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- oil
- natural gas
- wind
- solar
- biofuels
- ore
- coal
- electricity
- water
- nuclear energy
- new energy

Mcanxixun Information and News Service

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INDUSTRY OUTLOOK 行业 **展望**

Annual Energy Outlook (年度展望)

AVIEW TO 2040

(Exxon Mobil Corporation)

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U.S. Crude Oil and Liquid Fuels

美国原油和液体燃料

Natural Gas

天然气

Coal

煤炭

Electricity

电力

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***INDUSTRY NEWS* 行业动态**

Oil (石油)

Sinopec seeks \$5.5bn in Repsol arbitration

Chinese oil group Sinopec is seeking \$5.5bn in arbitration against Spanish oil firm Repsol stemming from disputes over a three-year old joint venture, Repsol said on Friday.

Sinopec and its Canadian listed subsidiary Addax formed the Talisman-Sinopec Energy UK Ltd joint venture with Talisman Energy in 2012.

The joint venture purchased a stake in a deepwater oil field off Nigeria that year, but in 2014 the Nigerian government declined to approve the purchase.

Repsol acquired Talisman in May of this year. A Sinopec spokesperson had no immediate comment.

中石化向雷普索尔索赔 55 亿美元

中石化因一个已存在三年的合资企业，与西班牙石油集团雷普索尔产生纠纷，通过仲裁向雷普索尔要求 55 亿美元。

西班牙石油集团雷普索尔(Repsol)周五表示，中国石油集团中石化(Sinopec)因一个存在三年的合资企业与其产生纠纷，就此对该公司提出仲裁，要求获得 55 亿美元。

中石化及其加拿大上市子公司 Addax 与塔里斯曼能源(Talisman Energy)在 2012 年成立了 Talisman-Sinopec Energy UK Ltd 合资企业。

该合资企业在当年收购了尼日利亚一个深水油田的股份，但 2014 年尼日利亚政府拒绝批准这一收购计划。

雷普索尔在今年 5 月收购了塔里斯曼能源。中石化发言人未就此事置评

New Energy (新能源)

Victoria aims for 40% renewables by 2025, to add 5,400MW wind and solar

Victoria's Andrews government says it will set a renewable energy target of 40 per cent by 2025, making it the latest state in Australia to introduce a target for large-scale renewables development more ambitious than that of the federal Turnbull government and underlining the political divide over wind and solar.

Victoria's labor government intends to end an investment drought in the state by aiming to lift its share of renewable energy from 15 per cent to 25 per cent by 2020.

Then it will establish a new target jumping to 40 per cent by 2025, which will require some 5,400MW of large scale wind, and large and small scale solar to be built in less than one decade. That compares to its current capacity of 1,200MW of large-scale wind and 930MW of small-scale solar.

The new targets were announced on Wednesday by Victorian Premier Daniel Andrews, along with his minister for energy and climate Lily D'Ambrosio, while they were marking the arrival of the first turbine blades at the Ararat Wind Farm.

The targets will be met with the help of reverse auctions modelled on the successful scheme pioneered by the ACT government which aims to reach 100 per cent renewable energy by 2020. Details will be released later this year and the legislation enacted in early 2017.

Some 1,800MW of large-scale wind and solar will need to be built by 2020, although D'Ambrosio insists it will not come at an extra cost. The 2025 target will be met by reverse auctions and will be "additional" to the national target, and D'Ambrosio says the costs will be limited to just a matter of "cents per week" to consumers.

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Victoria's move highlights a growing division between Labor and the conservative parties on renewable energy. On the national level, the federal Coalition has cut the target and caused a near three-year drought in investment, which D'Ambrosio said the state is now trying to break.

South Australia and Queensland – as well as the ACT – also have more ambitious renewable energy targets, although D'Ambrosio says Victoria will be the first to put theirs into legislation. The conservative states of NSW and Western Australia base their policies on the national target, with NSW recently rated the worst state for renewable investment.

The Victorian government auction schemes will be split into “solar only” auctions and others that will be technology neutral, but will most likely favour wind energy. The exact share is yet to be decided.

In an interview with RenewEconomy on Wednesday, D'Ambrosio said the first round of auctions were expected to be held in 2017, with the goal of generating 1,800MW of new capacity and getting it built by 2020.

“We think it is ambitious. And very achievable, and is what we need,” she told RE.

For the Victorian economy, D'Ambrosio said the scheme was expected to generate 3,000 jobs by 2020, before any costs were imposed, and then another 4,000 additional jobs by 2023/24.

In terms of emissions, the scheme is expected to deliver around a 12 per cent reduction in electricity sector greenhouse emissions by 2034-35, the government said.

In broader terms, the announcement of the new VRET means that Australia's three mainland Labor states – Victoria, South Australia (50 per cent by 2025) and Queensland (50 per cent by 2030) – now have markedly more ambitious targets than the federal government.

South Australia is expected to pass its 50 per cent renewable energy target this year, in fact it effectively reached that target in May – nearly a decade ahead of schedule – and the state's Labor government has pledged to focus all efforts on getting the state as close to 100 per cent renewable energy as possible.

Queensland's Labor government has set a 50 per cent renewable energy target by 2030, and recently doubled its short-term large scale solar target to 120MW, and already leads in rooftop solar, with 1.5GW of installed capacity – making it the second biggest power station after the Gladstone coal generator.

The ACT, meanwhile, leads the country on renewables ambition, while Tasmania is already there, given the right hydro conditions.

Federal Labor, too, has promised to set a national target of 50 per cent renewables by 2030 – a goal the Turnbull government has repeatedly attacked as economically “reckless” and described as an effective tax on electricity.

For Victoria, D'Ambrosio said that making the state's scheme complementary to the Commonwealth's was also about helping to save the national RET.

“Investors have lost faith in the national target, but we are restoring the confidence needed to invest. We've developed Victorian renewable energy targets that generate thousands of new jobs, particularly in regional Victoria, while also cutting Victoria's greenhouse gas emissions,” she said.

“Growing renewable energy means growing jobs, and we want a big boost to both right here in Victoria,” Andrews added.

“The world is shifting to renewable energy – it creates jobs, drives growth, and protects our environment – and Victorians want to be at the forefront of that.”

Energy analysts agreed that the scheme was likely to keep a lid on wholesale electricity prices. Morgan Stanley analyst says it will be a negative for brown coal generators, including AGL Energy, which owns Loy Yang A and is the only listed company with a major share of the brown coal generation fleet.

“This development reinforces our view of the long-term supply-demand outlook in the NEM, with our view of

flat nominal pool prices into the long term,” Koh wrote in a note to clients. “We therefore view this development as a longer term negative for AGL and a positive for (Origin Energy).

Green groups welcomed the Andrews government’s ambition on renewables.

“The targets announced today by the Premier and energy minister will see Victoria double its wind power capacity by 2020 and quadruple it by 2025, as well as supporting large-scale solar projects in the north of the state,” said Environment Victoria CEO Mark Wakeham.

“(The) VRET provides a lifeline for manufacturing in Portland, Glen Waverly, Geelong and the western suburbs of Melbourne,” said Friends of the Earth spokesperson Leigh Ewbank.

“With an estimated 10,000 jobs created in renewable energy, this is what the transition looks like.

“All available polling shows strong community support for renewable energy. Creating jobs, cutting pollution and acting on climate change is something all parties can support,” said Leigh Ewbank.

The Clean Energy Council also welcomed the 40 per cent VRET, particularly from a state that is home to some of the world’s most heavy polluting coal-fired power plants.

“Victoria faces many challenges in transitioning away from emissions-intensive forms of generation towards new renewable energy, and it’s vital for the community that the shift is managed well,” said CEC chief Kane Thornton.

“Victoria’s ambitious target to reach 40 per cent renewable energy by 2025 makes the state a very attractive destination for clean energy investment at a time when activity in the sector is ramping up significantly.

“We have seen about 450 megawatts of projects committed nationally in the past three months alone, so this move by Victoria is smart timing – and should see Victoria claim a big share of the renewable energy pie out to 2025 and beyond,” Thornton said.

维多利亚州计划到 2050 年将可再生能源份额提高到 40%

澳大利亚维多利亚州的安德鲁斯政府表示,它将设置一个可再生能源的目标,即到 2025 年份额达到 40%,这使得澳大利亚的最新状态成为引入大规模可再生能源发展的目标,比特恩布尔政府的目标更加雄心勃勃,凸显了在风能和太阳能的政治分歧。

维多利亚的工党政府打算结束一个无投资的状态,旨在提升可再生能源的份额,从现在的 15%到 2020 年的 25%。

那么它将建立一个新的目标,到 2025 年跳跃到 40%,这将需要在不到十年的时间里,大约建设 5400 兆瓦的大规模风能和大型或小型规模的太阳能。相比之下,目前大规模风能有 1200 兆瓦的发电能力,而小规模太阳能发电能力为 930 兆瓦。

维多利亚州州长丹尼尔·安德鲁斯及能源和气候部长 Lily D’ Ambrosio 在周三公布了新目标,当时他们标记了阿勒山风电场第一涡轮叶片的到来。

该目标将会在反向拍卖的帮助下实现,仿效由 ACT 政府领导的成功的计划,政府的目标是到 2020 年达到 100%的可再生能源。细节将于今年晚些时候透露,立法最早在 2017 年初实施。

到 2020 年,需要建立大约 1800 兆瓦的大规模风能和太阳能,尽管 D’ Ambrosio 坚称它不会带来额外代价。2025 年的目标将通过反向拍卖实现,并将次于国家目标,D’ Ambrosio 说,成本将被限制到仅仅是消费者每周“美分”花销的程度。

维多利亚州的举动凸显了劳动党和保守党,在可再生能源问题上增长的分歧。在国家层面,联邦联合政府削减目标,造成了近三年的无投资,D’ Ambrosio 说,国家现在试图打破。

南澳大利亚和昆士兰-以及 ACT——也有更加雄心勃勃的可再生能源目标,尽管 D’ Ambrosio 说维多利

亚将首先把它们纳入立法。新南威尔士州和西澳大利亚基地的保守州把他们的政策确立在国家目标之上,新南威尔士州最近成为可再生能源的投资最匮乏的州。

维多利亚政府拍卖计划将分为“只有太阳能”拍卖和其他技术中立,但很可能会支持风能。确切的份额仍有待决定。

D 'Ambrosio 在周三接受 RenewEconomy 采访中说,第一轮拍卖预计将在 2017 年举行,目标是发电 1800 兆瓦的新能力,到 2020 年建设完成。

“我们认为这是雄心勃勃的,是可实现的,是我们需要的,”她告诉 RE。

D 'Ambrosio 表示,对维多利亚的经济,该计划预计将在 2020 年前任何成本强加之前增加 3000 个工作岗位,另外,在 2023/24 年实现新增 4000 个就业岗位。

在排放方面,该计划预计将电力行业温室气体排放到 2034-35 年减少 12%,政府说。

在更广泛的术语中,宣布新 VRET 意味着澳大利亚三个劳动党的州——维多利亚,南澳大利亚昆士兰(50%,2025)和(到 2030 年 50%)——现在明显比联邦政府有更雄心勃勃的目标。

南澳大利亚州估计今年超过了 50%的可再生能源目标,事实上,它在 5 月有效地达到这一目标——提前将近十年,该州的工党政府已承诺把所有的努力集中在实现州确立的尽可能接近 100%的可再生能源的目标。

昆士兰的工党政府已经设定了到 2030 年,实现 50%的可再生能源目标,最近将短期大规模太阳能目标翻倍到 120 兆瓦,已经发展屋顶太阳能,装机容量为 1.5 千瓦——使其成为在格莱斯顿煤电站之后的第二大电站。

与此同时,ACT 位居国家可再生能源雄心之首,塔斯马尼亚已经达到,前提是考虑到对水力条件。

联邦劳工也承诺设定一个国家目标,即到 2030 年可再生能源达到 50%——特恩布尔政府多次攻击该目标,称其在经济上“不计后果”,并被描述为一个有效的电力税。

对于维多利亚州,D 'Ambrosio 说,使该州计划成为英联邦计划的补充,也有助于拯救国家的 RET。

“投资者对国家目标失去信心,但我们需要恢复信心,以实现进一步投资。我们已经开发了维多利亚州的可再生能源目标,即产生成千上万的就业机会,特别是在维多利亚地区,同时削减维多利亚的温室气体排放,”她说。

“越来越多的可再生能源,意味着就业增长,我们希望极大地推动两目标在维多利亚地区的实现,”安德鲁说。

“世界正转向可再生能源——它能创造就业机会,推动增长,并保护我们的环境,维多利亚州想要走在时代前沿。”

能源分析师一致认为,该计划可能会抑制批发电价。摩根士丹利(Morgan Stanley)分析师表示,这将是一个负面的对褐煤发电厂,包括 AGL 能源,其拥有 Loy Yang A,而且是唯一的上市公司,占褐煤发电份额的主要部分。

“这发展强化了我们 NEM 长期供需前景的观点 NEM,与我们的平名上的电网价格长期平缓的观点,”Koh 在给客户的报告中写道。“因此,我们认为这种发展是一个长期对 AGL 是不利的,对(Origin Energy)是有利的。

绿色组织欢迎安德鲁斯政府对可再生能源的目标。

“州长和能源部长今天宣布的目标将使维多利亚在 2020 年之前将风力发电容量翻倍,到 2025 年四倍,以及在该州北部支持大规模太阳能项目,”Environment Victoria 首席执行官 Mark Wakeham 说。

“VRET 为制造业在波特兰,格伦·韦弗利吉朗墨尔本西郊提供了一个生命线”,“地球之友”的发言人李 Ewbank 说。

估计可再生能源发展过程中创造 10000 个工作岗位,而这是过渡时期的样子。

“所有可用的民调显示,可再生能源的社区支持很强大。创造就业机会,减少污染和气候变化采取行动是各方可以支持的,”李 Ewbank 说。

清洁能源委员会也欢迎 VRET 的 40%,尤其是对世界上最严重的高污染的燃煤电厂的坐落地来说。

“维多利亚面临着许多挑战,转变远离排放量高的形式,生成新的可再生能源,这是至关重要的社区管理的转变”,CEC 首席凯恩桑顿说。

维多利亚的雄心勃勃的目标是,到 2025 年达到 40%的可再生能源,当该部门的活动逐步大幅提升时,使该州成为清洁能源投资的一个非常有吸引力的目的地。

“我们看到仅过去的三个月里,全国大约 450 兆瓦的项目被提交,维多利亚的战略步骤是最好的时间,应该看到维多利亚计划在 2025 年及以后有一个大的可再生能源份额,” Thornton 说。

SolarCity’ s Triex cell to be included in Chinese anti-dumping investigation

The US Department of Commerce has upheld its preliminary ruling that SolarCity’ s Triex cells were included within the scope of the anti-dumping duties, in a memorandum dated 17 June.

SolarCity’ s claim that its products should be excluded from the scope of the order as the Silevo modules are manufactured with a c-Si substrate, and the substrate is not what defines a cell, was ultimately rejected, after a thorough analysis of the information put forward by both parties after the initial ruling.

The memorandum states that the Triex cells are to be included within the order means that any Silevo products imported from China to the US will have to pay duties upfront at customs; reducing the competitiveness of the product.

SolarCity and SolarWorld arguments

SolarCity had argued that the “essential criteria for assessing whether a solar cell can be characterised as ‘thin film’ for purposes of the Orders” is whether “the cell derives all of its photovoltaic function from successively applied layers of amorphous silicon, and cannot function if some of those layers are removed” .

Conversely, SolarWorld rebutted that the conversion efficiency of Triex cells is much more comparable to subject CSPV cells than to “true amorphous silicon thin film products”. They also put forward an argument that the solar absorber (or solar absorbing material) is the “fundamental part” of a PV device as it enables the conversion of light into electricity – and the “primary absorber and dominant contributor to carrier generation” in Triex cells “is the crystalline silicon substrate, not the thin film layers of amorphous silicon” . Furthermore, SolarWorld emphasised that the “solar absorbers in a true thin film product...are the thin film layers themselves, not the substrate on to which the thin film layers are deposited” .

The plain language of the scope of the Orders excluded “thin film photovoltaic products produced from amorphous silicon, cadmium telluride, or copper indium gallium selenide” . So the clinching factor the ruling rested on was whether Triex cells could be classed as such.

Analysis of the final ruling

Despite the argument that Triex cells should be excluded from the scope of the orders because they contain functional thin film layers, the Department of Commerce held that it “unreasonably presumes that when thin film components are used, all other components in the cell are irrelevant, including a crystalline silicon component” .

Commerce also writes in the memorandum that they “do not believe this is a reasonable interpretation of the language of the scope, and we find no support in the descriptions of the merchandise contained in the Orders, the initial investigation, or the prior determinations of either the Department or the ITC for such an expansive interpretation of the ‘thin film’ exclusion” . It also determined that the Triex cells could not be excluded given that they contain a crystalline silicon component that “contributes to their photovoltaic function” .

In reaching the final ruling, the Department addressed the “unconsidered” facts listed by SolarCity – including the company’s concerns that the Department did not address evidence that CSPV products and thin film products are separate “like products”. However, a significant portion of the final scope ruling was focused on whether Triex cells are subject CSPV products or, alternatively, can be excluded as thin film products – holding with SolarWorld’s argument and concluding that as the primary solar absorber in Triex cells is the crystalline silicon component, they should be classified as CSPV cells, and thus included within the scope of the Order.

SolarCity 的 Triex 电池拟被列入中国反倾销调查

美国商务部在六月十七日的备忘录中，坚持其初步裁决，SolarCity 的 Triex 电池被列入反倾销税范围内。

SolarCity 声明由于 Silevo 组件是由晶硅基板制造，该基板并不限定电池，所以其产品应该被排除在该要求范围之外，但是在初步裁决后全面分析双方提出的信息，该声明最终被驳回。

该备忘录表示，Triex 电池被列入该要求意味着，任何从中国输入到美国的 Silevo 产品将必须在海关预先支付关税，降低了产品的竞争力。

SolarCity 和 SolarWorld 争执

SolarCity 认为，“评估是否一个太阳能电池被定性为‘薄膜’的基本标准”为，是否“电池从相继应用非晶硅层衍生所有光伏功能，以及如果一些层被除去，能否运行”。

相反，SolarWorld 反驳道，Triex 电池的转换效率相较“真正的非晶硅薄膜产品”，更堪比 CSPV 电池。他们还提出论点，太阳能吸收器(或太阳能吸收材料)是光伏设备的“基本部分”，其将光转换为电——Triex 电池“主要吸收器和对载流子产生的主要贡献”是“晶硅基板，而不是非晶硅薄膜层”。此外，SolarWorld 强调，“在真正薄膜产品中，太阳能吸收器……是薄膜层本身，而不是薄膜层沉积的基板”。

简单地说，该要求范围排除“非晶硅、碲化镉或铜铟镓硒薄膜光伏产品”。因此，该裁决的关键因素取决于是否 Triex 电池被归为此类。

最终裁决的分析

尽管争论 Triex 电池由于包含功能性薄膜层，应该被排除在要求范围之外，但是商务部认为其“不合理假定当使用薄膜部件时，电池中所有其他部件无关紧要，其中包括晶硅部件”。

商业还在备忘录中写道，他们“不相信这是范围的合理解释，我们在要求、初步调查、或者商务部和 ITC 的先前决定中所涵盖的商品描述中，都没有得到对于‘排除薄膜’这样广阔的解释的支持”。其还决定，鉴于 Triex 电池包含“有助于其光伏功能”的晶硅部件，不能被排除在外。

作出最终裁决，商务部处理了 SolarCity 列出的“被忽视的”事实——其中包括该公司认为商务部没有处理 CSPV 产品和薄膜产品是独立的“类似产品”的证据。然而，最终范围裁决的一个重要部分集中在 Triex 电池是 CSPV 产品，还是可以作为薄膜产品被排除——赞同 SolarWorld 的论断，总结道，由于 Triex 电池的主要太阳能吸收器是晶硅部件，故应该被列为 CSPV 电池，因此包含在该要求的范围内。

Egypt extends deadline for West of Nile 200MW PV tender

A tender for a 200MW BOO (build-own-operate) PV plant project in Egypt has had its deadline extended by six months, in a move that the Middle East Solar Industries Association (MESIA) has said was “widely expected”.

