance but recently pulled out).

Meanwhile, an investigation has begun into an Arizona commissioner's communications with utilities.

Investigations have exposed utilities' and utility finance companies' ties to dark money organizations.

The cozy relationship between utilities and regulators has been exposed. Unfortunately, the issues like net metering are buried behind such manipulations. Net metering has some advantages, but can also result in solar owners not being properly remunerated, or not properly reflecting utility's costs. It's a compromise.

The worst part of this is that lobbying and dirty tricks undermine the path to necessary change. The decades-old policy of guaranteed rate of return on capital has been a lucrative windfall for utilities, a prop for rate basing their way into complacency. And it has motivated utilities to defend stranded assets rather than avoid them.

But that era is ending, and they are trying with all their political might to hang onto their decaying monopolies.

A more edifying result would be an open discussion about how to respond to the changing customer/supplier landscape. The public/private public utility commission (PUC) regulated power system is badly out of date. Attempts to rectify imbalances in a rate-based system that subsidizes some customers at the expense of others have been found wanting. The California Public Utility Commission's early forays into time of use metering (TOU) are anachronistic.

Setting a fixed TOU annually by committee is unacceptable in the Internet era, as are schemes based on utility central data collection. They are both borne of ideas mired in the past and overlook the central problem. If electric power is to change, it must change its institutions first. Retail rates should reflect wholesale costs. That's what TOU is about. That would be fair to both consumers and producers. But implementing TOU won't do much good if we don't do it on a real time basis.

But what role would a PUC play if it didn't set rates? The California Electricity Crisis, artificially manipulated by Enron, exposed how weak regulation is, and how vulnerable we are to utility manipulation. We need to begin a fruitful discussion of how to prevent abuses, and how to move forward to a better system that embraces renewables and the other changes ahead, as we begin to navigate the stormy sea of climate change.

我们能将电力系统推动到一个崭新局面吗？

最近，据悉，几个西方国家公共事业努力抵制太阳能发电。SolarCity 已经联合了美国复兴社（RAS）。RAS 是一个制衡政府拨款的宣传团体，致力于保障公用事业监管机构各司其职。其他太阳能公司与太阳能选择联盟（TASC）结盟。TASC 一个是由 Sunrun 带头的 12 集团游说团（SolarCity 也曾是这个联盟之一，但最近退出了）。

与此同时，已开始一项对一个亚利桑那州专员与公用事业通讯的调查。

调查暴露了公用事业和公用事业融资公司与暗钱组织的联系。

公用事业和监管机构之间的和睦关系已经暴露。不幸的是，净计量电价的问题淹埋在这些操作背后。净计量具有很多优点，但也可能导致太阳能业主没有获得合适的报酬，或不能正确反映公用事业的成本。净计量只是一个折中方案。

最糟糕的是游说和肮脏的把戏破坏了通往改革的道路。几十年的资本收益保证率政策对公用事业来说是一笔丰厚的意外之财。该政策对资本收益保证率是一个支撑，同时也导致了他们的自满。它激励公用事业保护滞留资产，而不是避免他们。

但是，那个时代已经结束了，他们正试图以所有的政治力量保留他们腐朽的垄断。

更具启发意义的结果将是一个关于如何应对不断变化的客户/供应商的开放性讨论。调节电力系统的公共/私营公用事业委员会（PUC）已经严重过时。一种基于速率的系统通过牺牲他人的利益出资补助一些客户，试图纠正该系统失衡所做的努力被认为是存在缺陷的。早期加利福尼亚公共事业委员会尝试使用的时间计量（TOU）是不合时宜的。

在互联网时代，委员会设置的固定年时间计量是不可接受的，因为固定的年时间计量是基于公共设施中心数据收集的计划的。他们都是由过去的想法产生的，忽视了核心问题。如果电力系统要改革，必须首先改变它的机构。零售价格应该反映批发成本。这才是真正的时间计量。这对消费者和生产者都是公平的。但是如果我们不能立即去做，实现时间计量的效果将不会有多好。

但如果公共/私营公用事业委员会没有设定利率，那他扮演一个什么角色呢？加利福尼亚电力的危机、安然公司的人为操纵暴露了监管不力，以及我们对公用事业控制的软弱无力。我们需要就如何防止滥用职权、如何将现有系统推进到一个包括可再生能源和未来的其他变化的更好的系统等问题开始一个富有成果的讨论。我们即将航行在风云变幻、惊涛骇浪的海面上。

Why energy utilities are desperate to slug households with higher fixed charges

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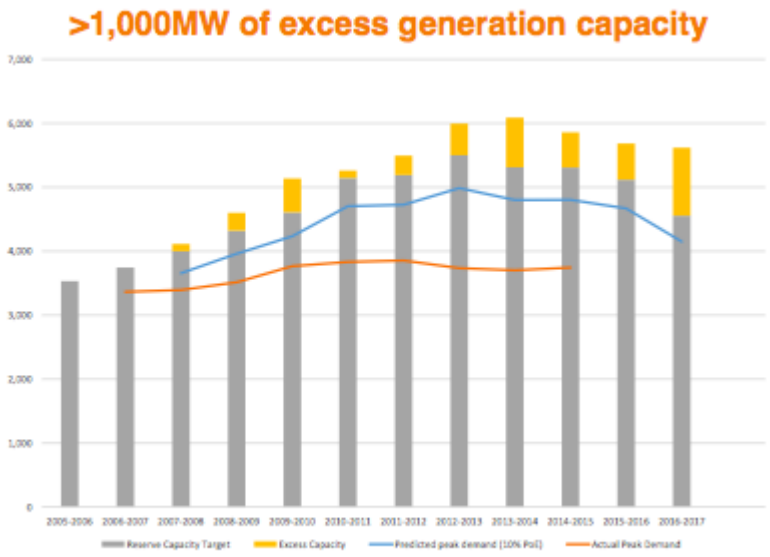
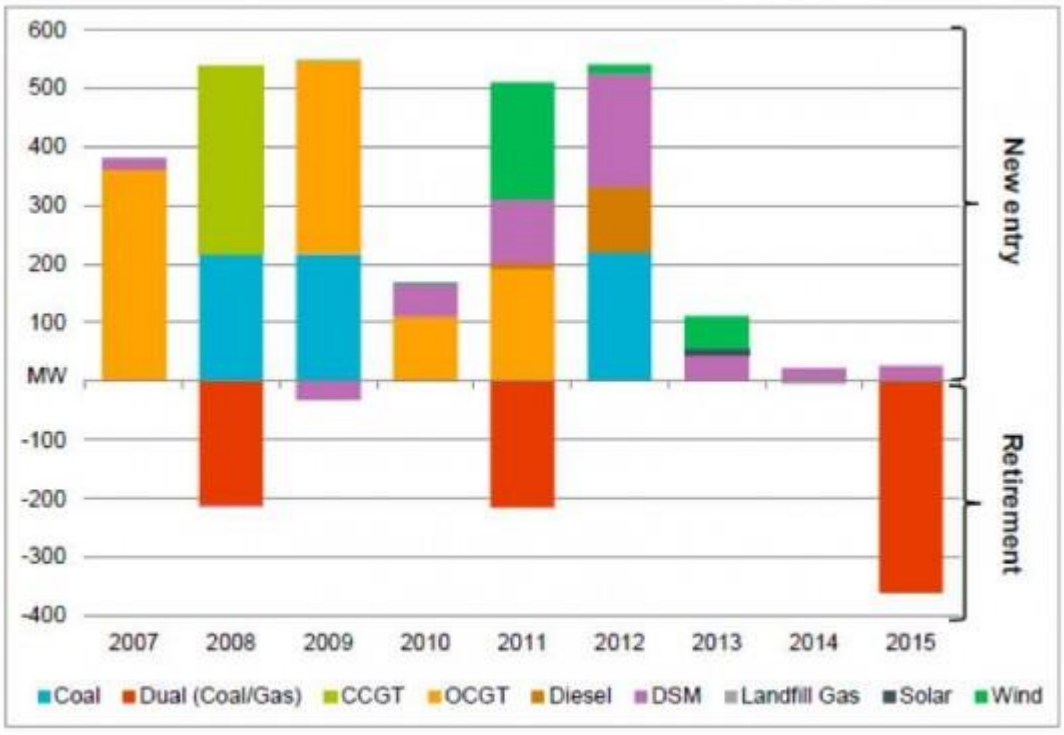
But based on those optimistic forecasts, industry members built a lot of extra capacity. By the time they realised their forecasts were wrong, there was about 1,000MW more capacity than was needed.



IMO Electricity Statement of Opportunities

And that wasn't because there was a lot of new wind farms (in green below) or solar. Most of it came in diesel and coal plants – the two most polluting technologies.

And because of WA's bizarre capacity market mechanism, some of these plants will never be switched on, but will still be paid to stand by for an event that will never materialise. The bill gets passed on to the consumer.

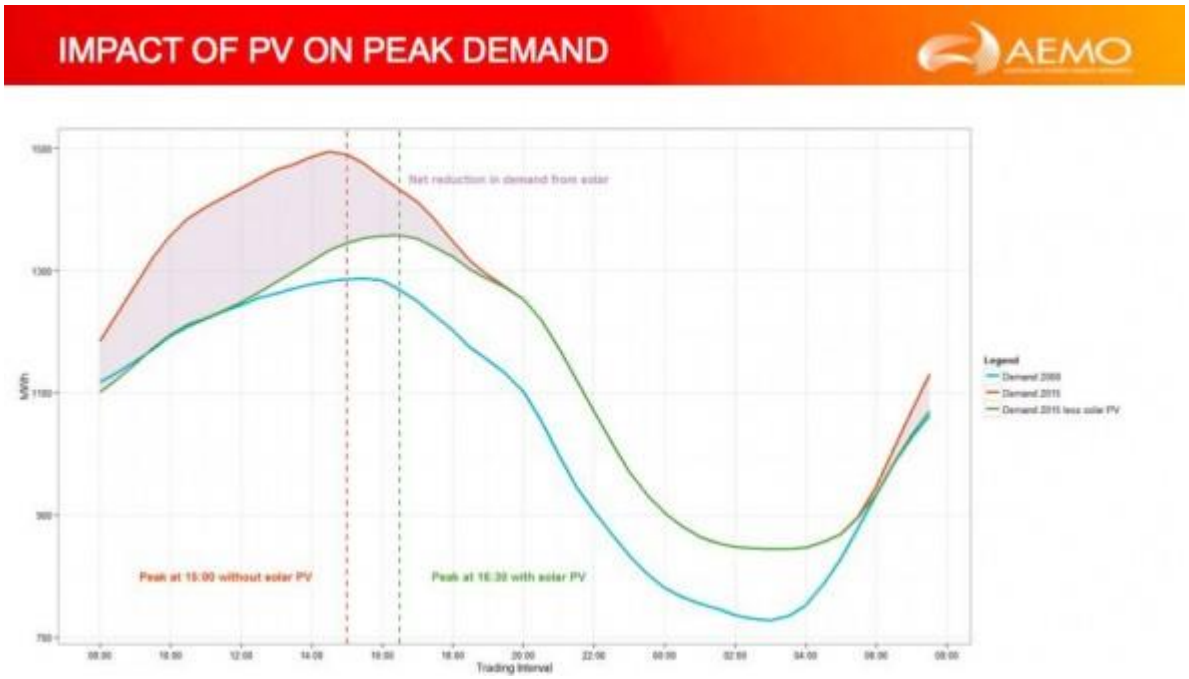


Entry and exit of generation capacity in the SWIS by fuel type, 2007-2015 (Source: IMO)

And because of the rising bills, including the costs of a super-sized grid that was also expanded on the basis of those mistaken demand forecasts, many households decided to invest in rooftop solar, first as the result of a high feed-in tariff, but eventually because it cut the bills.

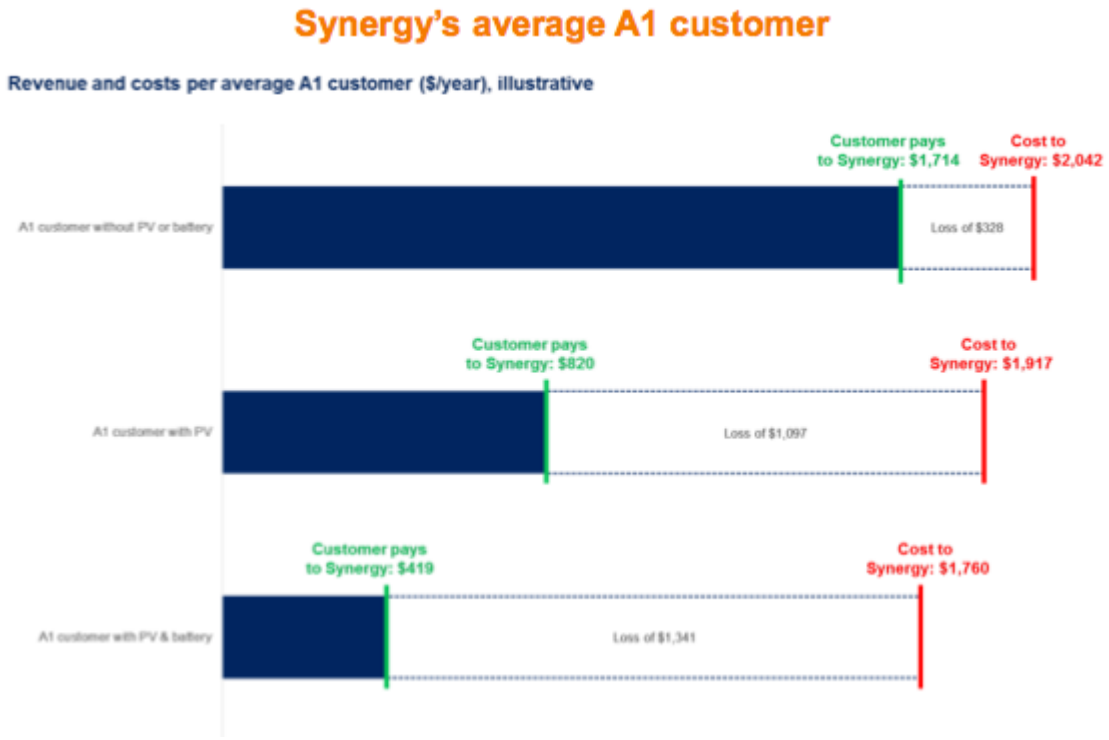
And this is what that has done to peak demand, pushing it back from 3pm to after 4.30pm, and reducing the size

of the peak by a considerable margin, meaning that the extra capacity in peaking plant and network size was not needed. Still, despite this, the networks try to argue that solar does not reduce peak demand, and should be hit with higher charges.

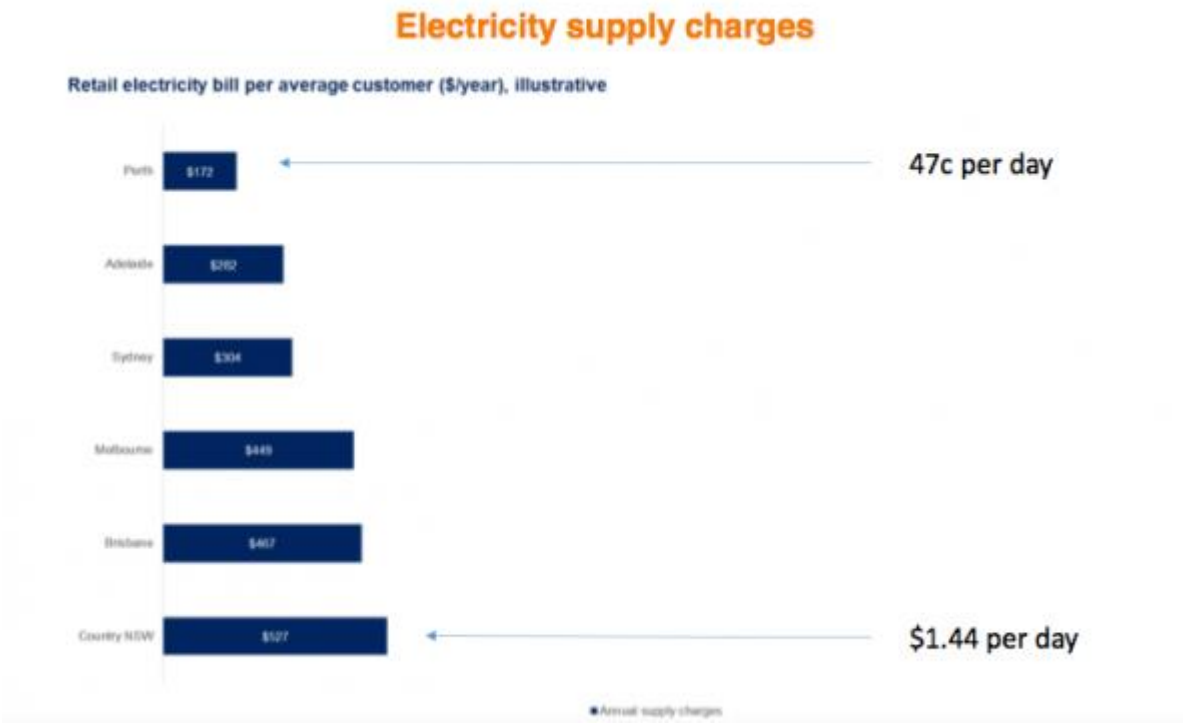


To cap things off, the government tried to hide the cost of building all those generators and network upgrades by subsidising the cost of electricity to consumers. Even now, each household pays around $328 less than the actual cost.