MESIA said today that the submission date for the West of Nile BOO PV Power project has been extended from 21 June of this year to 21 December. The project’s tender was one of a number issued by Egyptian Electricity Transmission Company (EETC) and the New and Renewable Energy Authority (NREA) in August 2015, adding

up to 500MW of renewable generation capacity, which included 50MW of CSP.

The original terms of the tender required the project's developer to submit a €4 million (US\$4.5 million) security bond. MESIA said that it had heard from unnamed sources within the industry however that the delay was related to the EETC not yet having responded to clarifications requested by would-be developers on certain aspects of the request for proposal (RFP).

Additionally, the tender had anticipated that those prospective developers would jointly survey possible sites for metrics including solar irradiance levels and geotechnical site assessment. According to MESIA this has not happened, with the association adding that deadline extension was "widely expected" due to these delays.

埃及延长尼罗河以西 200MW 光伏招标截止日期

埃及一个 200MW BOO(建设拥有运营)光伏电站项目招标日前将其截止日期延长六个月，中东太阳能产业协会(MESIA)日前表示此举是“普遍预期的”。

MESIA 今天表示，尼罗河以西 BOO 光伏发电项目的提交日期已经从今年六月二十一日延长至十二月二十一日。该项目的招标是 Egyptian Electricity Transmission Company (EETC)和新能源和可再生能源局(NREA)2015 年八月发布的众多招标中的一个，总计招标可再生能源发电量达 500MW，其中包括 50MW 的聚光光热。

此次招标的原始条款规定项目开发商递交四百万欧元(四百五十万美元)保证金。MESIA 表示，曾听到业内不愿透露姓名的人士提及过延迟，然而，此次延迟是关于 EETC 尚未回应准开发商对于投标申请书某些方面的澄清请求。

此外，此次招标预计，那些未来的开发商将共同调查可能的地点，其中包括太阳能辐照水平以及地质现场评估等指标。根据 MESIA，这尚未发生，该协会补充道，由于这些延迟，“普遍预期”会延长截止日期。

Little or no delayed payments for Indian solar but wind is an issue

Wind power developers in India have been facing delayed payments from distribution companies of up to eight months at a time in various states, but solar developers have experienced only negligible delays in a couple of states, according to industry analysts.

Consultancy firm Mercom Capital Group has reported minor delays in payments of just a couple of months for two solar developers in Rajasthan over the last three quarters, according to Mercom chief executive and co-founder Raj Prabhu. Furthermore, these small delays have actually improved over time in those three quarters.

Timely payments will be critical to solar developers in the future as low tariff bidding for capacity has led to "razor thin margins" when developing projects, according to Mercom's latest quarterly report.

Prabhu told PV Tech it was critical to separate wind from solar in the discussion over payments. Referring to solar alone he said: "The only state where we heard where there were some issues, not a large issue, here and there a month late, was Rajasthan.

"We know Tamil Nadu has always had some issues and most developers avoid it. [...] We've even talked to banks and all of them said there is no major payment issues that they can speak of, except a little bit on the Rajasthan side," added Prabhu.

Mercom's latest quarterly report did reveal, however, that Rajasthan (>1.3GW) and Tamil Nadu (>1.2GW) are the

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two largest states in India in terms of solar installations.

Stifling any concerns for solar further, Vinay Rustagi, managing director at consultancy firm Bridge to India, told PV Tech: “There are no delayed payments on solar to the best of our knowledge anywhere in India.”

This is partly down to delays of one or two months in payment being seen as relatively normal or even inconsequential in the Indian market.

On the other hand, as has been reported widely this week, wind power developers are facing severe delay in payments across various states.

Rustagi added: “On wind there are substantial delays in many states now – in Maharashtra, Rajasthan, Tamil Nadu, Madhya Pradesh.”

B.K. Dosi, the managing director of Rajasthan Renewable Energy Corp also said that the major Rajasthan distribution company (Discom) is 6-8 months delayed in its payments specifically to wind firms.

However, Dosi added that the government’s plan to alleviate the ballooning debts of the state Discoms across the country, known as UDAY, should help to improve the financial constraints of the Discoms, which would then go on to help them to improve or prevent payment delays to wind and any other renewable energy sources in the future.

Meanwhile, going back to solar energy specifically, S.A. Patil, general manager of Maharashtra Energy Development Agency (MEDA), confirmed: “In Maharashtra there is no issue of any late payments because [the Discoms] normally abide with the conditions of the power purchase agreements.”

Future of solar payments

When asked why solar payments are any different to those of wind, Prabhu said that solar is prioritised over wind by the Discoms. This can cause confusion for developers delving into both wind and solar such as Renew Power, but Renew happens to be a far bigger wind player than in solar at present.

Prabhu said: “Unlike wind projects most of the solar projects come under central government agencies, which is the reason why payments are mostly on time according to developers.”

On the other hand, Rustagi said solar is far smaller than wind across India at present and this may be part of the reason that Discoms are paying solar developers first.

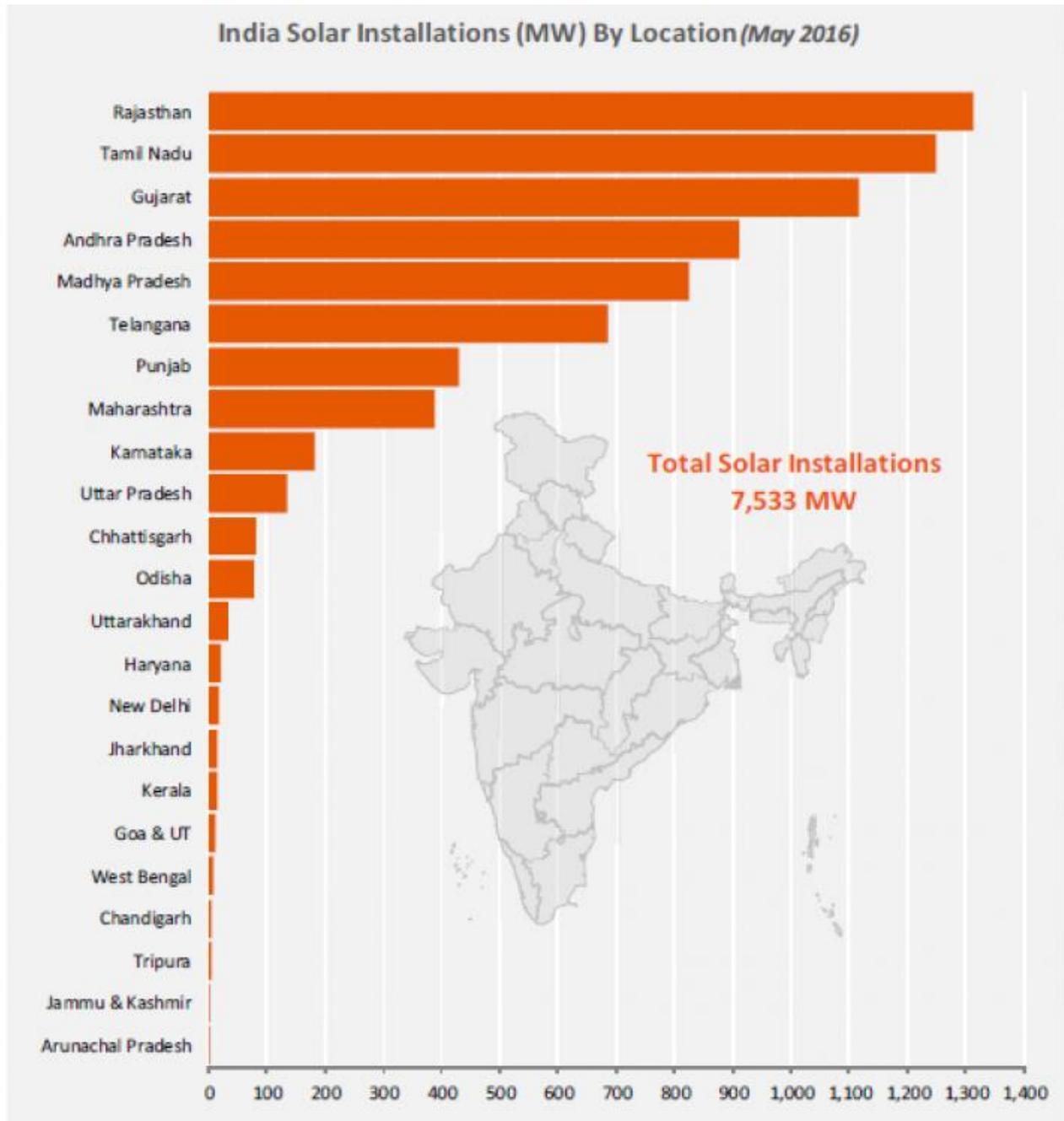
If this is the case, Rustagi said: “Then in three years’ time, when solar should be almost as big as wind, if the Discoms are still in [financial] distress, then the likelihood is that they will start delaying payments on solar as well as wind.”

In any case, Rustagi also pointed to the government’s UDAY scheme as having the potential to alleviate many of the issues cited.

He added: “We’ve already had a good start, but of course more debt needs to be transferred from the Discoms to the state and once that package of debt transfer and operational efficiencies etc is completed, the Discoms should be in much better financial position, if things go to plan.”

Mercom’s quarterly report for June noted that Discom finances are “still a mess”. It also said there is no mechanism to guarantee timely payments. It suggested that a billion dollar fund out of coal cess collections could act as a reserve backstop against non-payments.

Indian power minister Piyush Goyal recently claimed that every Discom in India will be making a profit by 2019.



Solar installations by MW across Indian states as of May 2016. Credit: Mercom Capital Group

印度太阳能很少或没有延迟付款，但风能是一个问题

根据业内分析师，印度各邦风能开发商正面临分销公司延迟付款长达八个月，但是仅几个邦的太阳能开发商经历可以忽略不计的延迟。

根据 Mercom 首席执行官兼联合创始人 Raj Prabhu，咨询公司 Mercom Capital Group 日前报告，拉贾斯坦邦过去三个季度两个太阳能开发商只有几个月经小的付款延迟。此外，实际上在过去三个季度这些小的延迟随着时间推进有所改善。

根据 Mercom 的最新季度报告，由于开发项目时低价投标装机容量导致了“微薄的利润”，未来及时付

款对于太阳能开发商而言将至关重要。

Prabhu 在接受 PV-Tech 采访时表示，在讨论付款方面将风能与太阳能分开至关重要。仅谈到太阳能，他表示：“只有一个邦我们听说有点问题，但不是大问题，晚了一个月，是拉贾斯坦邦。”

Prabhu 补充道：“我们知道泰米尔纳德邦总有一些问题，大多数开发商对其规避。(.....)我们甚至与银行谈论，所有银行都表示，除了在拉贾斯坦邦方面的一点问题，他们可以说没有重大的付款问题。”

然而 Mercom 最新的季度报告显示，拉贾斯坦邦(>1.3GW)和泰米尔纳德邦(>1.2GW)是印度在太阳能安装方面最大的两个邦。

进一步粉碎任何对于太阳能的担忧，咨询公司 Bridge to India 的总经理 Vinay Rustagi 在接受 PV-Tech 采访时表示：“就我们所知印度任何地区太阳能付款都没有延迟。”

一部分原因在于印度市场延迟一或两个月付款被视为比较正常或甚至无关紧要。

另一方面，正如本周广泛报道的，多个邦的风能开发商正面临付款的严重延迟。

Rustagi 补充道：“在风能方面，许多邦目前存在严重延迟——在马哈拉施特拉邦、拉贾斯坦邦、泰米尔纳德邦、北方邦。”

Rajasthan Renewable Energy Corp 总经理 B.K. Dosi 还表示，主要的拉贾斯坦邦分销公司(Discom)延迟付款六至八个月，特别是对于风能电站。

然而，Dosi 补充道，政府的计划缓解全国各邦经销公司激增的债务，被称为 UDAY，应有助于改善分销公司的财务紧缩，之后将有助于他们改善或防止未来对风能或任何其他可再生能源的付款推迟。

与此同时，具体回到太阳能，马哈拉施特拉邦能源开发署(MEDA)总经理 S.A. Patil 证实：“在马哈拉施特拉邦，由于(分销公司)通常属于购电协议，任何逾期付款都没有问题。”

太阳能付款的未来

当问及为何太阳能付款不同于风能，Prabhu 表示，分销公司优先考虑太阳能而非风能。这可以引起深入风能和太阳能的开发商的困惑，如 Renew Power，但是目前相比于太阳能，Renew 恰好是一个大得多的风能参与者。

Prabhu 表示：“不同于风能项目，大多数太阳能项目在中央政府机构下，根据开发商，这是付款大多按时的原因。”

在另一方面，Prabhu 表示，目前整个印度太阳能比风能小得多，这可能在一定程度上是分销公司先向太阳能开发商付款的原因。

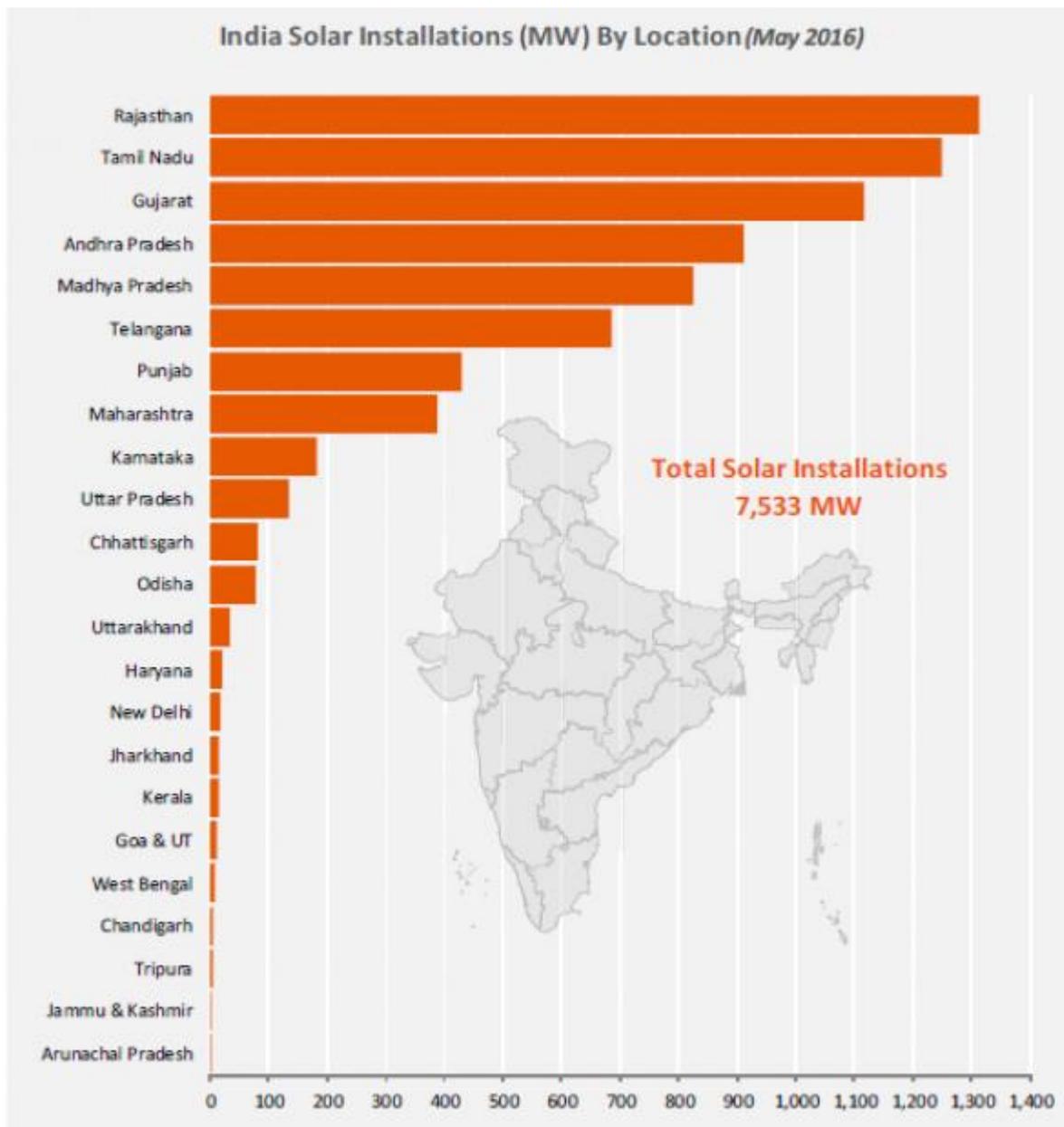
如果情况是这样，Rustagi 表示：“在三年的时间里，当太阳能规模应该和风能差不多时，如果分销公司仍处于(财务)窘境，可能它们将开始延迟对太阳能的付款，和风能一样。”

Rustagi 还指出，在任何情况下，政府的 UDAY 计划有潜力缓解援引的许多问题。

他补充道：“我们已经有了一个良好的开端，但当然，更多的债务需要从分销公司向国家转移，一旦债务转移和运营效率等完成，如果按计划发展，分销公司应该处于更好的财务状况中。”

Mercom 六月季度报告指出，分销公司财务状况“仍混乱”。其还表示，没有机制来确保按时付款。建议来自煤炭税收的十亿美元资金可以作为欠款的储备担保。

印度电力部长 Piyush Goyal 最近称，到 2019 年印度每家分销公司将盈利。



截至 2016 年五月印度各邦太阳能安装量。图片来源：Mercom Capital Group

Scatec Solar ' s 10MW project in Jordan reaches commercial operation

Scatec Solar's 10MW Oryx solar project in Jordan has officially reached commercial operation.