The fact that solar means that they will use the grid a lot less than they had means that Synergy will get around $900 less revenue a year from a solar households. The addition of storage expands that revenue loss by a further $400.



So Synergy and the network owner in Western Australia Western Power looked at what customers in other networks paid for their supply charges and found, to their horror, that the customer pays a lot less than households in the eastern states.



That's why they want to boost fixed charges. And what will be the result of that? Well, solar PV and battery storage costs are going to fall, and that will increase the options for consumers. So much so, that even energy minister Mike Nahan conceded that rooftop solar will meet all daytime demand in the state within a decade, and will force out coal generation.

So we go back to the start of Rowe's presentation, and this graph below about the failure of Kodak to adapt to new technology and the "gale of creative destruction."

What would you do?

为什么能源公用事业公司极度想要增收居民的定额费用

本月初，西澳大利亚电力公司协同多家公司引发了一场争议风暴，事情起因是电力公司董事长 Lyndon Rowe 建议增收一种“太阳能税”以打击太阳能用户。

说是协同，当然就不只一家这么想。在澳大利亚南部和新南威尔士州的网络运营商已经考虑对太阳能户增收网络费用，昆士兰州也在讨论类似的提议。

事实上，网络费用的上升会不可避免的影响到全国每个人。大多数网络运营商都在寻求提高固定收费的方法以应对消费者较少使用系统网络的情况。这是由屋顶的太阳能、能源的高效以及“账单休克症”共同导致的。

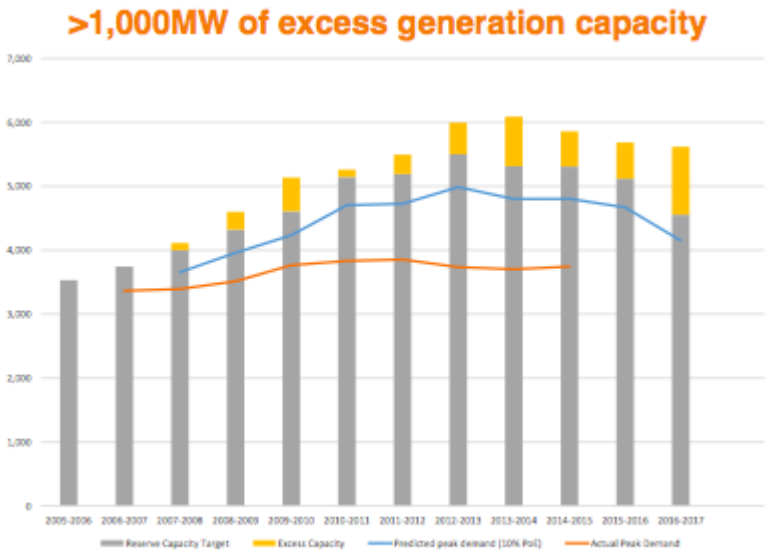
来自全国环境中心的 Mark Byrne 对新南威尔士州经销商 Ausgrid 在这片我们几周前调查的地方的行为给出了一个相当合理的解释。

但另一个问题是为什么网络运营商会如此热衷于用提高费用的方式打击消费者。从 Rowe 和 Matt Zema 介绍中看出，澳大利亚能源市场运营商的首脑已经接管了运营中的华盛顿电网。

又一个问题来了。网络运营商是如何花费大价钱扩大他们的网络，以及为什么要让零售商为他们的错误付出代价，而不是网络业主，如同敢做不敢当的合作公司想要消费者为他们的行为买单…

所以，在一开始都抱有很大的期望。当前能源行业对能源的使用做出了非常乐观的预测。在 2010 年，他们预测会有大的需求增长（图中的绿色线），但这些预测渐渐被现实取代。最后，事实表明几乎没有任何增长。

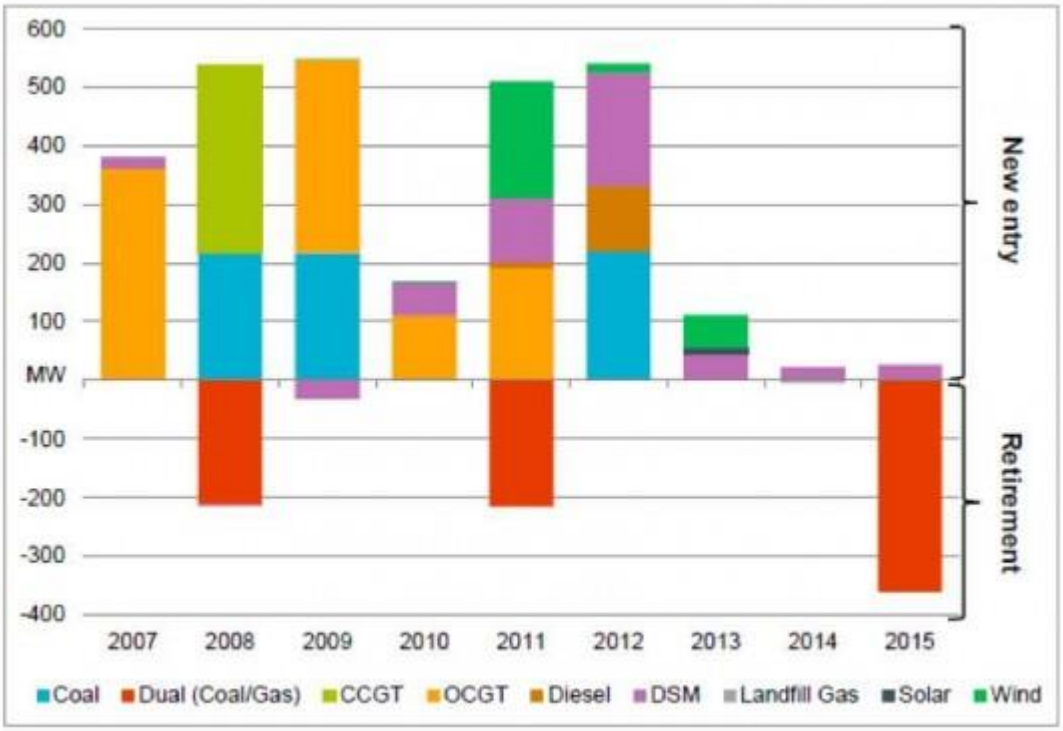
但是基于这些乐观的预测，行业成员制造了大量过剩的产能。当他们意识到自己的预测有误的时候，已经有 1000 兆瓦的产能过剩。



IMO Electricity Statement of Opportunities

这并不是因为有很多新的风力发电场（在绿色的下面）或太阳能。大部分过剩的能源产自柴油厂和煤工厂，这两种工厂污染最严重。

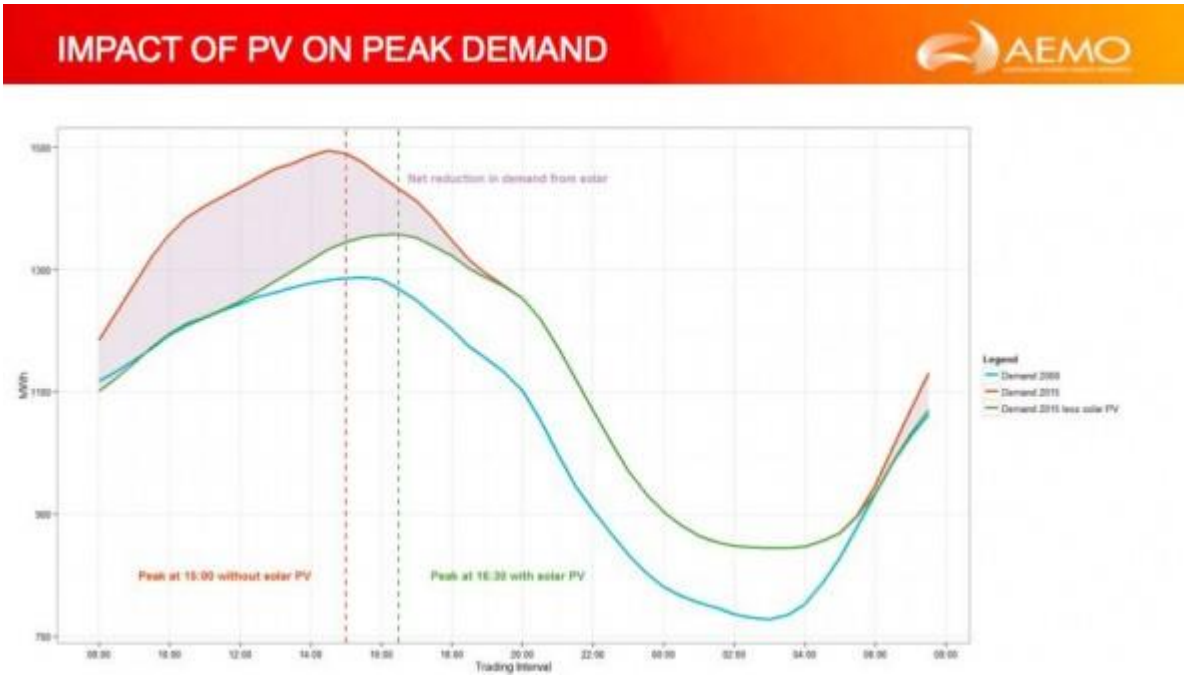
由于具有奇异能力的华盛顿的市场机制，这些工厂将不会盛行，但仍然需要为一些可能永远不会发生的事件的费用做预留。这些账单会转嫁给消费者。



Entry and exit of generation capacity in the SWIS by fuel type, 2007-2015 (Source: IMO)

由于不断上涨的费用，包括同样是基于那些错误的需求预测扩大的超大电网成本，许多家庭决定投资屋顶太阳能，首先这是高上网电价的结果，但最终因为投资屋顶太阳能削减了费用。

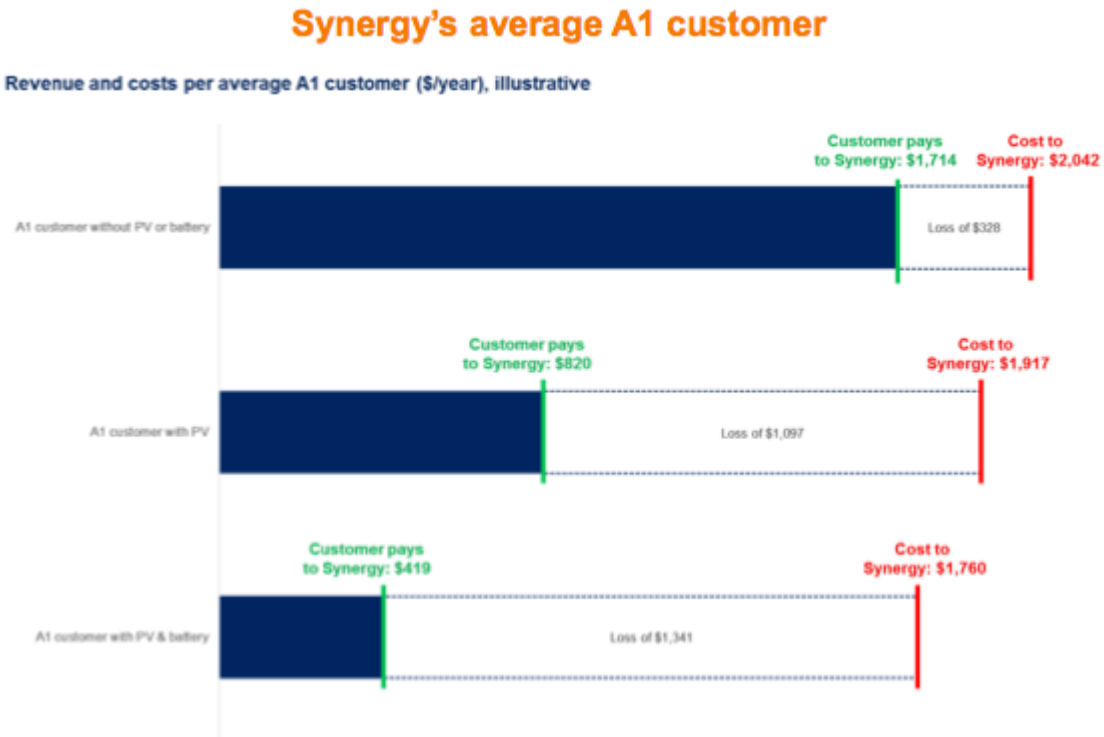
这就是他们为达到最高负荷所做的事情，从下午 3 点到 4 点半以后将它推回，通过一个相当大的盈余大幅度减少峰值的大小，这意味着这些剧烈增加的工厂和网络规模的产生的过剩电能是不需要的。尽管如此，网络运营商依旧试图争辩说，太阳能并没有减少需求高峰，并应收取更高的费用。



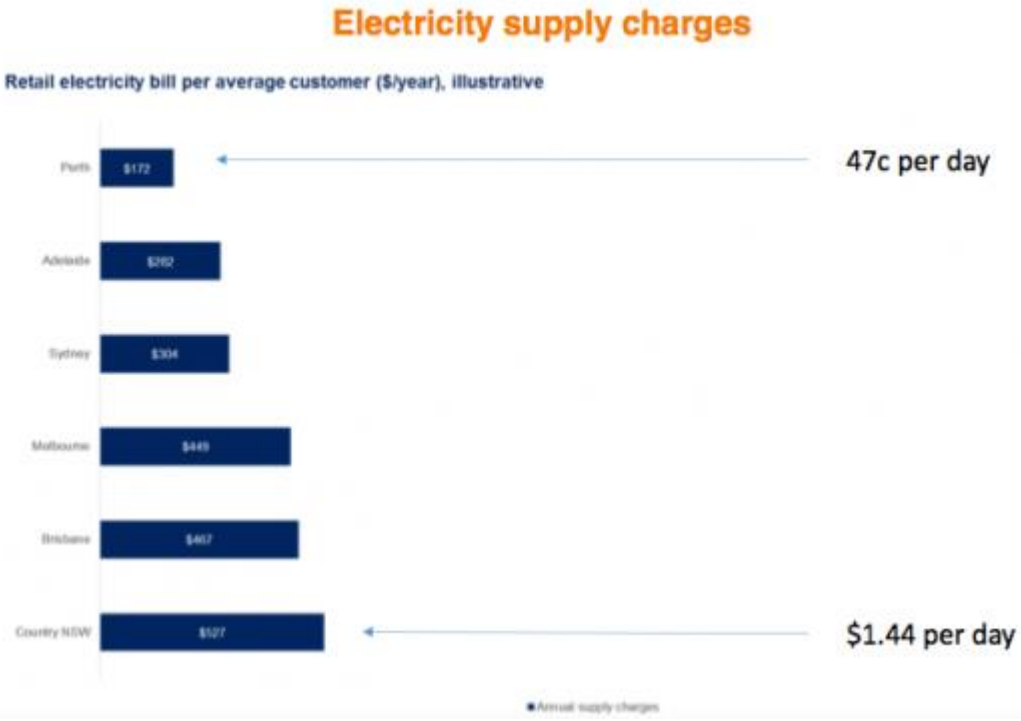
为了掩盖这些事情，政府试图隐藏所有这些发电机和通过给消费者补贴电力成本进行的网络升级的成

本。即使到现在，每个家庭支付的费用比实际成本低大约 328 美元。

使用太阳能意味着他们未来使用的网格比起过去使用的少了很多，这个事实意味着合作公司一年从一个太阳能家庭将获得不到 900 美元的收入。此外，存储增加需要进一步支付 400 美元，扩大了损失。



因此，西部电力公司的合作者和网络拥有者看到了客户在其他网络支付的费用，让他们恐惧的是，他们发现客户支付的费用远低于家庭在东部各州的客户。



这就是为什么他们要提高固定费用的原因。那这将会有什么样的结果呢？好吧，太阳能光伏电池和蓄电池成本将下降，这将增加消费者的选择。以至于能源部长 Mike Nahan 承认在这个国家的十年内屋顶太

阳能将满足所有白天的需求，并将迫使煤炭发电厂倒闭。

所以我们回到 Rowe 介绍的开始，下图讲述了关于美国柯达公司适应新技术的失败和“创造性毁灭的大风”。

你们会怎么做呢？

Climate change could cripple power generation, warns new study

Governments and the energy industry need to plan for the impact of climate change on power plants, says new research from the International Institute for Applied Systems Analysis

A warming world will reduce water supply from rivers and lakes that are essential to many forms of electricity supply, demanding a major response from governments and the energy industry, a new study has warned today.