Oryx was one of the first utility-scale projects granted permission by the Jordanian authorities to be developed under the nation's new Renewable Energy Program. The 10.4MW PV plant is linked to an existing substation controlled by the state utility, NEPCO, with whom Scatec Solar has signed a 20-year power purchase agreement.

Raymond Carlsen, Scatec Solar's CEO, said: "Oryx is a symbol of Scatec Solar working together with Jordanian partners to achieve results on the ground. With the commissioning of Oryx, we expand our international footprint

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into the Middle East and in the coming months, we will deepen our presence in the region.”

Oryx is capable of generating 25,000 MWh of electricity per year, providing the energy needs for about 5,000 homes. The plant is located near Na’ an, 230 km south of the Jordanian capital of Amman.

Oryx was developed on 36 hectares of land and created around 100 jobs during its construction. The clean energy produced by the project will avoid 15,000 tonnes of CO2 emissions per year.

Scatec Solar 的约旦 10MW 项目投入商业运营

Scatec Solar 位于约旦的 10MW Oryx 太阳能项目日前正式投入商业运营。

Oryx 是根据约旦新的可再生能源计划开发的, 约旦当局批准的首批公共事业规模项目之一。该 10.4MW 光伏电站连接到该国公共部门 NEPCO 控制的现有变电站, Scatec Solar 日前与 NEPCO 签署一份为期二十年的购电协议。

Scatec Solar 的首席执行官雷蒙德·卡尔森(Raymond Carlsen)表示: “Oryx 是 Scatec Solar 与约旦合作伙伴合作在地面做出成绩的一个标志。随着 Oryx 投产, 我们将国际业务扩大进入中东, 未来几个月, 我们将深化在这一地区的存在。”

Oryx 每年能够产生 25,000 MWh 电力, 为约五千户家庭提供能源需求。该电站位于约旦首都安曼以南两百三十公里的 Na’ an 附近。

Oryx 占地面积三十六公顷, 在其建设期间创造约一百个就业岗位。该项目产生的清洁能源将每年避免一万五千吨的二氧化碳排放量。

Will the outlook for the latest US solar town stay sunny?

A new solar-powered "eco-city" in southwestern Florida finally is under construction after almost a decade on hold, writes Jan McGirk

Babcock Ranch, located on cypress swamplands and pastures near Fort Myers, is marketed as “an eco-centric new town embedded in nature and powered by the sun, by innovation, and by the great outdoors.”

Up to 50,000 residents eventually are expected to live sustainable lives here, hailing rides on driverless electric cars or bicycling on trails through miles of lakeshore greenbelts.

The sun will power a cutting-edge smart grid, electric vehicle charging stations and universal internet access. On the state-owned nature preserve bordering Babcock Ranch, wild alligators, panthers and herds of boar roam on 73,000 acres.

At the Earth Day re-launch in April, the hyperbole was reminiscent of international hoopla for far grander projects such as Masdar City in Abu Dhabi, Dongtan near Shanghai, or Songdo, in South Korea. Not one of these pop-up metropolises has achieved all its green goals. Will Babcock Ranch be any different?

“It’s hard to measure sustainability,” observed Julie Sze, author of *Fantasy Islands: Chinese dreams and ecological fears in an age of climate crisis*. “Nature is being marketed here. They’re selling houses by invoking purity,” she told chinadialogue.

Sze added: “When nostalgia and high tech values are promoted together, I tend to approach it with scepticism. This feels like green gentrification - aimed at the upper middle class. Climate justice issues may be overlooked.”

Sydney Kitson, the driving force behind Babcock Ranch, is a retired professional Gridiron football player who has been dubbed “Solar Syd” by the local press due to his zeal to push through alternative energy for his latest vision. Most of his real estate is located elsewhere in Florida and New Jersey, where he is best known for upscale homes

and golf courses.

His aim is to bring green and sustainable building into the mainstream. “We want to be as innovative as possible: unique but not weird,” he said. “I hope people will use us as a model for smart growth.”

Kitson, the developer, has faced considerable hurdles. Even before the financial crisis of 2008 pushed back his start date, the local Sierra Club had threatened to sue and block his purchase of the land from the Babcock family, owners since 1914. He took pains to meet environmentalists’ demands.

The location of the brand new commercial centre, named, without irony, Old Babcock Village, was shifted so it would not encroach on a critical wildlife corridor used by a handful of endangered Florida panthers.

Advised by a coalition of green advocacy groups, Kitson also agreed to protect the wildlife at night by lowering speed limits, to address storm water retention and filter run-off, as well as to restrict the use of chemical fertilisers and pesticides.

According to his media spokesperson, Lisa Hall, within a portion of the Babcock Ranch property will maintain existing sod farms, cattle ranching and mining ventures for around 20 years. Meanwhile, the rural area “incubates and goes vertical” to a functioning town with 19,500 homes. Drinking water will come from wells and grey water will be used for irrigation. Drained wetlands are to be restored, too.

While Kitson insists that Babcock Ranch is not destined to be another elitist gated community because he is offering smaller units and condominiums, America’s demographic trends may not be in tune with his corporate plans. Since more young adults are moving back home with parents after college, increasing numbers of ageing baby boomers have delayed downsizing or moving to a retirement haven.

Fewer young singles are setting up households with roommates. Young professionals may struggle to afford to live here.

A mighty 75 megawatt photovoltaic solar plant is being erected on 443 acres that the developer donated to the state utility company, Florida Power & Light. (FP&L) When it’s finished by the end of the year, this plant is expected to generate even more energy than Babcock Ranch will consume when it’s up and running.

The array of glittering photovoltaic panels is already impressive, as seen from a drone aerial shot (above). This powerful solar field will feed the state grid as soon as it goes operational, enabling the utility company FP&L to meet government targets. So much new solar power will up their percentage of renewable energy, and “clean” natural gas will offset the “dirty” electricity derived from coal-fired plants from out of state. “It’s to everyone’s benefit. So more power to them. Literally,” said Craig Tyler, a veteran energy consultant on the west coast.

Tyler pointed out that the region’s torrid climate requires year-round air conditioning at Babcock Ranch. Rooftop solar panels would be more susceptible to hurricanes than the ground level system being built now. “But I hope it’s more than just solar window dressing. I’d wait to see whether materials and equipment in the homes and buildings really is green and how much high efficiency is built in.”

“They’re trying to do it right by considering the energy first. But it’s very complicated,” he added.

Most international eco-cities aim to reduce the municipal carbon footprint; reduce food waste; educate the population about sustainability; develop integrated and more eco-friendly use of water and energy; and promote realistic financing schemes for green architecture. But technology often moves faster than the permitting and financing of such green mega-projects.

As time passes, expenses will mount, and the planners’ strict goal of net carbon neutrality tends to give way. Strict energy efficiency standards get downgraded and become merely “environmentally friendly”. Too often the project ends up being more costly than retrofitting existing urban areas or instilling habits for conservation and recycling. If the carbon footprint of actually constructing a model eco-city is reckoned in, very few could be considered carbon neutral.

Yet the concept of futuristic sustainable urban planning has become a growth industry in the time of climate crisis.

In South Korea, “smart city” technology is about to take off and will be marketed across rapidly urbanising Asia. China may move 250 million people to eco-cities by 2025, and India’s prime minister, Narendra Modi, has pledged to erect 100 new smart cities across the subcontinent.

It remains to be seen whether Babcock Ranch, the solar experiment, can be a model for future planned cities. Some pessimists warn that unless emissions are curtailed and the population of people decreases, these new cities are just token gestures on the way to oblivion.

美国新建太阳城：前途是否一片光明？

搁置近十年之后，美国佛罗里达州西南部的新太阳城最终投入建设。

白考克牧场位于美国佛罗里达州迈尔斯堡附近的柏木湿地和草场之上。筹建之初，这里就被冠上了“生态新城”的名头，号称与自然融为一体，城市用电来自太阳能、源于创新技术、源于大自然。

落成后，这里预计将吸引 5 万居民迁入，一同开始他们的可持续生活。居民们可以搭乘无人驾驶的电动汽车，也可以骑着自行车在湖岸边长长的绿化带间穿行。

新城将配备尖端智能电网、电动汽车充电站点以及全面的网络覆盖，均采用太阳能供电。与白考克牧场相邻的是一片占地 7.3 万英亩的国家自然保护区，那里生活着野生短吻鳄、黑豹和成群的野猪。

这个大受吹捧的项目于 4 月 22 日世界地球日宣布重启，不禁让人联想到在国际上其他饱受热议的更大型项目，例如阿布扎比的马斯达尔城、中国上海的东滩生态城以及韩国仁川的松岛新城等。上述这些国际大都市都未能全部实现自己的绿色目标，白考克牧场能否逃过这种命运呢？

“要衡量可持续性很难，”《梦幻岛：气候危机下的中国梦和生态忧》一书作者朱莉·施对中外对话说：“在这里，大自然成了商品，借助人们对纯净自然的向往去推销房子。”

“针对这种一面打怀旧牌，一面兜售高科技价值的行为，我倾向于持怀疑态度。这种感觉就像是在进行一场针对上层中产阶级的旧房绿色改造运动，而气候正义问题却有可能被忽略。”

白考克牧场建设背后的推手是一位名叫西德尼·基特森的退役橄榄球运动员，他对开发替代能源完成牧场建设充满热情，当地媒体都称他为“太阳能西德”。基特森的房地产大多位于佛罗里达州和新泽西州，最为人熟知的产业都是一些高档住宅和高尔夫球场。

基特森的目标是将绿色可持续建筑主流化。“我们想要尽可能地去创新：独特但不怪异，”他说，“我希望大家会把我们当成智能发展的一种模型。”

作为开发商，基特森面临着相当大的阻碍。2008 年金融危机爆发，项目开工日期也因此而推迟。而在此之前，当地环保组织塞拉俱乐部已经威胁要提起诉讼，阻止他从白考克家族（牧场自 1914 年起的所有者）处购得这片土地。为了满足环保人士的要求，基特森可谓煞费苦心。他对新的商务中心——名为老白考克村（绝无讽刺之意）——进行了重新选址，从而保护濒危物种佛罗里达黑豹的走廊用地不受侵犯，并在绿色宣传小组联盟的建议下，同意降低夜间道路限速，保护野生动物，修建雨水贮留池，过滤径流，并且限制化肥和杀虫剂的使用。

基特森的媒体发言人利萨·霍尔表示，未来约 20 年间，白考克牧场有一部分将保持现有草场，继续用于牧牛，采矿业也会维持原状；而农村地区则会“逐渐得到开发，垂直发展”成为拥有 19500 间住宅的功能性城镇。居民饮用水来自水井，家庭污水用于灌溉，干涸的湿地也将得到恢复。

基特森坚称白考克牧场并非注定成为另一个面向精英阶层的封闭社区，因为这里提供的是较小的单位和公寓，但美国的人口趋势似乎并不符合他的计划。由于现在越来越多的年轻人在大学毕业后选择和父母一起生活，与他人合住的单身族越来越少，这就使得他们出生在婴儿潮一代的父母不得不推迟购买小型公寓或移居养老社区的计划。这样一来，白考克牧场的购房者大多限于空巢老人，以及想要购置度假屋或进行投资的非常住人口。刚工作的年轻人或工薪家庭可能很难负担这里的房子。

基特森将一片 443 英亩的土地捐献给了佛罗里达电力照明公司（FP&L），那里正在建设一座发电量高达 7.5 万千瓦的光伏太阳能电站。建设工作将于年底完工，届时该电站的发电量将超出白考克牧场正式投

入运作后的耗电量。

从无人机航拍的画面看，电站的太阳能光伏板闪闪发光，蔚为壮观。这一强大的太阳能电厂投入使用后，将立即接入佛罗里达州电网，满足政府为佛罗里达电力照明公司设置的发电目标。数量如此之多的新建太阳能装机将会提高可再生能源和清洁天然气在能源结构中的占比，抵消佛罗里达州外部燃煤电厂生产的“污浊”电量。“每个人都能从中获益，所以说真的，多给他们一些能量吧，”在西海岸工作的资深能源顾问克雷格·泰勒说。

泰勒指出，由于佛罗里达气候炎热，白考克牧场的居民需全年使用空调。在屋顶安装太阳能电池板容易受到飓风影响，不如现在的地面系统稳定。“但我希望看到的不仅仅是太阳能的表面功夫，而是大楼和住宅的建筑材料是不是绿色，里面的设备是不是绿色，它们能效到底有多高。”

“他们把能源放在第一位，试图做到绿色和高效，但这个过程很复杂，”他说。

大多数国际生态城市的建设目标是减少城市碳足迹；减少食物浪费；提高民众对可持续性的认识；以生态友好的方式对水电资源进行综合利用；推广切实可行的绿色建筑融资计划。但技术发展的步伐常常要先于此类巨型绿色项目的审批和融资。

随着时间的流逝，建设费用不断攀升，项目规划者坚定的碳中和目标出现松动，严格的能效标准一再下调，最终仅仅定位在“环境友好”。与改造现有城区或培养市民节约和循环利用的习惯相比，这些项目的最终成本往往更高。如果考虑到一座模范生态城实际建设过程的碳足迹，很少有城市能做到碳中和。

但在气候危机的时代背景之下，这种未来主义的可持续城市规划理念已经成为一项迅速发展的产业。韩国的“智能城市”技术即将走出国门，走遍正处于快速城市化进程中的亚洲；到 2025 年，中国或将有 2.5 亿居民移居生态城市；印度总理纳伦德拉·莫迪也承诺要在次大陆新建 100 座智能城市。

作为一个太阳城的实验项目，白考克牧场能否成为未来城市规划的楷模还未可知。一些并不看好该项目的人士警告说，只要碳排放不减，人口数量不降，这些新城也不过是一种象征性的姿态罢了，很快就会被遗忘。

Iowa's bipartisan push makes it US leader in wind energy

Iowa is the US state that has the biggest share of wind in its energy mix, mainly because of cross-party support, writes Roger Real Drouin

When crews prepared to erect five wind turbines on the Brunks' Iowa farm three years ago, Steven and his father, Ronald, watched in awe at the magnitude of the components trucked in — 50-metre blades that a person could stand inside at the base, and large sections of steel towers that would top 90 metres when assembled.

Amid the variability in crop prices, the turbines meant a steady annual income for the Brunk family and the neighbouring farmers who also entered long-term leases allowing the turbines to be built on their land. Such lease payments can net US\$5,000 to US\$10,000 a year per tower, an amount that typically increases by a small percentage annually.

For Iowa, the turbines on the Brunks' land alone can produce 11.7 megawatts of clean energy in a state that is rapidly increasing its wind-generated electricity. In total, the 60 turbines that make up the Wellsburg Project — including the five on the Brunks' property — produce 141 megawatts annually, most of which helps power a new Facebook data centre campus 60 miles away in Altoona, Iowa.

The slowly swirling blades above corn and soybean fields have become a welcome sight for Steven Brunk. “I don't think there is a chance of my groundwater becoming flammable or an increase of earthquakes,” Brunk says. “The impact is just so much less,” than fossil fuel extraction, including hydraulic fracturing, he says.

Mcanxixun Information

Across Iowa, wind farms such as the Wellsburg project dot the landscape, spreading across western and central regions of the state. The wind industry in Iowa employs roughly 7,000 people, supports 11 facilities that manufacture turbine-related components, and has attracted more than US\$10 billion in capital investment.

The state that leads the US in both corn and pork production also has the distinction of leading the nation in percentage of its energy produced from wind, now at 31%.

In overall wind-energy capacity, Iowa is the nation's No. 2 wind-power producer (trailing only Texas), with 6,364 megawatts of wind turbines, enough to power an estimated 1.3 million to 1.5 million homes, according to the American Wind Energy Association (AWEA).

Iowa offers a glimpse of what a thriving, apolitical renewable energy sector looks like.

Iowa — where support from the state capital came as early as the 1980s, many residents correlate the industry with green jobs, and opposition to wind turbines has not been as vocal as in some other states — offers a glimpse of what a thriving, apolitical renewable energy sector looks like. “In the national perspective, it has become left versus right,” John Boorman, vice president of the Iowa Wind Energy Association, says of renewable energy. “It has never been that here. It has always been about jobs and economic development.”

Outside the state, corporations that strongly support the push for renewable energy are taking note of all the wind farms. Facebook, Google, and Microsoft are among the companies that identified use of wind energy as one of the reasons to locate new facilities in Iowa, including the Facebook data centre in Altoona, says Debi Durham, director of the Iowa Economic Development Authority.

The rapid expansion of wind energy sites is not universally welcomed in the state. Some residents oppose the wind turbines on aesthetic grounds, while others object to the low-level noise created by the spinning blades. Still others are concerned about the turbines killing eagles and other birds. And some county planning commissions have rejected large-scale wind energy facilities on the grounds that they use up valuable farmland.

Despite this opposition, another wave of projects is now in the works in Iowa. The largest is a recently announced commitment by MidAmerican Energy Company, the Des Moines-based utility owned by Warren Buffett's Berkshire Hathaway Inc., to build another 1,000 turbines that would boost the percentage of Iowa's electricity produced by wind energy to 40%, according to state officials. The proposed US\$3.6 billion project is the largest wind project MidAmerican Energy has ever undertaken, and according to the company, it's being built without an increase in customer electricity rates or financial assistance from the state.

A recent report by AWEA and the Wind Energy Foundation says that by 2030 Iowa could meet all of its electricity needs from wind power and have enough left over to export to other states. The report spurred a roundtable discussion in January by wind energy organisations at the Des Moines Area Community College, where 70% of students in the Industry and Technology Department are enrolled in wind energy-related programmes.

Development of wind farms and the burgeoning presence of wind turbine component manufacturing didn't “start to explode” in Iowa until the early 2000s, said Boorman. Yet about 20 years before the first major investments from utilities such as MidAmerican, he added, support from the state officials made it all possible.

That's when then-Iowa Governor Terry Branstad — in an effort to move to a mix of industries after the farm crisis of the 1980s — signed the first state renewable energy mandate requiring a certain percentage of alternative energy generation.

It was not implemented fully until 1997, but the support of the long-standing governor, combined with subsequent support from other elected state representatives, helped pave the way for Iowa's wind energy boom. Today, swatches of turbines are a common sight from the Interstate 80 corridor in western Iowa to rural areas of north-central Iowa, where the Wellsburg Project was constructed.

According to the 2015 AWEA report, titled “A Wind Vision for New Growth in Iowa,” farmers and other rural

Iowa landowners currently receive an estimated US\$17.1 million annually in lease payments for hosting wind turbines on their land. The report projects that these payments could grow to US\$55 million by 2030.

More than five years of planning and wind monitoring by RPM Access, a regional developer of utility-scale wind projects in Iowa, was needed before the turbines went up on the Brunks' farmland. The elder Brunk, who shot video as workers used three cranes to hoist and assemble the different components, was proud to see the project come to fruition. "He was always into sustainability and conservation all his life," Steven Brunk says of his father, who died in 2015 at age 80.