Hydroelectric, coal, gas, nuclear and biomass plants, which currently account for around 98% of global electricity output, rely on plentiful supplies of water to operate effectively, and are a major draw on freshwater supplies that are already under pressure from climate change, pollution, and a growing global population.

Forecast temperature rises will likely further dry up rivers and lakes, and increase inland water temperatures to an extent that power supply would be curtailed, said the research, which was published in Nature Climate Change, an environmental journal.

“This is the first study of its kind to examine the linkages between climate change, water resources, and electricity production on a global scale. We clearly show that power plants are not only causing climate change, but they might also be affected in major ways by climate,” says Keywan Riahi, co-author and programme director with the Vienna-based International Institute for Applied Systems Analysis (IIASA).

The research cited US, southern Latin America, southern Africa, central and southern Europe, southeast Asia, and southern Australia as the most vulnerable regions, where climate change will likely have the biggest impact on water supplies, which help drive turbines in hydro plants or cool down coal and nuclear power stations.

The impact of climate change on water supply could affect 60% of the world's power plants in the period 2040-2069, a period by which the world will need to have shifted decisively away from coal if it is to stand a realistic chance of avoiding runaway climate change.

Foretaste

Several extreme weather events in the past few decades have given governments and energy companies a foretaste of a likely disruption to electricity supplies and huge economic costs that climate change could wreak on the power sector.

Sao Paulo, one of the world’s largest cities, endured regular power cuts last year as a major drop in rainfall, linked to climate change, deprived huge hydroelectric power plants of water.

A sustained drought in the western US has raised expectations that fast-growing cities in the ‘sunbelt’ will have to draw upon sources other than hydropower supplied by huge projects such as the Hoover Dam.

A record heatwave in northwestern Europe in 2003 prompted shutdowns of nuclear power plants as rising river temperatures hindered cooling systems. Low rainfall in western China earlier this decade curtailed hydro power production, ensuring that the grid had to turn to coal before rainfall levels returned to near normal levels.

China and India were among the countries that put a heavy emphasis on hydro power in climate plans, known as Intended Nationally Determined Contributions, that were the basis of the Paris climate agreement signed in

December.

There was less mention of nuclear, amid spiralling costs of atomic power. But for those countries considering big increases in coal, such as India, water shortages are a potential threat to future power supplies.

How to adapt

The IIASA study recommends that countries make their power plants much more efficient and encourage cooling systems that would reduce the vulnerability to dwindling water supply. Governments, as well as power companies, will also need to manage their water supplies effectively during periods of drought, points out Michelle Van Vliet, who led the study.

As a result, the power sector will need to increase its focus on climate change adaptation in addition to mitigation, the academic adds.

Climate campaigners hope that the 2C and 1.5C temperature targets backed by the Paris agreement, and a long-term decarbonisation goal, will speed up efforts to displace coal by encouraging big increases in the capacity of wind and solar, technologies that are much less reliant on water than thermal energy and hydro.

Developing countries want rich nations to deliver on promises to funnel finance that will help countries deal with the impacts of a warming world and climate proof essential infrastructure including electricity supply.

Developing and developed countries alike will also have to deal with other water-related impacts of climate change - such as flooding. Record levels of rainfall in the UK in December inundated electricity sub-stations, cutting off power to tens of thousands and adding to a hefty insurance bill as the world's major reinsurance companies grow increasingly concerned about climate change.

研究称气候变化恐削弱电力生产

新研究称，各国政府和能源行业需要就气候变化恐对电厂产生的影响做出规划。

今天，一项新的研究警告称，全球升温将会减少河流湖泊的水源供给，从而给多种发电形式产生至关重要的影响。因此，各国政府和全球能源行业需要采取重大措施加以应对。

水力、燃煤、燃气、核能和生物质发电量目前占据全球电力产量的 98%。这些电厂的有效运转依赖于充足的供水，对淡水供应的需求很大。受气候变化、污染和全球人口不断增长的影响，淡水资源已经十分紧张。

刊登在环保类期刊《自然气候变化》上的这项研究表明，预期气温上升有可能会进一步造成河流湖泊水量减少、内陆水域水温升高，从而导致发电量降低。

国际应用系统分析研究所（IIASA）项目主管兼报告共同作者 Keywan Riahi 表示，“这是首次从全球角度对气候变化、水资源、电力生产之间的关系进行研究。我们清晰地指出：发电厂不仅会导致气候变化，同时也是气候变化的受害者。”

该研究将美国、拉丁美洲南部、南非、中欧和南欧、东南亚、南澳大利亚列为最脆弱地区。气候变化将有可能最大程度地影响这些地区驱动水力涡轮发电机或参与燃煤和核能发电厂冷却环节的水资源的供应。

2040 年到 2069 年，气候变化对水资源供应的影响将有可能波及世界 60%的发电厂。在该阶段，若要切实避免气候发生不可挽回的变化，世界各国就需要实现从煤炭向其他资源的转移。

前兆

在过去几十年里，多例极端气候事件已经向各国政府和能源公司发出了一个信号：气候变化将有可能会给电力行业带来严重的破坏，造成电力供应中断，以及重大的经济损失。

由于常年干旱，美国西部地处“阳光地带”的一些高速发展的城市已经开始打算另辟蹊径，不再依赖胡佛大坝等大型水利设施来满足其电力需求。

2003 年，欧洲西北部地区遭受了极端热浪。由于河水温度不断升高严重影响了电厂的冷却系统，多家核电厂被迫关闭。前几年，中国西部地区降水过少导致水力发电量减少。在降水量上升到接近正常水平之前，当地电网不得不重新依靠燃煤电厂供电。

包括中国、印度在内的许多国家都在各自的气候计划，即 12 月份签订的《巴黎协议》的基础文件《国家自主贡献》（INDC）中着重强调要大力开发水电资源。

由于原子能成本不断增加，核电并未像水电那样受到重视。但是对于印度等计划扩大燃煤发电的国家来说，水资源短缺将有可能威胁其未来的电力供应。

如何应对

IIASA 的研究建议各国提高电厂能效，并鼓励安装能够能应对供水不足状况的冷却系统。该项研究的负责人米歇尔•冯丽德指出，在干旱时期，各国政府以及电力公司应当有效调节供水。

他还表示，除了减排之外，电力行业还需要加强适应气候变化的能力。

气候活动家们希望《巴黎协议》确定的 2℃和 1.5℃的温升目标、以及长期脱碳计划能够鼓励风能和太阳能的发展，从而能够更快地取代煤炭。相较于热能发电和水电，风能和太阳能技术对水的依赖程度更低。

发展中国家希望富裕国家兑现他们的承诺，提供资金帮助其他国家应对全球气温上升带来的影响、提供包括电力供应设备在内能够抵御气候变化的关键基础设施。

不论是发展中国家，还是发达国家，都将不得不应对气候变化导致的洪水等与水资源相关的问题。去年 12 月份，英国降水量创下了有史以来的新纪录，造成许多配电站被淹，导致电力中断，数以万计的居民受到影响。而由此造成的高额赔偿也引起了世界各大再保险公司和金融监管部门越来越多的关注。

China's power sector and the economic 'new normal'

The slowdown in China's economy is increasingly reflected in the country's flatlining power demand, a move that could deliver clear environmental benefits through a fall in coal consumption and increased use of renewable energy.

According to the latest figures released by National Bureau of Statistics (NBS), China generated a little over 5.6 trillion kilowatt-hours of electricity in 2015, down 0.2% from the previous year - its first drop since 1968.

Electricity output is an important gauge of the vitality of the industrial sector, and is a major cause of pollution in China, where coal is used for around two-thirds of power generation. Much of this electricity is used by heavy industries such as cement, steel, chemicals, materials and metals production.

Not only is coal-fired power generation blamed in part for the country's chronic air quality, the fuel is the biggest single source of greenhouse gas emissions in China, the world's largest emitter of carbon dioxide.

Since China’s GDP fell to an annual rate of 6.9%, its slowest pace in 25 years, electricity suppliers have been forced to rein in production and adapt to less favourable market conditions.

“From the data, we can see that China’s economy is still in the process of transition," said Wang Tao, assistant dean of the China Business News Research Institute. Total energy consumption, which includes oil products used in transport, only grew by 0.9% in 2015, the lowest growth rate since 1998, Wang added.

The same downward trend has affected China’s electricity consumption. The National Energy Administration confirmed that power consumption in 2015 stood at 5.55 trillion kilowatt-hours, an increase of only 0.5% year-on-year. The figure is 3.3% less than the 2014 level, registering as the slowest growth since 1974.

Zhou Dadi, a senior research fellow with the Energy Research Institute of the National Development and Reform Commission, said that weakening demand from the industrial sector had contributed most to the decline.

“A ‘new normal’ has been unfolding in China’s power sector. It’s marked by weakening demand and a

contraction in output resulting from the industrial restructuring. We have been used to seeing annual electricity consumption increase by 8% or more but it's quite a different situation now," said Zhou.

New players

Meanwhile, coal's contribution to the energy mix has continued to fall since its initial drop in 2014. Last year, electricity generated from thermal power (which includes gas) fell by 2.8%.

"This trend originates from an overall weakening demand and the increasing contribution of non-fossil fuels," said Wang.

By contrast, 2015 saw a 20% increase in the contribution of non-fossil fuels and renewables to electricity output, further evidence that China's fast-growing renewable energy sector is speeding up its shift away from coal, said Li Junfeng, director general of the National Climate Change Strategy Research and International Cooperation Center.

Long-term trend

"The deployment of more non-fossil fuels will not only meet electricity demand, but will eventually substitute the share that coal-fired power plants used to provide. In coming years, thermal powered electricity output is expected to decline at an annual rate of 2%-4%. In the meantime, the contribution of non-fossil fuels will increase by more than 20 % annually," Li added. "The decline [in power demand] will be a long-term trend."

However, despite the decline in output, more coal-fired plants were installed last year even though these are expected to become less economically efficient in future years, as renewable energy is given preferential access to the grid.

"Some local governments are still purchasing and installing new coal-fired generation units. This activity is clearly a misconception of the overall [oversupply] situation and should be curbed vigorously," said the ERI's Zhou.

Renewables power up

Analysts estimate that renewable energy, including hydro and nuclear will account for 1.7 trillion kilowatt-hours in 2016. Increases in wind and photovoltaic solar capacity will become the main focus of China's push for cleaner energy.

Alvin Lin, China climate and energy policy project director from the Natural Resource Defense Council, noted that China's energy sector, and wider economy, are moving decisively away from coal.

"With continuing efforts to reduce air pollution and carbon emissions, 2016 is likely to be a crucial year for China to cap coal consumption and restructure its economy in a more sustainable manner."

More efficient and wider deployment of non-fossil fuels and renewables could have wide economic benefits, said a recent report by the International Renewable Energy Agency.

Economic benefits

The report predicts that the global GDP can increase by up to 1.1% in 2030 if the share of renewables in the global energy mix can be doubled to reach 36% by that time. In economic terms, the GDP increase would be worth US$1.3 trillion (8.3 trillion yuan), in which China would have a large share.

According to the agency, China is already home to the world's largest workforce for renewables-related industries. More than 3.4 million people are employed in the sector, with more than half of them concentrated on the solar photovoltaics sector.

With more investments and technological upgrades in the offing, these industries are expected to diversify further and serve as an alternative, healthier and greener lubricant for China's economic engine.

中国电力产业呈现“新常态”

世界第二大经济体经济减速的又一个切实证据出现了。根据国家统计局公布的最新数据，2015 年中国的发电量略高于 5.6 万亿千瓦时，较上年减少 0.2%。这是 1968 年以来年发电量首次下降。

发电量是体现工业整体活力的一个重要标准。中国 GDP 年增速下降到 25 年来的最低点 6.9%时，电力供应商们也不得不控制巨大的发电能力来适应不利的市场环境。

第一财经研究院助理院长王韬博士在接受中外对外采访时说，整个能源产业的总体形势也是如此。

“从周一国家统计部门公布的数据可以看出，中国经济仍然在转型过程中，新常态尚未成型。根据已公布的能源强度和 GDP 数据推算，2015 年的能源消费总量只增长了 0.9%，这是 1998 年以来的最低增速，和 GDP 的增长情况毫无二致。”

中国的电力消费量也出现下滑。国家能源局已经确认，2015 年中国的电力消费量为 5.55 万亿千瓦时，同比增长 0.5%，较 2014 年增速下降了 3.3 个百分点，创 1974 年以来的新低。

国家发展和改革委员会能源研究所研究员周大地指出，工业部门需求的减少是造成电力消费下降的最大原因。

“可以说，中国电力产业的一个新常态正在形成，其主要标志是需求减少和发电量下降，这是产业结构转型的结果。现在来看，这个新常态似乎要持续一段时间。我们过去一直习惯了中国的年发电量以 8%或者更高的速度增长，但如今情况已经截然不同。” 周大地谈到。

非化石能源成为关键角色

电力产业的能源结构正在发生着深刻变革。中国电力产业正逐步减轻对传统煤炭的依赖，更多地利用非化石能源和可再生能源。

王韬说：“从能源结构来看，煤炭占比从 2014 年首次出现下降以后就一直没有停止下滑的趋势。2015 年火力发电量减少了 2.8%，这一趋势是由整体用电需求的下降以及非化石能源比例的持续增长所造成。”

与火力发电量的下降形成鲜明对比的是，2015 年非化石能源和可再生能源的发电量增长了 20%以上。中国国家应对气候变化战略研究和国际合作中心主任李俊峰将这看作是能源结构优化调整的一个标志。

他说：“非化石能源的比重增加，不仅可以满足未来电力需求的增长，也可以逐步替代由燃煤发电所占据的份额。未来几年，火力发电量将以每年 2-4%的速度下降；与此同时，非化石能源发电量将保持每年 20%以上的增速。”

周大地指出，能源结构的变化是国家战略再调整中优先利用非化石能源和可再生能源的结果。由于政府的利好政策和激励措施，非化石能源和可再生能源所生产的电力已经越来越多地纳入国家电网。他表示，火力发电产能过剩的问题仍然困扰着电力产业，因此，非化石能源和可再生能源仍有发挥更大作用的潜力。

燃煤发电过剩仍是一个巨大挑战

尽管发电量下降，2015 年新装燃煤发电机组仍在增加。据国家统计局估算，去年新增火力发电机组容量为 6400 万千瓦时。这样一来，中国的火力发电机组的年总发电能力达到 9.5 亿千瓦时。周大地强调，如何削减或导出这些过剩产能，仍然是今年电力行业的当务之急。

“电力行业似乎低估了电力供求关系的急剧变化。中央政府已经说得很清楚，要把非化石能源和可再生能源放在优先地位，未来会注入更多资金来激励发展。但是，某些地方政府仍然在购进和安装新的燃煤发电机组。这种做法显然是对整体形势的误读误判，必须切实加大管控力度。”

周大地的上述表态代表了大多数专家的观点。李俊峰提醒电力产业，事实上中国的煤炭生产和消费从 2014 年就开始持续下降。

李俊峰说：“当时，中国的煤炭生产和消费似乎进入了一个停滞期，未来可能会有回弹，但强劲的反弹或上涨将不会出现，下降会是一个长期的趋势。”

可再生能源前途大好

专家们估计，2016 年中国的可再生能源发电量将达到 1.7 万亿千瓦时，其中风力和光伏发电是最受青睐的方式。自然资源保护协会中国气候与能源政策项目主任林明彻认为，中国的经济和能源结构正在坚定地向着去除煤炭密集型的方向发展。可再生能源需求的不断增加对实现中国的环境保护承诺来说会是利

好。

“去年，中国对可再生能源的投资达到 1100 亿美元，创历史新高。清洁能源正在逐步替代燃煤发电。随着减少空气污染和碳排放的努力，中国要限制煤炭消费并用一种更加可持续的方式实现经济转型，2016 年将是至关重要的一年。”

中国要保持相对强劲的经济增长势头，更高效广泛的引入非化石能源和可再生能源会是一个可行出路。国际可再生能源署最近发表的一份报告有力地支持了这一观点。

这份题为《可再生能源之益：经济杠杆》的报告预测，如果 2030 年可再生能源在全球能源结构中的比例达到 36%，全球 GDP 将有 1.1%的增长。折算成货币价值约为 1.3 万亿美元。

该机构认为，中国已经拥有世界最大的可再生能源相关产业劳动群体，从业人数超过 340 万，其中一半以上都集中在光伏产业。随着投入的持续增加和技术升级，这些产业有望愈发多样化，并助力于中国经济引擎向更健康和绿色的方向发展。

Moving nuclear reactors inland is a bad idea

China is considering inland sites for nuclear reactors. Policy experts MV Ramana and Amy King tell us why this is risky

Following the Fukushima nuclear disaster, and wider concerns over the safety of Chinese nuclear facilities, China's central government suspended its consideration of proposals for construction of nuclear power plants at inland sites. But in the last couple of years, pressure has been renewed to build nuclear plants at sites away from the coast.