After construction, RMP Access sold the 60-turbine Wellsburg Project to MidAmerican. The utility operates the wind farm as part of a conglomerate of 448 turbines built from 2013 to 2015. Through an agreement between MidAmerican and Facebook, much of the electricity harnessed at the Wellsburg Project is utilised to offset carbon emissions associated with power consumption of Facebook's data centre campus in Altoona.

State officials say the extension of the federal wind energy tax credit will help continue Iowa's wind momentum.

Utilities small and large, from investor-held companies such as MidAmerican to rural electric cooperatives such as the Central Iowa Power Cooperative, are taking part in the state's wind boom. "They are looking for ways to green up their energy portfolios," says Debi Durham, director of the Iowa Economic Development Authority. "You are seeing it across the industry."

She and others say that Congress' extension of the federal wind energy Production Tax Credit in December 2015 will help continue Iowa's wind-energy momentum, as will a series of proposed transmission lines that, if built, would move wind-generated electricity across the state and possibly to population centres outside Iowa. (One such proposed transmission line called "The Rock Island Clean Line," would deliver 3,500 megawatts of wind power from northwest Iowa and the surrounding region to communities in Illinois and other states to the east.)

Companies such as Trinity Structural Towers, Inc. have bolstered wind power's role in the state's manufacturing sector. In 2009, the manufacturer of wind turbine towers moved into part of an old Maytag factory in Newton, Iowa left empty when the plant closed in 2007. At its Newton plant, Trinity employs about 250 people who build towers that are 79 to 94 metres tall. "The workforce has proven to be extremely capable and adept," says Kerry Cole, president of Trinity Structural Towers, Inc.

In the next three to five years, an additional US\$8 billion to US\$10 billion in investment in wind farms and manufacturing is expected in Iowa, according to wind industry officials. That investment is attracting other green-minded businesses to the state. Since MidAmerican made its expansion announcement in April, Durham says several additional large, high-profile companies have contacted her agency about locating new data centres or other services there.

More land is taken by the highway that goes by my home than by the five turbines,' says one farmer.

While the wind boom in Iowa has many supporters, from the state capitol to colleges and universities, local concerns have arisen about the aesthetics of the towers, which are getting taller. Opponents also are worried about the impact on birds and on taking farmland out of circulation.

In Grundy County, some of those concerns surfaced as plans for the Wellsburg Project took shape. The Grundy County Planning and Zoning Commission voted down the project, but that decision was overturned by the county's Board of Supervisors. A proposal for a subsequent wind farm, Ivester Wind Farm, in Grundy County was also voted down by the zoning board; the decision was again appealed by the Board of Supervisors, and the fate of the project is uncertain. The chairman of the planning and zoning board told the *The Grundy Register* that protecting the fertile soil of Grundy County from non-agricultural development was his chief concern.

When it comes to energy production, there's always a tradeoff, Brunk believes. He's heard some residents cite aesthetics or an aversion to the hum of the turbines as the drawbacks of wind energy. But, for Brunk, at least, one concern is unfounded. "The main complaint from people was it took up farmland," Brunk says. "Each turbine takes up less than an acre. More land is taken by the highway that goes by my home than by the five turbines."

Mcanxixun Information

According to Kirk Kraft, a project manager with RPM Access, developers are trying to address another environmental concern and are working to avoid important areas for migrating eagles. The number of eagles has been on the rise in Iowa, including western Iowa. “In the last year and a half, we have spent a great deal of time and money and effort to find and steer clear of some of those sensitive areas,” Kraft says.

With the number of wind turbines increasing across the state, more farmers understand how wind energy can coexist with agriculture, says Eugene Takle, a professor of atmospheric science and agricultural meteorology at Iowa State University. Furthermore, Takle says his early research on the effect of wind turbines on crops is showing that turbulence can actually promote photosynthesis and have a beneficial effect on crops.

That’s because turbines mix up the air and increase plant motion, bringing both sunlight and some of the natural levels of carbon dioxide to lower leaves of the plants and promoting more CO₂ capture by crops such as corn.

“Turbines help to push that CO₂ to the plant,” Takle says. “That’s important because if the plants are taking up more carbon, weight of grain and plants will increase.”

Such potential benefits are not on the minds of most Iowans. Mainly, many farmers and other Iowans are happy to be profiting from wind power and are taking pride in the state’s role as the leader in wind power produced per capita, Takle says.

“We don’t have mountains, and don’t have the ocean,” Takle says. “We are looking for things we can be proud of, and I think there is a good feeling about generating very clean energy.”

两党联合推动爱荷华州成为全美风能先锋

正是由于州政府官员长期以来对可再生能源的支持，如今爱荷华州能源产出中风能所占比例在全美已经处于领先地位。

三年前，当工作人员准备在爱荷华州的布伦克农场架设五座风力涡轮机的时候，史蒂文和他父亲罗纳德满怀敬畏地看着这些用卡车运来的大块头零部件——光是涡轮机叶片就有 160 英尺长，叶片底部足够容纳一人站立；安装完毕后，塔架主体高达 300 英尺。

史蒂文·布伦克说：“光是运输一个风机塔的组件就要动用 9 辆半挂式卡车。”

自此之后，除了随市场价格波动而变化的粮食收入之外，布伦克一家和附近的农户每年又多了一项稳定的收益：他们将土地长期出租，以便风力涡轮机架设。每座塔架每年的土地租金为 5000 到 1 万美元不等，而且每年还会出现小幅上升。如今爱荷华州正在快速发展风力发电，仅布伦克农场上的这几座涡轮机组就能产生 1.17 万千瓦的清洁电力。据统计，韦尔斯堡项目的 60 座风力涡轮机（其中包括布伦克农场上的 5 座）每年可以发电 14.1 万千瓦，其中绝大多数用于满足 60 英里之外位于爱荷华州阿尔图纳市的 Facebook 新数据中心的电力需求。

这些在玉米地和大豆田上空缓慢旋转的叶片在史蒂文·布伦克眼中已经成为了一道风景。布伦克说：“我觉得这里的地下水不会因为这个项目就变得可燃，地震也不会因此而变得多发。比起水力压裂等化石燃料开采，风力发电影响要小的多。”

类似韦尔斯堡项目的风电农场在爱荷华州中西部地区星罗棋布。风电产业为该州大约 7000 人提供了就业机会，为 11 家涡轮机相关零件制造商创造了市场，并且还吸引了 100 多亿美元的资本投资。这个因玉米和猪肉制品而闻名的地方如今在风力发电领域也走在全国前列。目前爱荷华州的风力发电占比达到 31%，美国风能协会（AWEA）统计显示，爱荷华州的风能总装机容量达 636.4 万千瓦，排名全美第二（第一名是德克萨斯州），所发电量能够满足 130 万到 150 万户美国家庭的用电需求。

爱荷华州政府自对风能产业的支持可以回溯到上世纪 80 年代。当地居民将风能产业与绿色就业联系起来，他们对于风力涡轮机建设反对之声也不像其他地方一样喧嚣——这里呈现出一派蓬勃发展、无关政治的可再生能源产业所应有的面貌。爱荷华州风能协会副主席约翰·布尔曼表示：“从全国来看，风能发

展已经演变成了左右两翼之争。但在爱荷华州却从来没有出现过这种情况。在这里，风能产业的发展只关乎就业和经济发展。”

在爱荷华州以外，许多积极推动可再生能源发展的大公司也关注着这些风电场。爱荷华州经济发展署负责人黛比·杜伦指出，风能的普遍使用正是脸书、谷歌和微软等公司选择在爱荷华州新建园区的原因之一。脸书的数据中心就选址在阿特图纳市。

然而，快速扩张的风电场在爱荷华州也并没有受到普遍欢迎。有一些居民出于审美的考虑反对架设风力涡轮机；有人对风叶转动产生的低噪音颇有微词；还有人担心涡轮机可能会误杀鹰或者其他鸟类。因为担心侵占宝贵的农田，有些县的规划委员会拒绝批准新建大规模风电设施。

尽管遭遇反对，新的项目建设热潮已经开始在爱荷华州悄然兴起。隶属于沃伦·巴菲特麾下伯克希尔哈撒韦公司、位于得梅因市的中部能源公司近期宣布将在该州新建 1000 座风机。州政府官员透露，建成后可以将爱荷华州风力发电比例提升到总发电量的 40%。据该公司称，这项耗资 36 亿美元的工程是中部能源公司近期风电建设计划中最大的一个。而且项目建设既不会抬高当地用户的电费支出，也不需要州政府的任何财政支持。

美国风能协会（AWEA）和风能基金会（Wind Energy Foundation）最近发布的一项报告显示，到 2030 年，风能不仅能够满足爱荷华州所有的电力需求，还有足够充裕的电量可以“出口”到其他各州。今年 1 月多个风能组织在得梅因市社区大学就该报告展开了一场圆桌讨论，这所大学工业与科技系 70% 的学生被录取到与风能有关的课程中学习。

布尔曼表示，风电场和风电涡轮机组件生产在爱荷华州的“爆发式增长”是在 2000 年早期才出现的。在中部能源公司这样的大手笔投资出现之前的近 20 年间，该产业的顺利发展仰仗着州政府官员的大力支持。

早在上世纪 80 年代，时任爱荷华州州长特里·布兰斯塔德签署了第一份州级可再生能源指令，明确提出提高替代能源的发电占比。这项政令的目的在于消退当时农场危机的影响，推动混合型产业发展。尽管该指令迟至 1997 年才得到贯彻落实，这位长期在职的州长以及其他获选州议会代表的支持，为爱荷华州风能的大发展铺平了道路。如今，无论是横跨爱荷华州西部的 80 号洲际公路，还是韦尔斯堡项目所在的爱荷华州中北部乡村地带，标志性的风力涡轮机随处可见。

美国风能协会（AWEA）2015 年发布的题为《爱荷华州新增长---风能视角》的报告指出，当地农民和以及其他爱荷华州农地所有者通过将土地租赁给风电企业架设涡轮机，每年可获得 1710 万美元的地租收入。报告预测，到 2030 年这一数字有望增长到 5500 万美元。

爱荷华州大规模风电项目开发商 RPM Access 对项目进行了五年多的规划和风力观测后，才开始在布伦克农场上兴建风力发电机。老布伦克曾经专门拍摄了工人用三台起重机起吊和组装涡轮机的过程，并对亲眼目睹项目的完成感到自豪。他的儿子史蒂文·布伦克说：“他一辈子都倡导可持续发展和环境保护。”老人家已经在 2015 年去世，享年 80 岁。

建设完成后，BMP Access 将韦尔斯堡项目的 60 座涡轮机组出售给中部能源公司。该公司负责这些风电场的运营，它们是在 2013 年到 2015 年间建立起来的，由 448 座涡轮机组成的风电联合体的组成部分。

中部能源公司已与脸书达成协议，韦尔斯堡项目生产的大部分电力将用于抵消脸书公司阿特图纳数据中心园区耗电产生的碳排放。

无论是中部能源公司这样的由投资者拥有的企业，还是中央爱荷华电力合作社这样的农村小型电力协作组织，大大小小的电力企业都积极投身到了席卷整个州的风电大潮中。“大家都想让能源结构变得更环保”，爱荷华州经济发展署负责人黛比·杜伦表示：“整个行业都在积极行动。”

黛比等人也表示，美国国会于 2015 年 12 月做出的延长联邦风电优惠税的决定将继续推动爱荷华州风电的发展势头。一系列拟议中的输电线路建设如果到位的话，爱荷华州将有望跨越本州，向州外的人口密集区输送电力。（其中一条拟建的输电线路名叫“洛克岛清洁线”（The Rock Island Clean Line），预计将从爱荷华州西北部以及周边区调集 350 万千瓦的电力，输送至伊利诺伊州以及东部其他各州，满足居民用电

需求。)

圣三一结构塔 (Trinity Structural Towers) 等设备制造商巩固了风能产业在全美制造业中的地位。2009 年, 圣三一进驻爱荷华州牛顿市的 Maytag 部分老厂区。2007 年该厂关闭后, 这里一直处于空置的状态。圣三一在该厂区雇佣了大约 250 名工人, 制造高度在 260 到 308 英尺之间的涡轮塔架。公司总裁克里·科尔 (Kerry Cole) 表示: “这儿的工人都很能干, 而且技术也很娴熟。”

风电业界人士透露, 未来 3 到 5 年, 爱荷华州还将吸收到 80 到 100 亿美元的投资, 用于风电场建设和设备制造。这些投资正吸引着其他具有环保理念的公司进驻爱荷华州。杜伦表示, 自从中部能源公司 4 月发布扩张声明后, 已经先后有多家大型知名企业联系到她所在机构, 希望在爱荷华州建立新的数据中心或开展其他服务。

风能大发展在爱荷华州得到了上至州议会、下至大学和学院的大力支持, 民众却开始担心担心塔架的审美价值, 毕竟这些家伙越建越高。也有反对者质疑塔架对当地鸟类的影响, 并担心农业用地的正常供应。

在格伦迪县, 韦尔斯堡项目逐步成型之时, 已经有人表达了忧惧。格伦迪规划与区域划分委员会投票否决了这个项目, 但是这一决定却被县议会推翻。随后的另外一个风电场项目——伊斯维特风电场项目也被格伦迪郡规划委员会否决后, 被提交至格伦迪议会进行复议, 目前该项目的命运还悬而未决。对此, 格伦迪规划与区域划分委员会主席告诉《格伦迪记录》, 保护格伦迪郡的肥沃土地不受非农业发展侵害才是他最关心的问题。

布伦克相信, 能源生产总会涉及利益权衡。他听说有些居民对风力涡轮机的外观耿耿于怀, 也有人对涡轮机叶片的噪音表示反感。但是对布伦克而言, 至少有一种责难他并不认同。“很多人抱怨风力涡轮机侵占了农田”, 布伦克说: “但其实每个涡轮机占据的面积不足一英亩。要知道, 我家附近途径的公路占地更广, 远比 5 个涡轮机多。”

RPM Access 项目经理柯克·克拉夫特表示, 项目开发商正在试图解决另外一个环境担忧, 想方设法地避开鹰群迁徙的重要地区。包括西部地区在内的爱荷华州的鹰群总体数量呈上升趋势。“在过去一年半里, 我们花费了大量的时间、金钱、以及人力, 就是为了识别并规避一些敏感区域” 克拉夫特指出。

爱荷华州州立大学大气科学与农业气象学教授尤金·塔克 (Eugene Takle) 表示, 随着爱荷华州风力涡轮机数目逐步上升, 越来越多的农民已经认识到原来风能可以和农业和谐共存。此外塔克表示, 自己早期对风力涡轮机对作物生长影响的研究证明, 风叶转动事实上可以促进光合作用, 对植物生长反而是有利的。那是因为涡轮带动空气流动, 增加了植物运动, 促进光照, 也向植物低处的枝叶输送了正常生长所需的二氧化碳, 提高了玉米等粮食作物的二氧化碳捕获量。

“风机有助于植物吸收二氧化碳”, 塔克表示: “这一点非常重要, 因为如果植物吸收更多的碳, 粮食和作物也会变得更加饱满和茁壮。”

绝大多数爱荷华州人并没有意识到这些潜在的益处。塔克认为, 农民和爱荷华州民众很高兴能从风能受益, 而且为爱荷华州人均风电量在全国的领先地位深感自豪。

“我们没有山脉和海洋”, 塔克说: “我们在寻找可以引以为傲的事物。我觉得, 能够生产清洁能源让人感觉良好。”

Natural Gas (天然气)

Iran-Pakistan gas pipeline to complete by 2018

The Pakistani minister for petroleum and natural resources has reportedly said that a long-awaited gas pipeline

project between Iran and Pakistan will complete by 2018.

Shahid Khaqan Abbasi, speaking at a media briefing about the government's performance during the last three years, told reporters that the major project will finally come to an end. He did not, however, give further details about it.

The minister also noted that the Turkmenistan–Afghanistan–Pakistan–India Pipeline (TAPI) project will be completed by January 2020.

This is while back in March, Iran's President Hassan Rouhani told reporters in Islamabad that the pipeline had already been completed on the Iranian side.

While Iran has completed its part of the gas pipeline project with a total investment of above \$2 billion of investment, Pakistan has fallen behind the target to take delivery of gas, initially scheduled for 2014.

The joint project was launched in 2010 and aims to construct 1,800 kilometers (over 1,100 miles) of pipeline from Iran to Pakistan.

Iran plans to deliver 21.5 mcm/d of gas to Pakistan through the project.

Trade between Pakistan and Iran fell to \$432 million in 2010-11 from \$1.32 billion in 2008-09, according to the Trade Development Authority of Pakistan.

Energy-starved Pakistan suffers about 12 hours of power cuts per day and is keen to import Iranian oil, gas, iron and steel.

The energy crisis in Pakistan has worsened in recent years over 4,000 megawatts of electricity shortfall. The nation of 190 million people can only supply about two-thirds of its gas needs.

Iran in turn is interested in Pakistani textiles, surgical goods, sports goods and agricultural products.

伊朗-巴基斯坦天然气管道将于 2018 年完工

据报道，巴基斯坦石油和自然资源部部长称，期待已久的伊朗和巴基斯坦之间的天然气管道将于 2018 年完工。

Shahid Khaqan Abbasi 在一次关于政府过去三年政绩的新闻发布会上说道，主要项目即将进入尾声。然而，他并没有披露进一步的细节。

部长还指出，土库曼斯坦 - 阿富汗 - 巴基斯坦 - 印度管道 (TAPI) 项目将在 2020 年 1 月完成。

今年三月，伊朗总统 Hassan Rouhani 在伊斯兰堡告诉记者，伊朗端的管道已经完成。

虽然伊朗已经完成它这一部分的天然气管道项目，总投资为 20 亿美元，但是巴基斯坦落后于其输送天然气的目标，最初计划时 2014 年。

联合项目在 2010 年推出，旨在构建长达 1800 千米(超过 1100 英里)的从伊朗到巴基斯坦的天然气管道。

伊朗计划通过此项目给巴基斯坦提供 21.5mcm/d 的天然气。

根据巴基斯坦贸易发展局，2010-2011 年间，巴基斯坦和伊朗之间的贸易额从 2008-2009 年间的 13.2 亿美元降至 4.32 亿美元。

巴基斯坦能源匮乏，一天中有 12 小时在停电，迫切需要从伊朗进口石油、天然气、铁及钢铁。

最近几年，巴基斯坦的能源危机越发严重，超过 4000 兆瓦的电力短缺。这个拥有 1.9 亿人口的国家，只能满足其国家 2/3 的天然气需求。

而伊朗又对巴基斯坦的纺织、外科用品、体育用品和农产品感兴趣。

Energy giants focus on finding new gas markets

Mcanxixun Information

Global LNG output capacity expected to rise by 150m tonnes by 2020

London: Energy giants such as Royal Dutch Shell and Total are looking to build terminals and power plants in new markets to soak up the gas industry's rapidly burgeoning supply.

Companies have invested billions in plants to produce liquefied natural gas (LNG) in places such as Australia and the United States.

But gas demand growth is slowing, prices are down and the LNG volumes companies are set to produce will exceed those even major buyers such as China and Japan can absorb.

That has turned attention to the downstream market and opportunities to create new markets from Ivory Coast to remote Indonesian islands by building gas-fired power plants, pipelines, regasification and storage terminals.

"We are ready to go downstream as much as it takes to unlock gas demand," said Laurent Vivier, president for the gas division at Total.

"We need to be present in downstream ourselves, to create demand and unlock bottlenecks along the chain including regasification, pipelines and power plants."

Total aims to triple the number of its gas and power markets and raise its annual LNG output to 20 million tonnes and its trading to 15 million tonnes by 2020.

The company is taking part in LNG infrastructure tenders, including several gas-fired power plants, in countries including Indonesia, Chile, Ivory Coast, Ghana and Morocco, Vivier said.

Shell believes the number of markets buying LNG could double, according to its chief financial officer, Simon Henry.

"From around 20 to 30... we can see potential for around 50 different markets if you look out to 2030," Henry said. "Our aim is to capture the best share of those who are looking now to start or grow."

The focus on downstream mimics a model that companies such as Shell, Total, Exxon Mobil and Chevron have used for decades in the oil sector where their operations span oil wells, refineries and service stations.

But some analysts question how easily that model can be reproduced.

"Whether they succeed in this is another story, whether they have the mindset for this type of work is also another story," said Thierry Bros, senior gas analyst at French bank Societe Generale.

"It will be a painful test for these companies who are not that experienced in building small downstream demand," he said.

Technology

New technologies are helping speed development, with floating terminals, for example, offering a cheaper alternative to onshore units that cost more than \$1 billion (Dh3.67 billion).

"We are looking at multiple markets around the world in terms of potential to regas," said Shell's Henry. "Quite a lot of it is floating regasification because it is quick and you can develop [a market] in stages." Shell, the world's top LNG trader after buying BG Group, expects to produce around 30 million tonnes of LNG this year and trade nearly 50 million tonnes, accounting for about a sixth of global trading volume.

Global output capacity is expected to rise by half by 2020, potentially adding some 150 million tonnes of LNG to the market.

However, overall gas demand growth is expected to slow to 1.5 per cent a year to 2021 from the 2.5 per cent rate seen recently, the International Energy Agency has forecast.

In step with oil and gas, LNG prices have also struggled in the last two years. That has prompted traders to offer

more single cargoes for immediate delivery on the spot market, making it easier for smaller buyers to find supply.

能源巨头们正寻找新的天然气市场

全球液化天然气产能至 2020 年将上升 1.5 亿吨

伦敦：荷兰皇家壳牌和 Total 等能源巨头正在新的市场寻求建立终端及发电厂，以吸收天然气工业蓬勃发展的能源供应。

这些公司在澳大利亚和美国的工厂投资数十亿美元以生产液化天然气(LNG)。

但是天然气需求增长正在放缓，价格也在下降，这些公司生产的 LNG 体积已经超过了中国和日本等主要买家能吸收的水平。

因此它们的注意力转向了下游市场，通过建设燃气电厂，管道，再气化终端和存储，从象牙海岸到偏远的印度尼西亚群岛，试图创造一些新市场。

“我们正准备开创下游市场，吸引客户的注意”，Total 燃气部主席，Laurent Vivier 说道。

“我们需要在下游市场展示我们自己，以创造需求，并破除沿链瓶颈，包括再气化、管道及发电厂”。

Total 的目标是使其天然气和电力市场的数目增加三倍，并且直到 2020 年，其每年的 LNG 输出达 2000 万吨，交易量达 1500 万吨。

Vivier 说，Total 参与了液化天然气基础设施的招标，包括在印度尼西亚、智利、象牙海岸国家，加纳和摩洛哥的一些天然气发电厂。

根据皇家壳牌公司的首席财务官 Simon Henry，该公司相信购买 LNG 的市场数量将翻倍。

“大约从 20 到 30...2030 年我们有望看到大约 50 个不同市场的潜力”，Henry 说道。“我们的目标是抓住这些现在正在起步或是成长中的市场中最好的一部分市场”。

下游市场的重点模仿了诸如皇家壳牌、Total、艾克森美孚和雪佛龙等公司在扩充油井、炼油厂和加油站等石油部门已经使用了几十年的模式。

但是一些分析师质疑该模式如何能被容易复制。

“关于他们是否能成功，这是另外一个故事了，他们是否有这种类型的工作心态也是另外一个故事了”，法国兴业银行高级天然气分析师 Thierry Bros 说道。

“对于那些没有经历过创造下游小型需求市场的公司来说，这将会是一个痛苦的考验”，他说道。

技术

新技术加速了发展，以浮式接受终端为例，其为斥资达十亿美元的陆上单位提供了廉价的替代品(Dh 3.67 亿)。

“我们从再气化潜力的角度，巡视世界上各种各样的市场”，皇家壳牌的 Henry 说道。因为其快速，现在已有相当多的浮式再气化终端，并且你可以分阶段发展（一个市场）。皇家壳牌公司在其收购 BG 集团后，成为世界上最大的液化天然气贸易商，预计今年将生产约 3000 万吨液化天然气，交易额可达近 5000 万吨，约占全球液化天然气贸易总体积的六分之一。

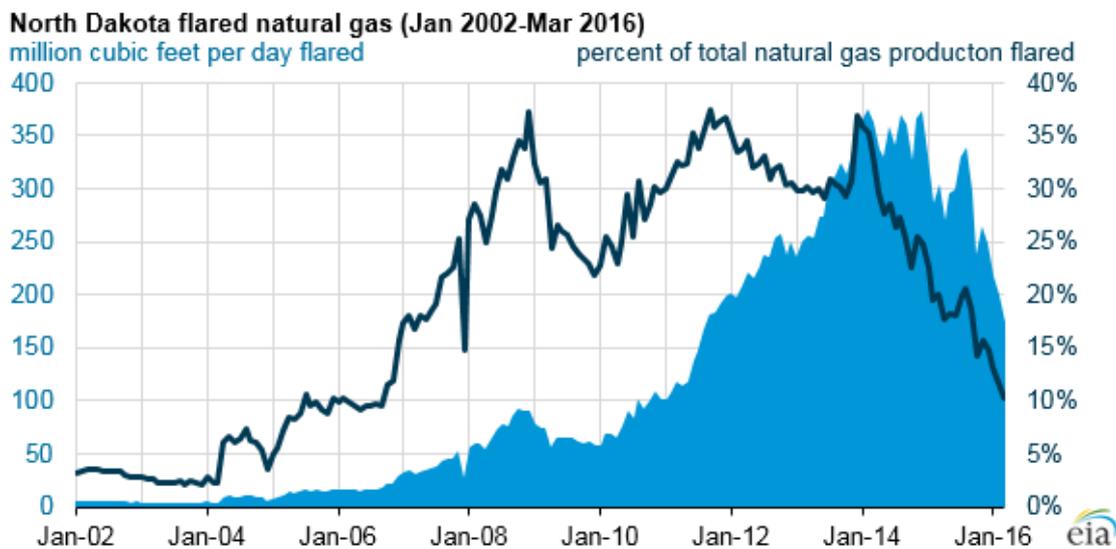
全球输出量到 2020 年预计会增长一半，潜在额外增加 1.5 亿吨液化天然气进入市场。

然而，国际能源机构预测，总体的天然气需求将会放缓，从现今的 2.5%可能下滑至 2021 年的 1.5%。

与石油和天然气步调一致，LNG 的价格也在过去两年内苦苦挣扎。这促使贸易商在现货市场上提供更多的单现货以及时供应小需求买家，使其能更容易得到能源。

Natural gas flaring in North Dakota has declined sharply since 2014

Mcanxixun Information



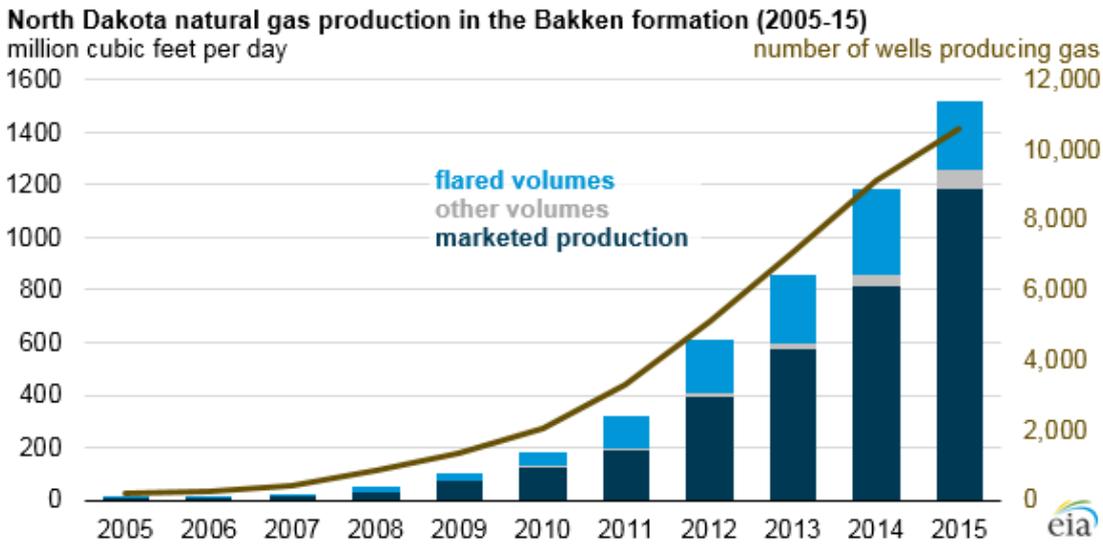
Source: U.S. Energy Information Administration, based on the North Dakota Department of Mineral Resources

The volume of North Dakota's natural gas production that is flared has fallen sharply in both absolute and percentage terms since 2014. In March 2016, 10% of North Dakota's total natural gas production was flared, less than one-third of the January 2014 flaring rate, which was at 36%. Flaring rates and volumes have significantly decreased as North Dakota's total natural gas production has continued to grow, setting a monthly total natural gas production record of 1.71 billion cubic feet per day in March 2016. The North Dakota Industrial Commission established targets in September 2015 to reduce natural gas flaring.

Natural gas is flared (burned) rather than vented (released into the air) without combustion for both safety and environmental reasons. Vented, unprocessed natural gas contains hydrocarbons that are heavier than air, such as propane and butane, which can be hazardous if ignited. Methane, the primary component of natural gas, is also a potent greenhouse gas. Flaring natural gas produces carbon dioxide, which, while also a greenhouse gas, has a much lower global warming potential (a measure of how various gases can affect the atmosphere's radiative balance) than methane.

Natural gas flaring in the United States is not confined to North Dakota, but since 2012, North Dakota has had the highest volumes of flared natural gas. By law, North Dakota prohibits natural gas venting.

Most North Dakota oil and natural gas production is in the Bakken formation, a relatively new production area that has lacked sufficient natural gas pipeline infrastructure. As new infrastructure has been built, more of the Bakken region's natural gas production has been brought to market, reducing the volume of flared natural gas despite much higher production.



Source: U.S. Energy Information Administration, based on North Dakota Department of Mineral Resources

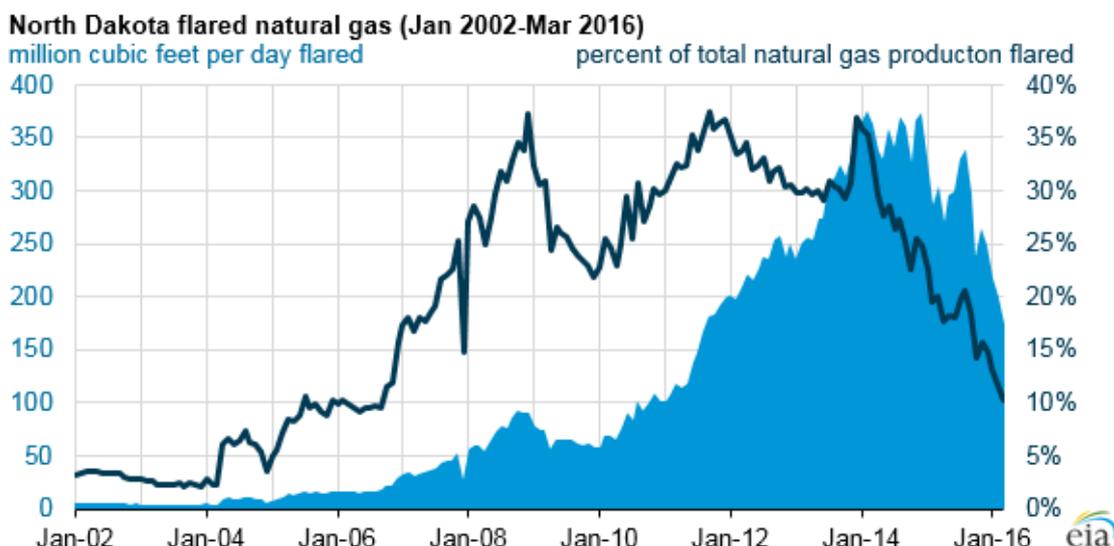
Note: Data include Bakken wells producing natural gas. Wells do not exclusively produce natural gas, but include other volumes such as volumes used on the lease, volumes stored, volumes used to repressure the wells, and natural gas plant liquids production.

New wells account for a large share of the volume of North Dakota's flared natural gas. North Dakota oil and gas regulations require that tax and royalties be paid for all natural gas flaring beyond a well's first year of production. The North Dakota Department of Mineral Resources can grant confidential reporting status to wells for the first six months of a well's production. These wells, which are also known as confidential wells, have nearly double the flaring rates of nonconfidential wells.

Based on data for the 12 months from April 2015 through March 2016, 29% of the natural gas produced by confidential wells in North Dakota was flared, while 15% of the natural gas from nonconfidential wells was flared. Once a well's first year of production ends, operators must cap the well, connect it to a natural gas gathering line, equip the well with an electrical generator that consumes at least 75% of the natural gas from the well, or find another approved approach that reduces flaring.

The North Dakota Industrial Commission first established targets for the percentage of natural gas flared in April 2014 and subsequently revised these targets in September 2015. Currently, the targets allow a maximum of 23% of production volumes to be flared through the first quarter of 2016, 20% for April through October 2016, 15% for November 2016 through October 2018, and 12% for November 2018 through October 2020. Ultimately, the target falls to 9% of production beginning November 1, 2020.

北达科他州天然气费用自 2014 年以来已大幅下降



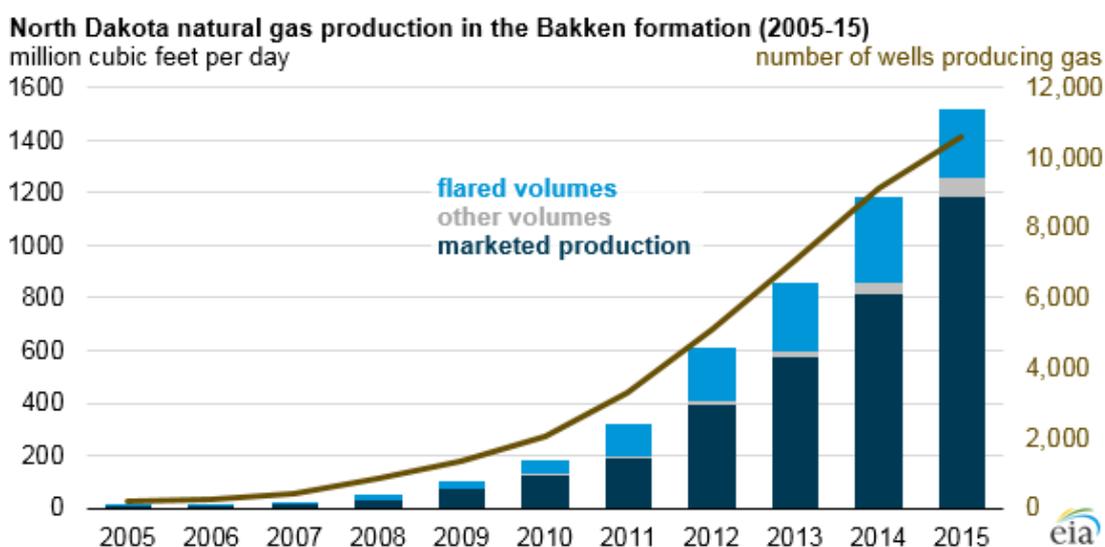
来源:美国能源信息管理局根据北达科他州的矿产资源

北达科他州的天然气生产的体积绝对值和百分比自 2014 年以来急剧下降。2016 年 3 月,北达科他州消耗了天然气总产量的 10%,2014 年 1 月不到三分之一的扩口率,达到 36%。北达科他州的天然气产量持续增长,而扩口率和体积大大减少了。2016 年 3 月创下每月每天 17.1 亿立方英尺的天然气总产量记录。北达科他州工业委员会在 2015 年 9 月设立的目标,以减少天然气燃除。

天然气燃烧(燃烧),而不是不考虑安全和环境方面的原因未经燃烧就排放(释放到空气中)。未经处理排放的天然气包含比空气重的碳氢化合物,如丙烷和丁烷等,一旦点燃,很危险。甲烷,天然气的主要成分,也是一种强有力的温室气体。天然气燃烧产生的另一种温室气体二氧化碳,相比甲烷,更可以称得上是全球变暖的罪魁祸首(测量各种气体如何影响大气辐射平衡)。

天然气燃除并不局限于在美国北达科他州,但自 2012 年以来,北达科他州的天然气燃除率最高。法律禁止北达科他州燃烧天然气。

大多数北达科他州石油和天然气在巴肯生产,一个相对较新的生产领域,缺乏足够的天然气管道设施。随着新基础设施的建成,更多的巴肯地区的天然气进入市场,虽然产量更高,却减少了天然气的体积。



来源:美国能源信息管理局,基于北达科他州的矿产资源

注:数据包括肯井生产天然气。井不专门生产天然气,但包括其他用于租赁,存储,用于液压井,液体和天然

气工厂生产量。

北达科他州燃除的天然气很大一部分来自新井。北达科他州石油和天然气法规要求第一年税收和版税支付所有天然气燃除以外生产量。北达科他州的矿产资源可以承认前六个月的生产。这些井,也被称为保密井,扩口率是非保密井的两倍。

基于2015年4月到2016年3月12个月的数据,北达科他州29%的天然气生产机密井燃烧,而15%的天然气来自非保密井。油井生产第一年结束后,运营商必须密封好,连接到一个天然气集输管线、装备一个消耗至少75%的天然气发电机,或另寻可行方法,减少燃除。

北达科塔工业委员会首先建立的目标天然气比例与2014年4月燃除,随后在2015年9月修订了目标。目前,到2016年第一季度,目标允许最多23%的产量燃除,2016年4月至10月为20%,2016年11月到2016年10月为15%,2018年11月到2018年10月为12%。最终,从2020年11月1日开始,目标降至9%。

Minerals (矿产)

Anglo American closing in on Australian coal mines sale

Anglo American is hopeful of concluding the sale of its Australian coal mines within weeks with BHP Billiton among the leading bidders, said people who have been close to the sales process.