Beijing is now mulling over the decision to build new nuclear plants inland as an alternative to coal power, which has been the cause of disastrous air pollution in parts of the country.

As we have argued elsewhere, there is a growing tension between the government’s plan for rapid expansion of nuclear power and its commitment to safety. The final decision over inland nuclear construction will decide how this tension is resolved.

For now, Chinese policymakers face a risky decision. All of China’s nuclear power plants are currently located in coastal provinces. But in the second half of the last decade, plans were drawn up to start construction of nuclear power plants in inland areas.

The renewed pressure on the central government to reintroduce this plan is coming from local, provincial and county-level governments. The latter argue that they would benefit from greater tax revenues and economic growth generated by future nuclear plants, built and managed by State Owned Enterprises (SOEs), such as China National Nuclear Corporation and China General Nuclear Power Corporation.

In Hunan province, for example, the general manager of the Hunan Taohuajiang Nuclear Power Company, Zheng Yanguo, told reporters in September 2014 that an investment of 70 billion yuan (US$11 billion) in the Taohuajiang nuclear power plant would return GDP growth of over 100 billion yuan to Hunan, and generate annual tax income of around 15 billion yuan.

At the March 2015 National Party Congress, delegations from Hunan and Hubei provinces called upon the central government to restart construction of inland power projects at the beginning of the 13th Five Year Plan (2016-2020).

Further adding to these pressures to restart inland nuclear construction are the central government’s own ambitious nuclear expansion targets, which are increasingly seen as requiring the opening up of inland sites.

So why is the location of inland plants so controversial? It stems from the fact that inland nuclear power plants pose far higher risks to nearby water sources and to the people dependent on these resources than comparable

coastal plants.

Water worries

Water is critical to the functioning of nuclear power plants. Nuclear reactors circulate large quantities of water through their radioactive cores in order to remove the tremendous amounts of heat produced.

For each hour of operation, a typical 1,000 megawatt nuclear reactor has to pull in (or withdraw) about 170,000 cubic metres of water from some external source. Of this, about a thousand cubic metres evaporate and the rest of the water is returned to the external source at a higher temperature.

This is why nuclear reactors are always located near a large body of water—the ocean or a large lake or river. By contrast, 'combined cycle ' natural gas plants withdraw only about a quarter of what a nuclear plant does and the net amount of water that would evaporate from a natural gas plant is about 40% of the evaporation level of a nuclear plant.

Wind and solar photovoltaic plants use only very small amounts of water, such as for cleaning or panel washing, and thus have negligible impacts on water resources.

Water is also critical in the event of a nuclear accident, as was demonstrated during the March 2011 Fukushima disaster. While at Fukushima, there was no shortage of water outside the reactor, it was not possible to circulate this water through the reactor—and therefore remove the heat being generated there—because there was no electricity available to run water circulation pumps. The result was a nuclear meltdown and eventually the dumping of enormous amounts of radioactive materials into the Pacific Ocean.

In the event of an accident, nuclear plants located far from the ocean would have to discharge their effluent into a river or a lake. In China, where 70% of rivers and lakes are already contaminated according to the World Watch Institute, this could be disastrous.

Climate change is only making the situation worse. Globally, the number of days per year when inland water body temperatures are too high to effectively cool a nuclear reactor are increasing.

Finally, even without an accident, the sheer amounts of water needed by nuclear plants make it unsuitable for inland locations in China. Water availability is already a big concern—the per capita availability of renewable freshwater is only a third of the global average. Consulting company McKinsey estimates that demand for water in China will increase by 61% between 2005 and 2030 and outstrip supply by 25% at the end of that period.

Holes in the argument

In China, pro-inland expansion groups argue that there is a paucity of coastal sites; that profits inland are favourable; that new reactor designs “can avoid Fukushima-like catastrophes”. They add that nuclear power plants have a role in clearing smog and improving air quality because, unlike coal-fired power stations, nuclear plants do not emit smoke or various chemicals.

However, each of these arguments is only partially valid. For instance, the provinces where inland nuclear plants are proposed are not necessarily those most threatened by air pollution. Furthermore, all nuclear reactors can undergo catastrophic accidents, even the so-called third generation ones. These reactors have all of the same fundamental ingredients that made possible the earlier accidents at Chernobyl and Fukushima: a complex technology with large quantities of radioactive materials at high temperatures and pressures, and where even small errors can quickly spin out of control.

Although the nuclear industry uses a technique called probabilistic risk assessment to argue that the likelihood is very small, there are serious problems with this methodology and its results are simply not reliable.

Local opposition

Plans for inland construction have met resistance from citizens.

In the aftermath of Fukushima, opposition to the plant erupted in the adjoining Anhui province. The government of Wangjiang county, which is directly downstream from the proposed Pengze site, publicly accused the Pengze project of "falsifying its EIA [Environmental Impact Assessment] report," and objected to Jiangxi province's failure to consult its provincial neighbours before deciding where to site the plant.

If the Pengze project goes ahead, Anhui faces the risk of nuclear contamination in the event of an accident, but would not enjoy the majority of any economic or energy benefits from the plant.

While the level of opposition in Anhui is unprecedented, it comes in the wake of a significant increase in the Chinese public's perception of risk from nuclear facilities, following the Fukushima disaster. This concern is also shared by some elite, retired nuclear experts. More generally, it has been reported that many Chinese people are nervous about the prospect of large nuclear expansion.

Five days after the Fukushima nuclear disaster started, China's State Council stated: "Safety is our top priority in developing nuclear power plants". As we approach the fifth anniversary of Fukushima, it is worth remembering that just talking about nuclear safety is not enough. If safety is indeed the top priority, it should be demonstrated through firm decisions. Some of these decisions could result in slowing down or limiting nuclear construction.

A ban on inland nuclear construction would be a good start. It would make clear that China's central government is willing to put the lives and livelihoods of its citizens above the economic interests of local governments and SOEs.

内陆核电建设并非明智之举

中国大举推动内陆核电项目，政策专家拉玛纳•M·V 和金艾美解析为何核电从沿海转向内陆会导致更大的环境风险。

水是生命之源。中国属于相对干旱的国家，人均可再生淡水资源拥有量仅为世界平均水平的三分之一，水资源的可利用量并不乐观，而这一情况将会变得更糟。麦肯锡咨询公司预计，2030 年中国的用水需求量将在 2005 年的基础上增加 61%，并将超出供应量 25%。

水资源对亿万中国老百姓的生计也至关重要。中国有三分之一的劳动力从事农业生产，但由于气候变化的影响，这一产业面临着水资源供应不足的威胁。中国《第三次气候变化国家评估报告》预计，"气候变化可能会进一步加剧洪涝灾害的发生"并且"给水资源管理带来更加严峻的挑战"。

更让人惊讶的是，水也是核电站运作的重要条件。核反应堆运转时需要大量的循环水带走反应堆内核产生的巨大热量。通常一座 100 万千瓦的核反应堆每工作一小时就需从外部水源中吸入 17 万立方米的水量来降温，这其中约有 1000 立方米水蒸发成为水蒸气，其余温度较高的水则会回流到外部源头之中。这就是核反应堆总是建造在大片水域（海洋、大型湖泊或河流）附近的原因。相比之下，天然气联合循环电厂的取水量和耗水量仅为核电站的 25%和 40%。风能和太阳能光伏发电厂则仅需要少量用水进行清洁，因此对水资源造成的影响可以忽略不计。