A sale of the Moranbah and Grosvenor mines would be a key component of Anglo's debt reduction plans as it tries to persuade investors that it can stave off the consequences of lower commodity prices.

The efforts by Anglo to sell the mines come in spite of global pressure on coal producers because of weak prices and concerns over the fuel's role in increasing carbon emissions.

The two mines produce coking coal for use in steelmaking, which is seen by many analysts as a more robust part of the market compared with demand for thermal coal for power stations.

Anglo stepped up its asset sale plans in February. It has sold a trio of smaller Australian coal mines in recent months, while it also sold niobium and phosphate deposits in Brazil for \$1.5bn in April, as part of plans for between \$3bn and \$4bn of asset disposals this year.

Glencore, the commodities group, was among the groups to consider a bid for the Anglo coal assets but people aware of the sale plans said the Switzerland-based group was no longer in the process.

Apollo, the private equity group, has also been considering a bid for the assets.

英美资源集团接近完成澳大利亚煤矿出售

出售位于澳大利亚的两座煤矿是该集团债务削减计划的关键组成部分。知情人士表示,主要竞购者包括必和必拓。

英美资源集团(Anglo American)有望在未来几周内完成对其位于澳大利亚的煤矿的出售,接近出售进程的知情人士表示,主要竞购者包括必和必拓(BHP Billiton)。

出售莫兰巴(Moranbah)与格罗夫纳(Grosvenor)煤矿是英美资源集团债务削减计划的关键组成部分,该集团正试图说服投资者相信其能够抵御大宗商品价格下跌的不利影响。

尽管价格疲软以及围绕煤炭增加碳排放的担忧对煤炭生产商造成全球压力，英美资源集团还是在努力出售旗下的煤矿。

这两座煤矿生产的是用于炼钢的炼焦煤，许多分析师认为，与发电厂使用的动力煤相比，炼焦煤的市场需求更强劲。

今年2月，英美资源集团加快了资产出售计划。最近几月，该集团已出售了三家较小的澳大利亚煤矿，同时还在4月以15亿美元的价格出售了位于巴西的铌和磷酸盐矿，该集团计划今年处置30亿至40亿美元的资产。

大宗商品集团嘉能可(Glencore)也曾考虑参与英美资源集团煤炭资产的竞购，但知情人士表示，这家总部位于瑞士的集团已经退出。

私人股本集团阿波罗(Apollo)也在考虑竞购这些资产。

Chinese mining interests disrupt Australian election

Shenhua's coal project may lead to the ousting of one of Australia's most senior politicians days before its federal election

Five hours drive northeast of Sydney, in the Liverpool Plains, is where Chinese coal firm Shenhua intends to build its next mine. If it goes ahead, this will be one of the largest coal mines in Australia.

The Shenhua Watermark mine is expected to produce a staggering 290 million tonnes of coal over 30 years. There will be three working open cut pits, each several kilometres wide; and the disturbance area of the whole site is 40 square kilometres, larger than the central business districts of Sydney and Melbourne combined.

Lying on prime agricultural land, the Watermark mine plan has been highly contentious as it pits Australia's mining industry at loggerheads with farmers. Those opposing the mine say it could affect local groundwater sources.

"It has never been shown that mines can safely operate close to water resources. The risks to agricultural potential are too great," says Timothy Duddy, a local landowner.

Those in favour, such as Stephen Galilee of the NSW Mineral Council, point to the 425 local jobs that will be created during operation (625 during construction), and the AU\$1.3 billion (6.4 billion yuan) in revenue to accrue over the lifetime of the mine.

The mine has become so controversial that it may directly contribute to the downfall of one of Australia's most senior politicians in the federal election on July 2.

The site lies in the home constituency of deputy prime minister, Barnaby Joyce. When the mine was approved, Tony Windsor a former Independent MP for the area, decided to come out of retirement in order to challenge Joyce over the proposed coal mine. With only a few days remaining until the election the two candidates are polling extremely closely in a heated and hard-fought campaign.

Chinese interests

Given that China has the second largest coal reserves in the world, it is worth considering why Shenhua has been looking at mining opportunities in Australia's agricultural heartlands at all. The answer goes back to 2008 when China's economy experienced double-digit growth, and demand for coal was rocketing. This was the year when Shenhua was first given a licence to explore the Liverpool Plains.

Although China has vast domestic coal resources, the majority are located in the northern and western provinces whilst the major coal-consuming centres are located along the eastern and southern coastline. Growth in the 2000s caused transportation bottlenecks as China's railways and seaports struggled to keep pace, and the prospect of imported coal became increasingly attractive. Meanwhile, Australia has strong mining infrastructure, significant

coal resources and a government that is determined to show China that it is open for business.

Australia's mining industry has boomed over the past 20 years, with most exports of iron ore and coal destined for China. The trend has boosted job creation and driven economic growth, yet it is not without its risks. Australia has become increasingly dependent on a single economy, with China receiving three quarters of Australian coal in 2013, for example. As the Chinese economy has slowed in recent years, the risk for Australia is that the source of its multi-decade boom becomes the cause of its bust.

Imports drop

In July 2015, the Chinese government decided to limit the use of imported coal in a bid to improve air quality in major cities such as Beijing and Shanghai. This has had a direct impact on the Australian coal mining sector. Tao Wang, a scholar at the Carnegie-Tsinghua Centre for Global Policy explains that "the recent trend of importing coal has largely been reversed. Chinese coal imports fell 11% in 2014, and they have fallen 37.5% again in 2015." Mining giants Glencore and Rio Tinto slashed production due to an oversupply in the market whilst several small miners have gone into administration.

When Shenhua's exploration licence was granted in 2008, the price of Australian coking coal was around US\$300 per metric tonne (Mt). However, coal prices dropped in the following years. When the mine's financial viability study was carried out in 2012, prices were expected to be US\$142 / Mt over the lifetime of the project, and "a sustained reduction in coal price (over 55%) would be required to make the project welfare reducing".

Since then prices have continued to tumble, down to around US\$85 per Mt at the time of writing, and this trend shows no signs of reversing. If Shenhua decides to excavate this year there is a clear risk that they will be left with an asset that has lost most of its former value. Tao Wang thinks "it would be a liability to Shenhua, given the poor prospect of coal consumption in China".

Shenhua's exploration licence expires in October 2016 and they have yet to apply for a full mining licence. However, it would be tricky for them to back out at this stage, given all that they have committed to the project.

Shenhua's Australian chief Liu Xiang said: "To date, after eight years, Shenhua has spent \$700 million and has little tangible progress to show for this investment." There is speculation that the Australian government will return Shenhua's original exploration licence fees in order to allow the company to retreat with dignity.

Foggy future

What this means for the longer term prospects of Australian coal exports is uncertain. Besides Shenhua's mine, there are several other major coal export projects in the pipeline in the Galilee basin of northern Queensland. These projects have attracted controversy because of the impacts on climate, local environment and the risk involved in transporting the coal through narrow shipping lanes in the Great Barrier Reef. Like Shenhua's mine, the Queensland projects have been on hold pending a recovery in coal prices.

If demand remains low over the next few years it is conceivable that China's energy transformation will leave Australia's coal sector (and deputy prime minister) in its wake.

In the words of Shenhua chairman Zhang Yuzhou: "The pace of adjustments to the global energy structure in the short run will speed up... and the demand for fossil fuel energy including coal will steadily decrease... the structural adjustments to the coal and electricity sectors will accelerate."

中国矿业利益恐扰乱澳大利亚大选

距联邦选举仅数天，神华集团的煤碳项目可能导致澳大利亚资深政治家下台。

从悉尼出发，驱车五小时就能来到位于这座城市东北方向的利物浦平原，这里就是中国神华煤炭集团选定的下一个采矿点。如果计划得以实施，这里将会建成澳大利亚最大的煤矿之一，产量非常惊人。

神华集团的水印煤矿预计将在 30 年间产出煤炭 2.9 亿吨。该项目将拥有三个露天矿坑，每个矿坑的宽

度都达到了数千米，整个工程的“扰动区”面积为 40 平方公里，比悉尼和墨尔本的商业中心区还要大。

水印煤矿计划极具争议性，其选址主要为农业用地，使得澳大利亚的采矿业与农场主陷入对立。反对该煤矿计划的人认为，煤矿可能会影响当地的地下水源。

“我从来没见过在水源附近采煤还能确保水源安全的。对农业生产潜力来说，这个风险太大了。”当地一位土地所有者蒂莫西·达迪说。

而像新南威尔士矿产委员会的斯蒂芬·加利利这样支持该项目的人则指出，煤矿作业期间将为当地创造 425 个就业岗位（建设期间可创造 625 个就业岗位），整个项目累计将为澳大利亚带来 13 亿澳元（合 64 亿人民币）的税收。

围绕该煤矿的争议非常激烈，甚至可能会直接导致一位即将在 7 月 2 日参加联邦选举的澳大利亚资深政治家垮台。

该煤矿位于副总理巴纳比·乔伊斯的原选区。澳大利亚政府批准煤矿建设之后，这一选区的前独立议员托尼·温莎决定复出参加选举，就煤矿的建设问题向乔伊斯提出挑战。距选举仅数日，两位候选人的支持率十分相近，竞争非常激烈。

鉴于中国有着全球第二大的煤炭储量，我们很有必要想一想，为什么神华集团会在澳大利亚的农业核心地带寻求采矿机会。这个问题可以追溯到 2008 年。当时，中国经济呈两位数增长，国内煤炭需求量急速上涨。就在那一年，神华集团首次获得许可，对利物浦平原的煤矿进行勘探。

虽然中国国内的煤炭资源丰富，但大多位于北部和西部省份，而主要的煤炭消费中心则位于东部和南部的沿海地区。本世纪初，中国煤炭需求急速上涨，铁路和海港只能勉强跟上增长的步伐，最终导致交通运输出现瓶颈，而进口煤炭的前景显得愈发具有吸引力，与此同时，澳大利亚有着健全的矿业基础设施和丰富的煤炭资源，澳大利亚政府也欢迎中国企业进驻。

过去 20 年间，澳大利亚的采矿业繁荣发展，其生产的铁矿石和煤炭大部分出口至中国。这一趋势为澳大利亚创造了就业，刺激了经济发展，但也并非毫无风险。澳大利亚越来越依赖于中国这个单一的经济体。仅以 2013 年为例，澳大利亚生产的煤炭中有 3/4 出口至中国。而随着近年来中国经济增速放缓，澳大利亚也面临着风险，造就其多年繁荣经济的源头如今成了破产的原因。

2015 年 7 月，中国政府为了改善京、沪等主要城市的空气质量，决定限制进口煤炭的使用。这一决定对澳大利亚的采矿业造成了直接影响。卡内基-清华全球政策中心学者王韬解释说“近来的煤炭进口趋势很大程度上是逆向的，2014 年中国煤炭进口量下降了 11%，2015 年则再次下降了 37.5%。”由于煤炭市场供过于求，采煤巨头嘉能可和力拓集团纷纷削减产量，一些小型采矿企业则已经走向破产。

2008 年神华集团获得探矿许可证之时，澳大利亚炼焦煤的价格约为每公吨 300 美元。接下来几年间，煤炭价格一降再降。2012 年对该煤矿的财务可行性进行研究之时，项目生命周期期间的煤炭价格预计为每公吨 142 美元。“为了减少项目的福利支出，必须持续降低煤炭价格（降幅超过 55%）。”

此后，煤炭价格持续暴跌，截至本文撰稿时已跌至每公吨 85 美元，且这一趋势没有任何扭转的迹象。很明显，神华集团如果决定今年内开挖作业，就将面临资产严重贬值的风险。王韬认为“鉴于中国国内煤炭消费前景黯淡，这个项目将会成为神华集团的负担。”

神华的探矿许可证将于 2016 年 10 月到期，目前该集团尚未申请完整的采矿许可证。然而，鉴于项目前期投入庞大，神华现在想要退出也并不容易。

神华集团澳大利亚高管刘翔说：“截至今天，八年过去了，神华投入了 7 亿美元，却几乎没有看到一点实质性进展。”据猜测，澳大利亚政府将返还神华集团最初缴纳的探矿许可费用，好让其体面的撤资。

这对澳大利亚煤炭出口的长期前景意味着什么尚不明确。除了神华的煤矿，昆士兰北部加利利盆地还有其他几个大型煤炭出口项目正在筹备中。鉴于其对气候和当地环境的影响，以及在大堡礁狭窄的运输航线中运煤可能涉及的风险，这些项目也饱受争议。和神华集团的煤矿一样，昆士兰地区的项目也已经搁置，等待煤炭价格的回升。

可以想象，如果未来几年煤炭需求依旧低迷，澳大利亚的煤炭产业（和副总理）将会步上中国能源转

型的后尘。

用神华集团主席张玉卓的话说：“全球能源结构调整的步伐在短期内会加速……包括煤炭在内的化石燃料能源需求将稳步下降……煤炭和电力部门的结构调整将会加快。”

Clean Energy (清洁能源)

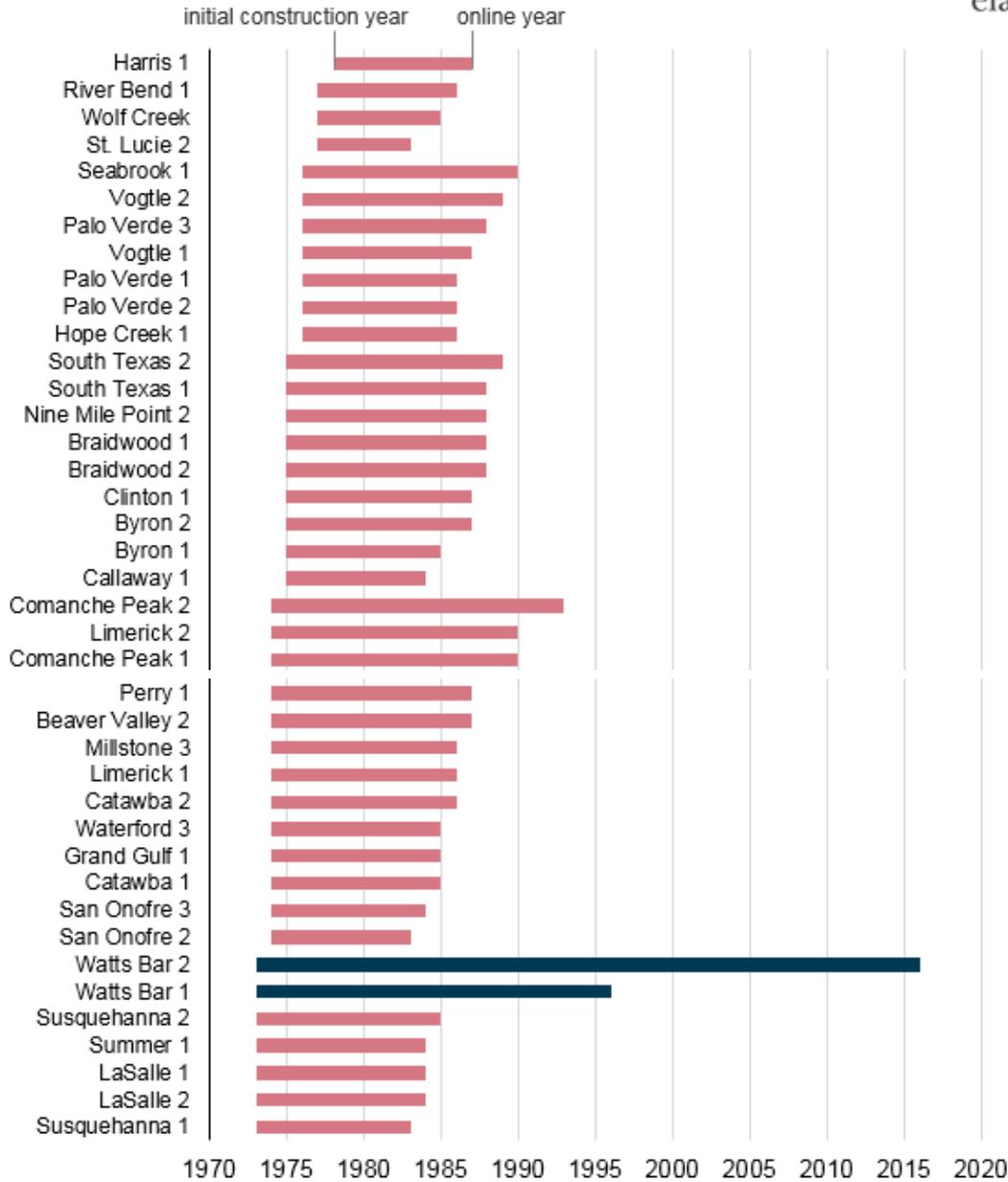
First new U.S. nuclear reactor in almost two decades set to begin operating

The Tennessee Valley Authority's (TVA) Watts Bar Unit 2 was connected to the power grid on June 3, becoming the first nuclear power plant to come online since 1996, when Watts Bar Unit 1 started operations. Watts Bar Unit 2 is undergoing final testing, producing electricity at incremental levels of power, as TVA prepares to start commercial operation later this summer. The new reactor is designed to add 1,150 megawatts (MW) of electricity generating capacity to southeastern Tennessee.

Watts Bar Unit 2 is the first nuclear plant in the United States to meet new regulations from the U.S. Nuclear Regulatory Commission (NRC) that were established after the 2011 earthquake and tsunami that damaged the Fukushima Daiichi Nuclear Plant in Japan. After the NRC issued an operating license for the unit in October 2015, 193 new fuel assemblies were loaded into the reactor vessel the following month. TVA announced at the end of May that the reactor achieved its first sustained nuclear fission reaction.

Construction on Watts Bar Unit 2 originally began in 1973, but construction was halted in 1985 after the NRC identified weaknesses in TVA's nuclear program. In August 2007, the TVA board of directors authorized the completion of Watts Bar Unit 2, and construction started in October 2007. At that time, a study found Unit 2 to be effectively 60% complete with \$1.7 billion invested. The study said the plant could be finished in five years at an additional cost of \$2.5 billion. However, both the timeline and cost estimate developed in 2007 proved to be overly optimistic, as construction was not completed until 2015, and costs ultimately totaled \$4.7 billion.