核事故发生时，水的作用可能会更加关键，2011 年 3 月日本福岛第一核电站事故就是很好的例证。福岛核电站反应堆外部并不缺少水源，但由于事故发生时没有电力可用，水循环系统无法启动，反应堆内部热量得不到散发，由此造成堆芯融毁，最终导致大量放射性废水流入太平洋。现在请想象一下在内陆建立核电站的情形。这种核电站一旦发生事故，核废水将势必排入湖泊或河流之中。因此，内陆核电站给附近的水源以及依赖这些水源而生的人们造成的威胁，要远远高于规模相近的沿海核电站。而气候变化只会让这一情况变得更糟：全球范围内，每年内陆水体水温过高的天数正在增加，而内陆水体温度过高时就无法有效地降低核反应堆的温度。

那这一切又有什么重要的意义呢？目前，中国决策部门正面临一个极具风险的决定。当前中国所有的核电站均位于沿海省份。上个十年的后半段，曾有方案提出在内陆地区设立核电站。但出于对中国核设施安全问题的考虑，也鉴于福岛核事故的发生，中央政府出台禁令，禁止修建内陆核电站。在过去一年左右

的时间里，中央面临着越来越大的压力，要求取消这条禁令的呼声越来越高。据报道，目前政府正在审慎地考虑建设内陆核电站的问题。正如我们在其他文章中详细讨论的那样，中国政府加速发展核能的计划与核安全之间的权衡关系日趋紧张，而中央关于内陆核电站修建的决定将会体现出其如何缓解这一紧张趋势。

中央政府的压力来自多方强大势力——除了着眼于核电站落成后带来税收和经济增长的地方、省级以及县级政府之外，还有像中国核工业集团以及中国广核集团这类负责核电站建设和管理的国有企业。例如，在 2015 年 3 月召开的中国共产党全国代表大会上，湖南省和湖北省的代表都呼吁中央政府在十三五计划（2016-2020）初期重启内陆核电站的建设计划。而促使中央政府重启内陆核电站建设的另一项压力其实来自它自身雄心勃勃、想要加速发展核能的目标，中国政府要求放开内陆选址也日益体现了这一点。

一些团体以各种理由向中央施压，要求开放内陆核电站建设，理由包括：沿海厂址匮乏；从现有投资中获利；新型的反应堆设计“能够避免类似福岛事故的灾难”；以及内陆核电站有可能减少雾霾，改善空气质量。上述每条理由都仅仅是部分成立。例如，计划建立内陆核电站的省份并不全是空气污染最严重的地区。同样地，所有核反应堆都有可能发生灾难性事故，甚至所谓的第三代核电站也不例外。

建设内陆核电站的计划同样也遭到了当地居民和政府的抵制，位于长江边的江西彭泽核电站项目就是其中之一。福岛事件发生之后，江西的邻省安徽就爆发了反对该核电站建设的事件。安徽省望江县位于彭泽核电站拟选址地点的下游，该县政府公开谴责彭泽核电项目“伪造环境影响评价（EIA）报告”，并且抗议江西省未咨询邻省意见，就擅自决定电站选址的行为。如果彭泽核电项目得以继续，安徽省非但无法享受到核电站带来的大部分经济和能源利益，且一旦出现事故，还将面临核污染的危险。安徽省内对于彭泽核电项目的抗议程度是前所未有的，这主要是由于福岛核电站事故发生之后，中国民众对于核设施的风险认知出现大幅提升。一些已经退休的核电精英对此也有着同样的担忧。普遍来说，有报道称许多中国民众都对本国大规模发展核能的计划表示担忧。

福岛核事故爆发后五日，中国国务院表示：“核电发展安全第一”。在即将迎来福岛核事故五周年之际，我们应该牢记，核安全单靠说是不够的。如果真的是安全第一，那就应该通过具体决定证明这一点，而其中一些决定可能会减缓或者限制核电建设。明确禁止内陆核电站建设将会是一个良好的开端，禁止发展内陆核电将清楚地表明，中国中央政府愿意把民众的生活和生计放在地方政府和国有企业的经济利益之上。

Spanish court feed-in tariff ruling branded ‘superficial and alien to reality’

pain’s Constitutional Court has published the full details of its judgement rejecting appeals against a decrease in feed-in tariffs for renewable energy sources, but the reasoning has been branded “short, superficial and alien to reality” by a legal representative.

The Spanish government announced the result of the judgement last week, but without any detail on the court's full judgement. However, this week’s publication shows that the Constitutional Court considers that the Royal Decree Law establishing a new payback of 7.5% for renewable energy sources, down from 10-12%, does not collide with the principles of legal certainty or protection of legitimate expectations, as had been claimed by opponents of the measures.

Daniel Pérez, attorney at Holtrop S.L.P, told PV Tech that this Royal Decree would now need to be put through the Court of Justice of the European Union. Meanwhile a major electricity reform law still is still to be put through both the constitutional and EU legal processes.

Pérez explained that Royal Decree laws are instruments that can only be used in extraordinary circumstances as they have legal force but do not require parliamentary approval. The appeal against the Royal Decree claimed that

the tariff deficit under the FiTs was not an urgent situation, but the court rejected this.

Secondly, referring to legal certainty, the court said there is no “petrification of the legal norms” and therefore the government is able to change these laws at will, according to Pérez.

Thirdly, the court decided that renewable energy producers should have foreseen that there was a possibility of change in the law, and therefore rejected the appeal based on ‘legitimate expectation’. It said these expectations of possible changes should have come in a few months before the norm was applied in July 2013.

However Pérez claimed that this decision does not take into account the nature of renewables “especially PV”, where the majority of investment takes place at the very beginning of a project with investment recovered over a period of several years afterwards.

Pérez said: “If the tariff regime is changed after five years, the producer will not have recovered its investment and there will be no margin for the producer to change its activity.”

Therefore Pérez said producers should only have to foresee possible law changes “at the moment of investment” rather than a few months before a change in the norm.

Furthermore, Pérez said that three out of the 11 judges have signed a dissenting opinion against the court ruling, saying that the reasoning should be more elaborated, as the court faces a very delicate issue.

In related news, Spain’s Supreme Court has found an administrative appeal by the Association of Renewable Energy Producers (APPA) against new legislation on the self-consumption of PV to be legally admissible.

Pérez that this was a “positive step” for the appeal against Spain's so-called 'Sun Tax', but it is only a basic qualification for the APPA to participate in the legal process and no significant decision has been made.

西班牙法院上网电价补贴裁决被打上“肤浅且违背现实”的标签

西班牙宪法法院日前公布其判决的全部细节，驳回反对削减可再生能源上网电价补贴的上诉，但论证日前被法定代理人打上“缺乏、肤浅且违背现实”的标签。

上周西班牙政府宣布判决结果，但是没有法院整个判决的任何细节。不过，本周的发表显示，宪法法院认为，皇家法令对可再生能源确定的从 10-12%下调至 7.5%的新投资回报，与反对者声称的法律确定性原则或合法预期的保护并不冲突。

Holtrop S.L.P 的律师丹尼尔·佩雷斯(Daniel Pérez)在接受 PV-Tech 采访时表示，这一皇家法令现将需要提交给欧盟法院。与此同时，一个主要的电力改革法也要遵守宪法和欧盟法律程序。

佩雷斯解释道，皇家法令由于具有法律效力但不需要议会批准，所以只能在特殊情况下使用。反对该皇家法令的上诉称，上网电价补贴造成的资费亏空并非紧急情况，但是法院驳回了这一点。

根据佩雷斯，其次，提及法律确定性，法院认为，“法律规范并非僵化”，因此政府能够根据意愿改变法律。

第三，法院决定，可再生能源生产商应预见到法律改变的可能性，因此驳回基于“合法预期”的上诉。其表示，对于可能发生的变化的预期应该在 2013 年七月规范实施前几个月出现。

然而佩雷斯称，这一决定没有考虑到可再生能源的特点，“特别是光伏”，大多数投资是在项目一开始的时候，投资回报却在随后几年。

佩雷斯表示：“如果补贴机制在五年后改变，生产商将无法收回其投资，对于生产商而言没有余地去改变其活动。”

因此佩雷斯表示，生产商应该只需“在投资时”而非在规范改变前几个月预见可能发生的法律修改。

此外，佩雷斯表示，十一名审判员中三名对于法院裁决持反对意见，表示由于法院面对一个非常棘手的问题，论证应该更详尽。

据相关消息，西班牙最高法院日前发现，可再生能源生产商协会(APPA)提起行政上诉，反对光伏自发自用的新立法合乎法律。

佩雷斯表示，这对于反对西班牙所谓的“Sun Tax”的上诉是“积极的一步”，但是对于 APPA 而言，参与法律程序仅仅是一个基本资格，尚未作出任何重要决定。