U.S. nuclear reactors that began construction and came online since 1973



Source: U.S. Energy Information Administration, based on the International Atomic Energy Agency's Power Reactor Information System

Although Watts Bar 2 is the first new U.S. nuclear generator to come online in 20 years, four other reactors are currently under construction and are expected to join the nuclear fleet within the next four years. Vogtle Electric Generating Plant Units 3 and 4 in Georgia and Virgil C. Summer Nuclear Generating Station Units 2 and 3 in South Carolina are scheduled to become operational in 2019–20, adding 4,540 MW of generation capacity.

近二十年来美国第一个新核反应堆开始运行

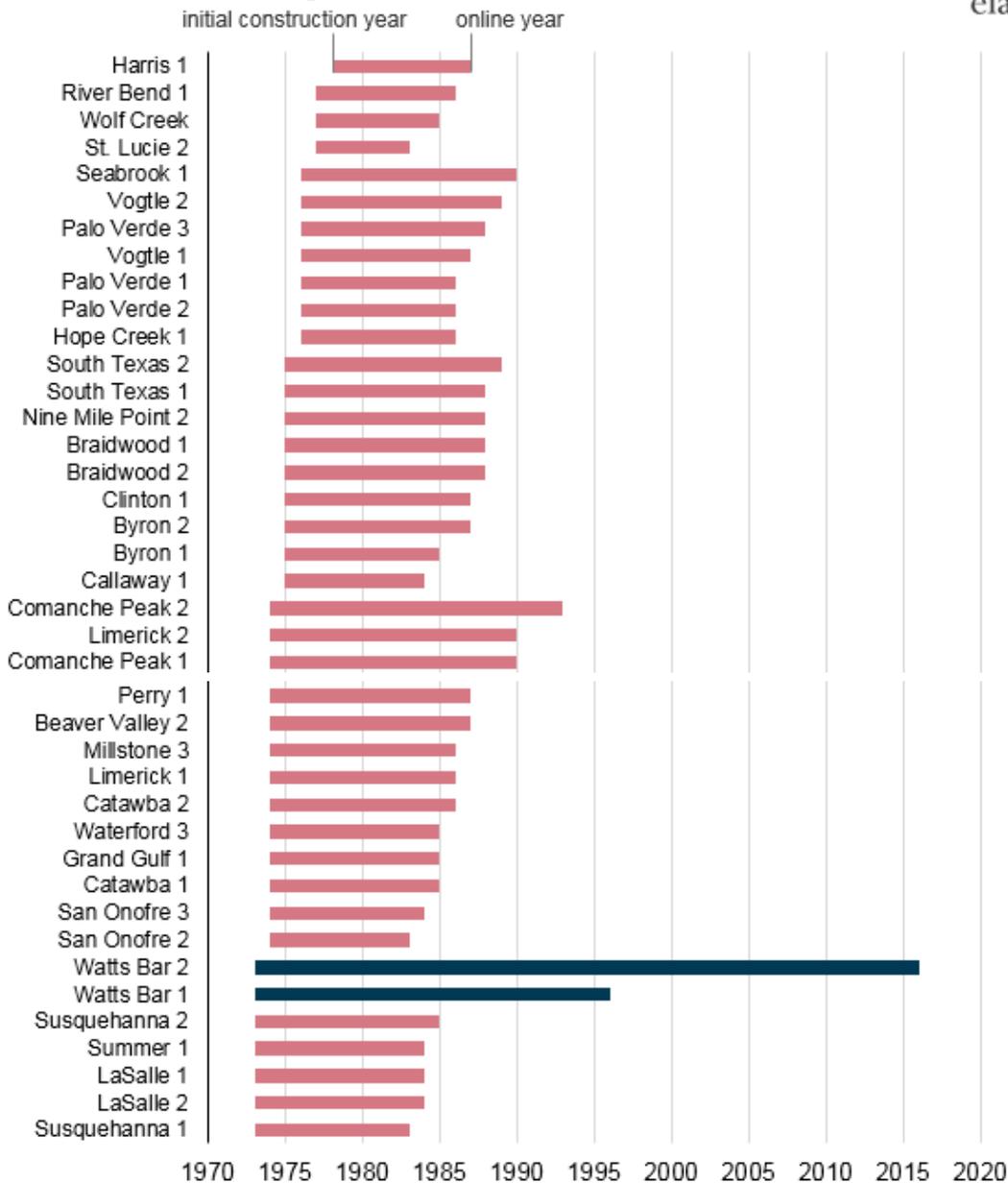
田纳西流域管理局(TVA)Watts Bar2 组于 6 月 3 日连接到电网, 成为自 1996 年以来,当 Watts Bar1 号机组开始操作以来, 第一个在线的核电站。Watts Bar2 组正在进行最后的测试,并正以增量水平在生产电力,与此同时 TVA 准备今年夏天早些时候开始商业运营。新的反应堆设计为田纳西州东南部的增加 1150 兆瓦

(MW) 的发电容量。

在经历了 2011 年的地震和海啸,日本的福岛第一核电站收到损坏后, Watts Bar2 组是满足美国核管理委员会(NRC)新规定而建立的第一个核电站。于 2015 年 10 月, NRC 给 Watts Bar 组发布了一个操作许可证。一个月后, 193 个新燃料组件被加载到反应堆容器。TVA 在 5 月底宣布, 反应堆首次实现持续的核裂变反应。

Watts Bar2 组最初始建于 1973 年, 在 1985 年, NRC 确认 TVA 核计划的缺点后停止建设。2007 年 8 月,TVA 董事会授权完成 Watts Bar2 组并于 2007 年 10 月重新开工建设。当时,一项研究发现 2 组以 17 亿美元的投资高效得完成了 70%得工程。这项研究说, 以 25 亿美元的额外费用,核电站可以在五年内完成。然而,时间表和成本估计在 2007 被证明是过于乐观,施工直到 2015 年才完成,最终成本总计 47 亿美元。

U.S. nuclear reactors that began construction and came online since 1973



资料来源:美国能源信息管理局,根据国际原子能机构的动力反应堆信息系统

虽然 Watts Bar2 组是 20 年来, 美国第一个新核能发电厂, 他四个反应堆正在建设,预计在接下来的四年参加核舰队。乔治亚州的 3、4 号机组发电工厂和南卡罗来纳州维吉尔 C.的夏天核能发电站单组 2 和 3

定于在 2019 到 2020 年开始运作,并增加 4540 兆瓦的发电能力。

Wind energy's biggest month, and how it keeps prices down

Wind energy in Australia has enjoyed its biggest every month in May, producing nearly a quarter more electricity than its previous record month, and overtaking hydro to provide 8.5 per cent of electricity demand in the country's main grid.

The record output came, coincidentally, in the same month that the last coal fired power station in South Australia was closed (May 9). And a new analysis from energy consultants Pitt & Sherry points to how wind generation is keeping a lid on wholesale electricity prices.

The Pitt & Sherry analysis notes that four states recorded record monthly totals in May – South Australia (where wind met 49 per cent of demand), Victoria, New South Wales and Tasmania. (There is only one very small wind farm in Queensland and Western Australia operates on a separate grid).

The 3.9GW of wind generation in the month of May operated at a capacity factor of 49 per cent, according to Pitt & Sherry, meaning that it produced 22 per cent more than it did in its previous record month (July, 2015). (See this story for more details, and how most wind farms in NSW operated at a higher capacity factor than some of the biggest coal plants).

South Australia has the biggest share of wind farms, with 1.5GW, and this accounted for 49 per cent of its electricity demand in the month. On some occasions, wind energy provided more than 100 per cent of electricity demand in the state.

Wind energy also met 13 per cent of demand in Tasmania, 12 per cent in Victoria (nearly twice as much as hydro) and 4.8 per cent in NSW (also more than hydro). As a comparison, the capacity factor of the wind farms in the National Electricity Market in March was just 23 per cent.

What's also of interest is the impact that wind generation has on wholesale prices. Pitt & Sherry analyst Hugh Saddler notes that opponents of wind generation often claim that increasing wind generation volumes pushes up wholesale market prices.

He says the data from recent months provides a good opportunity to test this claim against the facts, and against economic theory, which suggests that prices should be lower when there is more wind generation.

To illustrate his point, Saddler calculated the volume weighted average wholesale pool (spot) price for each of the four mainland NEM states in May and again in March.

The volume weighted price means the average price over the 744 thirty-minute trading intervals in each month, weighted by the total demand in each trading interval.

A second calculation is for the wind generation volume weighted average price, i.e. the same calculation as above, but weighted by the wind generation volume in each trading interval, rather than total demand.

The table below shows the results of these calculations. It also shows the shares of wind generation in total electricity supply in each month in each state.

State		NSW	Victoria	SA	Queensland
May 2016	Pool price (\$/MWh)	70	70	75	69
	Wind price (\$/MWh)	62	58	50	NA
	Wind share of total supply	4.8%	12%	49%	0%
	Ratio wind: pool price	88%	82%	66%	NA
March 2016	Pool price (\$/MWh)	46	46	61	46
	Wind price (\$/MWh)	43	46	52	NA
	Wind share of total supply	1.6%	5%	24%	0%
	Ratio wind: pool	93%	100%	85%	NA

In terms of comparisons between states, it can be seen that the SA price was higher than prices in the other three states in both months, but the difference was much less in May, when wind generation was high, than in March when wind generation was low.

For most of the time since the NEM was established, Saddler notes, spot prices have been higher in SA than in other states, because its local supply has, until the recent rise of wind generation, been confined to high cost gas generation and, until its closure, one high cost coal generator.

“It can also be seen that when there are large amounts of wind generation, prices are lower than the average level for the whole month and, in general, the larger the share of wind generation the larger the difference between the wind price and the total price,” he says.

“This relationship demonstrates unequivocally that, exactly as economic theory predicts, wind generation holds down wholesale prices.”

Gas generators are able to reduce output at times of high output from wind generators, and quickly increase output when wind output falls away. This reduces their need to supply at times when prices are low and enables them to increase output when prices are higher.

The Northern coal fired generator, and nearly all other coal generators, do not have the same flexibility to vary its output, so it was much more exposed to periods of low prices. “This was one of the main reasons that it was unable to be competitive in the market and was closed down on 9th May,” Saddler says.

Saddler’s conclusions are no surprise, and are consistent with what the wind industry has been maintaining all along, and with what is recognised by the Australian Energy Regulator.

The AER, which investigates price spikes and keeps a monitor on bidding patterns (necessary in a small market dominated by a few large generators), had this to say about South Australia.

Spot prices tend to be higher in South Australia than elsewhere, partly reflecting the region’s historical reliance on gas powered generation, and its ratio of peak to average demand being higher than in other NEM regions.

The South Australian market has been increasingly volatile since 2007. Relatively concentrated generator ownership, generator rebidding behaviour, thermal plant withdrawals, and limited import capability are contributing factors. South Australia’s high levels of wind capacity also contribute to price swings, due to wind’s intermittent nature.

That concentration in ownership, and the bidding behaviour, is a critical element. On several occasions it has pinged generators for bidding patterns that it says have forced up the price of electricity. It says this is a particular problem in South Australia and Queensland, where a few generators dominate the market.

风能最大月以及它如何使价格下降

澳大利亚的风能在 5 月的每个月已经享有最大的,比先前的记录多生产近四分之一的电能,并超越水电,提供主要电网电力需求的 8.5%。

记录结果出来时,巧合的是,就在同一个月,南澳大利亚的最后的燃煤电站被关闭(5月9日),能源顾问皮特&雪莉的一个新的分析指出了风力发电是如何限制电力批发价格的。

皮特和雪莉分析指出,四个州5月月度总额创记录——南澳大利亚州(风满足需求的49%),维多利亚州、新南威尔士和塔斯马尼亚岛。(只有一个非常小的风电场在昆士兰和西澳在一个单独的电网中运作)。

据皮特&雪利,5月3.9吉瓦的风力发电的利用率占到了49%,这意味着它比以前的月记录多生产22%(2015年7月)。

南澳大利亚风电场的最大份额为1.5GW,这占了月电力需求量的49%。在某些情况下,风能提供超过100%的电力需求。

风能还满足了塔斯马尼亚的需求的13%,维多利亚的12%(水电的两倍)和新南威尔士州的4.8%(也超过水电)。作为比较,风电场3月的利用率在全国电力市场仅为23%。

有趣的是,风力发电对批发价格的影响。皮特&雪莉分析师 Hugh Saddler 指出,风力发电的反对者往往声称增加风力发电量推高了批发市场价格。

他说,最近几个月的数据提供了一个很好的机会来说明这个论断与事实不符,与经济理论不符。根据理论,当更多的风力发电被提供时,价格应该低。

为了说明他的观点,Saddler 计算了5月和3月四个主要 NEM 州每个产量的加权平均批发电价(现货)批发价格。

加权价格意味着每个月超过了744三十分钟的交易区间的平均价格,被每一个交易区间的总需求加权。第二个计算是风力发电量的加权平均价格,即上面的计算一样,但被每个交易区间的风力发电容量加权,而不是总需求。

下表显示了这些计算的结果。它也显示了每个州每个月风力发电在电力供应总量的份额。

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从州之间的比较可以看出,在这两个月,SA价格高于其他三个州,但相比在风力发电低的3月,在风力发电很大的五月差别更小。

自NEM成立以来的大部分时间,Saddler指出,SA的现货价格已经高于其他州,因为它的本地供应,直到最近上升的风力发电,已经被限制在高成本气体发电站,直到关闭,一个高成本的煤炭发电站。

“也可以看到,当大量的风力发电,价格低于整个月的平均水平,一般来说,风力发电的市场份额越大,风价格和总价格的差别越大,”他说。

明确说明,“这种关系明确地证明,正如经济理论预测的一样,风力发电压低批发价格。”

天然气发电机能够减少输出当风力发电机输出的高时,并迅速增加输出当风输出低时。这也降低了他们供应的需要当价格低,并且使他们能够提高产量当价格更高时。

北方燃煤发电机,和几乎所有其他煤发电机,没有同样的灵活性来改变其输出,这一点更加地暴露出来当价格低的时期。“这是其中一个主要原因,无法在市场上具有竞争力,并于5月9日关闭,”saddler说。

Saddler的结论是意料之中的,与风电行业一直保持的是一致的,并与澳大利亚能源监管机构认可的一致。

AER,其调查价格飙升和保持监测对招标模式(必要的在一个小市场,主要由几大发电厂控制),对南澳大利亚这样说。

南澳大利亚的现货价格往往高于其他地方,一定程度上反映了该地区的依赖天然气发电厂的历史,和其峰值与平均需求的比例高于其他 NEM 地区。

南澳大利亚市场自 2007 年以来日益动荡。相对集中的发电机所有权,发电机重新招标行为,火电厂退出,和有限的进口能力,这些都是影响因素。南澳大利亚的高水平风能容量也导致价格波动,这是由于风能间歇性的本性。

所有权的集中,以及招标行为,是一个关键元素。它说,多次尝试发电机招标模式,迫使电力价格上涨。它说这在南澳大利亚和昆士兰是一个特别的问题,在这些地方由几个发电厂主导着市场。

Coal (煤炭)

India cancels four major new coal plants in move to end imports

The Indian Energy Ministry has this week announced plans to cancel four proposed coal-fired power plants with a combined capacity of 16 gigawatts (GW).

The plans previously called for four ultra mega power plants (UMPP) across Chhattisgarh, Karnataka, Maharashtra and Odisha, but these are now to be cancelled due to lack of interest from the host states.

This is yet another major policy shift underscoring how seriously India is working to transform, modernize and diversify its electricity sector away from coal.

For eight years, these four proposed plants remained in the planning, preparation and land acquisition stage. However, community resistance to compulsory land acquisition and forced resettlement combined with electricity power surpluses to push the government to issue a cancellation order.

Moreover, two of the UMPPs (8GW) were planned for coastal locations, aimed to run on imported coal. As such, the announcement is in line with Indian Energy Minister Piyush Goyal target of eliminating thermal coal imports into India.

His motivation in eliminating thermal imports is to drive delivered cost of electricity down, reduce the current account burden, improve energy security and the straight out lack of need in light of increased domestic production.

April 2016 coal imports fell 15% year on year.

To operate, these four UMPPs would have required upwards of a total of 46 million tonnes per annum of coal (approx. 12Mtpa per plant), half of which was to have been imported.

For 2016/17, the Ministry of New and Renewable Energy (MNRE) has set the highest ever capacity addition target for the clean power sector, that being up to 16,660 megawatts (MW). Of this, the solar installs target is set at 12GW, wind at 4GW, biomass power at 400MW, small scale hydro-electricity at 250MW and waste-to-power at 10MW.

India is increasingly looking to source its incremental electricity needs from the combined expansions of renewable energy, as well dampening demand growth by accelerating energy and grid efficiency programs. With the utilization rates of the average coal fired power plant at six year lows of 58% in 2015/16 (down from 75% in 2010), another government goal is to better utilize the existing thermal capacity.

Mcanxixun Information

At this stage Indian Energy Minister Piyush Goyal is still persevering with plans for three new UMPP that, if awarded, would add a combined 12GW of new coal fired power generation capacity across Cheyyur in Tamil Nadu, Behabahal in Odisha & Banka in Bihar by 2020.

While the awarding of these projects has already also been repeatedly delayed, these three UMPPs would facilitate the proposed closure of old coal-fired power plants that are now beyond their use by date.

In May 2016, S.D. Dubey, chairman of the Central Electricity Authority, announced the plans to close up to 37GW of antiquated, heavily polluting subcritical coal plants, stating: “Our first concern is emissions ... We also want plants to be more efficient in use of resources.” This 37GW is equal to 20% of India’s current coal fired power fleet, or 12% of the total system capacity of 303GW.

In April 2016 the Power Ministry announced it had scaled back its projected thermal power capacity growth forecast by 50GW, reducing the target from 289GW to 239GW by 2022. India currently has a thermal power capacity of 211GW. As a result, the Power Ministry said in June 2016 it would not need any new thermal capacity for the next three years beyond what was already under construction.

This week, S&P Global Platts forecast that India’s reliance on coal fired power generation would drop from an estimated 69% share in 2020 to just 60% by 2030, relative to a peak of 75% in 2015. IEEFA expects this to be achieved as early as 2025.

The government message is clear, consistent and compelling. In his address to the U.S. Congress this week, Prime Minister Shri Narendra Modi clearly articulated that in the focus on driving Indian economic growth at 7.6% pa, this must “be achieved with a light carbon foot print, with greater emphasis on renewables.” In his meeting with President Obama, Prime Minister Modi also confirmed India will ratify the Paris Climate Agreement this year.

印度取消四个新的主要煤电厂运行拟结束进口

本周，印度能源部已宣布取消四个被提议的燃煤电厂总计 16 吉瓦的计划。

这些计划之前呼吁的四个超百万电厂覆盖了恰蒂斯加尔邦(UMPP)，卡纳塔克邦和 Odisha，但是由于缺少来自东道主的兴趣从而都取消了。

这是强调重视印度如何正在转变，现代化以及使电力部门多样化远离煤炭的另一个重大政策变化

在过去八年里，这些被提议的四个计划仍处在准备和土地收购的阶段。然而，社区结合电力盈余抵制强制性的收购土地和强迫的重新安置来推动政府发布命令取消。

此外，UMPPs (8GW)都计划在沿海区，旨在运行进口煤炭。因此，这个宣布与印度能源总裁 Goyal 减少印度煤矿出口目标

他的动机在消除热进口的方面是压低电力的交货成本，减少现今账目的负担，提高能源安全以及直接从缺乏必要的国内生产增加。

2016 年四月煤炭进口与上年同期比较降低了 15%。

据统计，这四个 UMPPs 每年将需要 4600 万吨以上的煤(大约每个工厂 12Mtpa)，其中一半的都是进口的。

为了 2016/17，新能源和可再生能源 (MNRE) 树立了有史以来最高的容量来增加清洁能源部门的目标，高达 16660 兆瓦 (MW)。有关于此，太阳能安装目标设定在 12 兆瓦,风力 4 吉瓦,生物发电 400 兆瓦,小型水力发电 250 兆瓦,能量浪费 10 兆瓦。

印度急于增加来源于结合扩张可再生能源的电力需求，以及通过加快能源和电网效率计划来抑制其需求的增长。燃煤电厂平均产能利用率在六年里低于 58%的 2015/16 (与 2010 年相比下降 75%)，政府的另一个目标则是更好的利用现有的热容量。

在这种情况下能源部长总裁 Goyal 仍然坚持三个 UMPP 的计划，到 2020，将在泰米尔纳德邦 Cheyyur 和 Tamil Nadu, Behabahal in Odisha & Banka 在 Bihar 。

然而获得的这些计划已经一再被推迟，三个 UMPPs 将促进一些现在超出它们使用日期的旧燃煤电厂被提议关闭。

在 2016 年 5 月，时任中央电力委员会主席的 Dubey 宣布关闭多达 37 吉瓦的破旧，严重污染次临界的燃煤电厂的计划，声明：我们最为关心的是排放问题，我们也希望各工厂能有更有效的利用资源。这 37 吉瓦相当于现今印度 20% 的燃煤电力舰队，或者是有 303 吉瓦容量 12% 的总系统。

2016 年 4 月电力部门宣布使投射火力发电能力相对增长预期下调 50 吉瓦，将目标在 2022 年以前从 289 千瓦降低到 239 吉瓦。印度目前火电容量 211 吉瓦。因此电力部门在 2016 年 6 月表示，在未来三年里除了正在建设的将不需要任何新的热容量。

本周，标普全球普氏预测，受到 2015 年 75% 峰值的影响印度年代依赖燃煤发电将从 2020 年估计的 69% 的份额降到 2030 年的 60%。

政府的信息是明确的，一致的和令人信服的。在本周美国国会演讲中，总理莫迪先生明确指出，在关注印度经济增长达 7.6%pa 时，必须实现光碳脚印，更加强调可再生能源。在会见奥巴马总统期间，总理莫迪也证实了印度将在今年认可巴黎气候的协议。

India's reliance on coal to continue

India's clean energy sector has seen massive investment and commitments over the past few years, but the country's dependence on coal will continue, says New Energy Outlook-2016 brought out by Bloomberg New Energy Finance.

According to the report, the Asia-Pacific region will lead the pack with 50 per cent of all new investments worldwide in energy sources ranging from coal, gas to renewable energy.

In this, India would see the highest growth in energy and fuel demand. The country's electricity demand is forecast to grow 3.8 times between 2016 and 2040.

“Despite investing \$611 billion in renewable in the next 24 years, and \$115 billion in nuclear, India will continue to rely heavily on coal power stations to meet rising demand. This would result in trebling of its annual power sector emissions by 2040,” said the report.

Zero-carbon power

An extra \$5.3 trillion investment in zero-carbon power would be needed by 2040 to prevent power-sector emissions rising above Intergovernmental Panel on Climate Change's 'safe' limit of 450 parts per million, the report said.

India has revised by five times the target for installed renewable energy capacity to 175,000 Mw till 2022. Solar power is envisaged to hold the lion's share of 100,000 Mw in the total renewable energy capacity.

In the Paris Climate Change commitment, India committed 40 per cent of its power generation to come from renewable energy sources. However, with rising energy demand, India would also lead the pack in emissions numbers, the report noted.

According to the report, the slowdown in China could reduce carbon emissions after 2015, but emerging economies such as India would contribute similar amount of emissions. “China's weakened GDP and rebalancing economy means emissions peak as early as 2025. However, rising coal-fired generation in India and other Asian emerging markets indicate that the global emissions figure in 2040 will still be some 700 mega-tonne, or five per cent, above 2015 levels,” said the report.

According to the report, coal generation would slow down in Europe and peak in 2020 in the US and in 2025 in China. The report estimates that the cost of coal and gas would remain low as a supply glut is projected for these commodities.

“This cost of generating power by burning coal or gas, but will not derail the advance of renewable,” it said, adding: “Wind and solar costs would also drop. These two technologies become the cheapest ways of producing electricity in many countries during the 2020s and in most of the world in the 2030s.” Onshore wind cost is projected to fall by 41 per cent and solar photovoltaic costs by 60 per cent by 2040.

Among the areas where high growth is expected include electric car, which would increase the global electricity demand by eight per cent and represent 35 per cent of new light-duty vehicle sales in 2040, some 90 times the 2015 figure.

The report says the rise of electric vehicles will bring down the cost of lithium-ion batteries.

Source: Business Standard

印度持续对煤炭的依赖

过去的几年里，印度在清洁能源领域都进行了巨大的投资，但中国对煤炭的依赖将持续，彭博新能源财经新能源 2016 前景如是说。

根据这份报告，全球能源从煤炭、天然气向可再生能源转变。亚太地区将增加 50% 的新投资。

其中，印度对能源和燃料的需求将实现最快增长。从 2016 年到 2040 年，中国电力需求预计将增长 3.8 倍。

“尽管未来的 24 年，6110 亿美元和 1150 亿美元分别投资于可再生能源和核能，印度将依旧严重依赖煤炭发电站，用以满足日益增长的需求。2040 年将导致电力行业年度碳排放增加三倍。

零碳排放能量

报告表明，2040 年将有额外的 5.3 万亿美元投资到零碳电力，以防止在能源方面的排放超过政府间气候变化专门委员会安全限制 450 ppm。

可再生能源装机容量在 2022 年达到 175000 兆瓦的目标，印度已经进行了五次修改。太阳能发电的理念是 100000 兆瓦的最大可再生能源的能力。

报告指出，巴黎的气候变化的承诺，印度保证 40% 的电力来自可再生能源。然而，不断增长的能源需求也将导致排放数量增长。

据这份报告，2015 年之后中国经济放缓，碳排放可能会减少。但像印度这样的新兴经济体将贡献相似数量的排放。中国的 GDP 再平衡意味着排放早在 2025 年达到顶峰。然而，火力发电在印度和其他亚洲新兴市场上升，表明到 2040 年全球温室气体排放仍将有 700 mega-tonne，或者高于 2015 年水平。

据这份报告，在欧洲煤炭发电会减缓，2020 年在美国达到顶峰，2025 年在中国。成本的报告估计，煤和天然气供应过剩。

“这烧煤或天然气发电的成本，但不会破坏推进可再生，它补充道：“风能和太阳能的成本也会下降。世界上许多国家在 2020 年代和 2030 年代，这两种技术成为成本最低的发电方式。”陆上风力成本预计将下降 41%，到 2040 年太阳能光伏发电成本降低 60%。

预计在电动车这一类发展较快的领域，会增加 80% 的全球电力需求量，是 2040 年新轻型汽车销量的 35%，2015 的 90 倍。

这份报告表明，电动汽车的兴起将降低锂离子电池的成本。

来源：Business Standard

Indonesian February thermal coal exports drop 6% on year

Exports of Indonesian thermal coal totaled 18.8 million mt in February, sliding 6% in year-on-year comparisons, as shipments to all major off-takers slowed, customs data showed.

The total exported volume was also down 4% from January, with reduced exports of sub-bituminous coal offsetting the more marginal gains seen in the bituminous market.

Taiwan was the largest consumer of Indonesian bituminous coal in February, posting a 14% increase on the month to reach 868,2020 mt, although this was down 16% year on year.

India remained the largest importer of sub-bituminous material at 5.9 million mt, although this was 28% lower year on year and a marginal reduction on the month, the data showed.

India had also scaled back its bituminous imports considerably in February, posting a 32% decrease from January, as alternative originations began to make their way into the market owing to lower freight costs. This had opened arbitrage into the country, sparking non-traditional trade flows such as the route between India and Colombia.

Chinese imports of bituminous coal were more or less steady in both on month and year comparisons, but sub-bituminous coal was down 20% from January as demand began to stall on climate policy, lower economic growth and competition from alternative and renewable energy sources.

Several sources had said that the lower demand from overseas consumers prompted Indonesian miners to turn their focus to the domestic market, which — as the rainy season dragged on — effectively tightened availability of specific grades more recently.

Indonesia's Ministry of Energy and Mineral Resources had set its monthly thermal coal reference price, also known as Harga Batubara Acuan, at a record low for the 10th consecutive month at \$50.92/mt FOB in February, the lowest recorded since its inception in January 2009.

印尼的煤炭二月出口下降 6%

出口海关数据显示，印尼煤二月份出口总计 1880 万吨，同比下滑 6%，对所有主要销售商运输速度放缓。

自一月份，出口总额下降了 4%，减少次烟煤出口，沥青市场出现更多的边际收益。

台湾是 2 月份印尼烟煤的最大消费对象，虽然这是同比下降了 16%，发布的一个月增加了 14%，达到 868,2020 吨。

数据表示，尽管同比下降 28%，边际月减少，印度依然是亚煤烟煤材料最大进口国，进口量 590 万吨。数据显示。

印度也大幅度缩减了沥青进口量，2 月比 1 月份下降 32%，由于运费成本降低，替代发放开始进入市场。这致使了国家套利，引发如印度和哥伦比亚之间的路线的传统贸易流动。

中国进口的烟煤在一年中比较稳定。但由于气候政策，较低的经济增长和可替代和可再生能源的竞争，需求量开始停滞，次烟煤自一月下降了 20%。

有来源说，较低的海外消费者的需求促使印尼矿业公司把重点转向国内市场，而雨季持续有效地收紧了特定的成绩最近的可用性。

印度尼西亚能源和矿产资源已经设置了月度热煤炭参考价格，也称为 Harga Batubara Acuan。今年二月，连续第十个月的纪录低点 50.92 美元/吨 FOB 称为自 2009 年 1 月成立以来的最低记录。

Coal to remain part of Africa's energy mix

COAL will be part of Africa's energy mix owing to its availability, cost advantage and ability to generate much-needed electricity, says African Union (AU) chairperson Nkosazana Dlamini Zuma.

Mcanxixun Information

Zuma, who was speaking to journalists during a media conference in South Africa, made it clear that coal will play its part on the continent, in spite of the global trend to move to alternative sources of energy, given its cost.

Her view is that it would be unrealistic to expect that Africa could develop without using coal.

“It’s there, it’s cheap, it can be used to generate electricity,” she emphasises, adding that it behoved the continent to use what it had to industrialise.

“But, of course, as the technology for solar power and wind energy become cheaper, we must increase that component of electricity generation.

Hydro is clean energy and we must also use that. “But in the foreseeable future, coal will be part of the energy mix. I don’t think it should be the sole source of energy but it will be part of the mix,” she insists.

Nigeria is targeting 30 percent coal-based electricity and investment is being invited in exploration for coal in the West African country.

The AU is set to launch an African Minerals Development Centre in an attempt to ensure that African governments are better equipped to negotiate better mining and exploration terms and contracts.

Through the centre and its related mooted African commodity strategy, Dlamini Zuma hopes to change mind-sets and to increase the value add to Africa’s natural resources from 15 percent to at least 30 percent, which she expects to facilitate the creation of at least seven-million jobs on the continent in its first year of implementation.

In order to implement this strategy Dlamini Zuma called on the mining and education sectors to invest in much needed skills particularly in science, technology, engineering and mathematics.

煤炭仍然是非洲能源组合的一部分

非洲联盟（AU）的主席恩科萨扎纳·德拉米尼·祖马表示，煤炭由于其可用性、成本优势以及产生急需的电力的能力，将成为非洲能源组合的一部分。

在南非媒体见面会上对记者进行发言的祖马明确表示，尽管全球趋势是朝着替代能源发展，但是考虑到成本，煤炭将在这片大陆上发挥其作用。

她的观点是，期待非洲能够在没有煤炭的前提下发展是不实际的。

“它存在于这片领土，它价格便宜，它能够被用于发电，”她强调称，并且补充说，这片大陆理应利用它所拥有的资源来进行工业化。

“但是，当然，随着太阳能发电及风能发电的技术变得更加便宜，我们必须增加这部分的发电量组成部分。”

水电是清洁能源，我们也必须加以利用。“但是在可预见的未来中，煤炭将成为能源结构的一部分。我并不认为它将成为能量的唯一来源，但它将成为该组合中的一部分，”她坚称。

尼日利亚的目标是 30% 的煤电，并且欢迎对西非国家煤炭的开采进行投资。

非盟预计推出一个非洲矿业开发中心，企图确保非洲政府能够更好地作好准备以协商更好的开采及勘探条约及合约。

通过该中心及其相关的尚未达成一致的非洲商品策略，德拉米尼·祖马希望改变思维方式，并且将非洲自然资源的价值从 15% 至少增加到 30%，她期望通过此举措在其实施的第一年内至少在该大陆上创造 700 万个岗位。

为了实现这一战略，德拉米尼·祖马呼吁采矿和教育部门对急需的技能进行投资，特别是科学、技术、工程和数学。

Pakistan, China ink agreement for coal project

Pakistan and Chinese companies have inked an agreement for the construction of a coal-fired power plant jetty in Balochistan.

The project is being jointly financed by China Power International Holding Limited and Hub Power Company, and will be constructed by China Harbour Engineering Company, a subsidiary of China State Construction Engineering Corporation, reported Radio Pakistan.

The construction of the jetty is expected to be completed by September 2018, with an uploading requirement of 4.4 million tons of coal being produced annually.

Earlier, Pakistan and China have signed a contract to build a coal-fired power plant near Bin Qasim port in Karachi.

According to Radio Pakistan, the work on the plant having a capacity of 350MW will start in July which will be completed in 31 months.

The agreement was signed between China's state-owned Harbin Electric Corporation and Pakistan Siddiqsons Energy.

Pakistan has so far used oil and gas to meet two-thirds of its electricity demand. However, time and again, the country was left at the mercy of price fluctuations in the international markets, especially as its own gas reserves depleted.

China, Pakistan ink \$820m Thar coal agreement

The country now aims to add 8,100 megawatts (MW) through coal to its system – as much as 40% of its existing generation capacity. The obvious reason for using coal is energy economics.

Electricity produced using coal is cheaper than both oil and gas. While use of alternatives, like wind, solar and hydel has also been encouraged, coal-based power plants remain most viable for investors and national grid.

巴基斯坦与中国就煤炭项目签订协议

巴基斯坦和中国公司对于俾路支省燃烧电厂码头的建设签订了协议。

巴基斯坦电台报道称，该项目是由中国电力国际控股有限公司和集线器电力公司共同资助的，并且是由中国港湾工程公司——中国建筑工程总公司的分公司——建造的。

码头的建设预计将于 2018 年 9 月完工，上载要求是每年生产 440 万吨的煤炭。

此前，巴基斯坦和中国已经签署了一份合约，建造卡拉奇本卡希姆港口附近的燃煤电厂。

据巴基斯坦电台的报道，这个具有 350MW 容量的工厂的工作将于 7 月启动，并且该工厂的建造将在 31 个月内完成。

该协议是由中国国有企业哈尔滨电气集团公司与巴基斯坦 Siddiqsons 能源公司签署的。

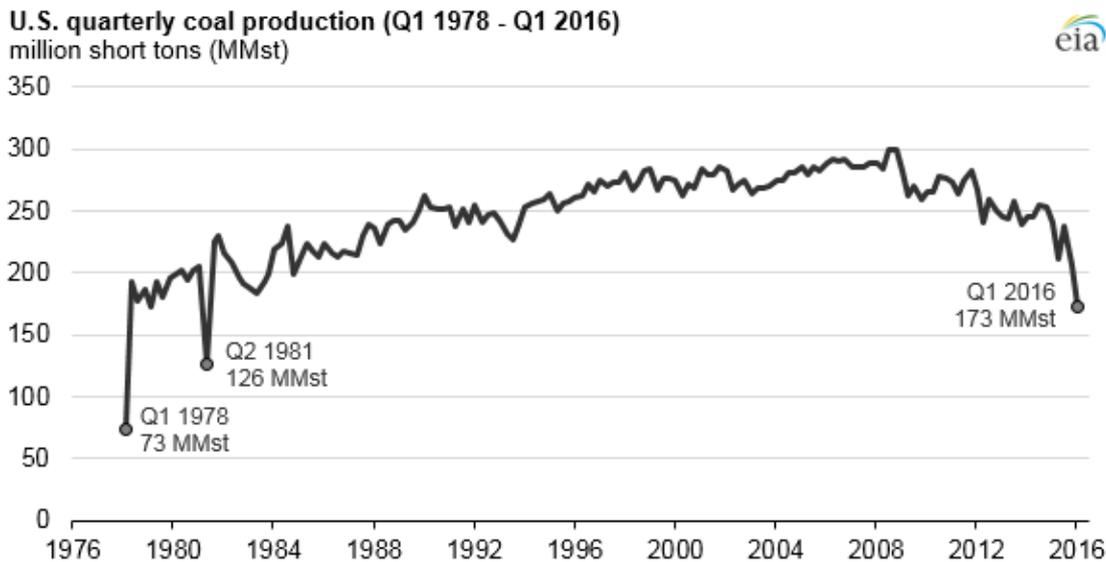
巴基斯坦到目前为止使用石油和天然气来满足其三分之二的电力需求。然而，一次又一次，该国受到了国际市场价格波动的摆布，特别是在其自己的天然气储备耗尽的情况下。

中国与巴基斯坦签订了 8.2 亿美元的塔尔煤炭协议

该国目前的目标是对其系统通过煤炭增加 8100 兆瓦 (MW) ——相当于其现有发电能力的 40%。使用煤炭的一个明显的原因是能源经济学。

使用煤炭生产电力的成本比石油和天然气都要便宜。在替代方式的使用，例如风能、太阳能和水力均受到鼓励的同时，煤电站对于投资者和国家电网来说仍然是最可行的。

Quarterly coal production lowest since the early 1980s



Source: U.S. Energy Information Administration, Weekly Coal Report, and U.S. Mine Safety and Health Administration

Coal production in the first three months of 2016 was 173 million short tons (MMst), the lowest quarterly level in the United States since a major coal strike in the second quarter of 1981. Among the supply regions, coal production from the Powder River Basin in Montana and Wyoming declined the most in tonnage and percentage since the previous quarter.

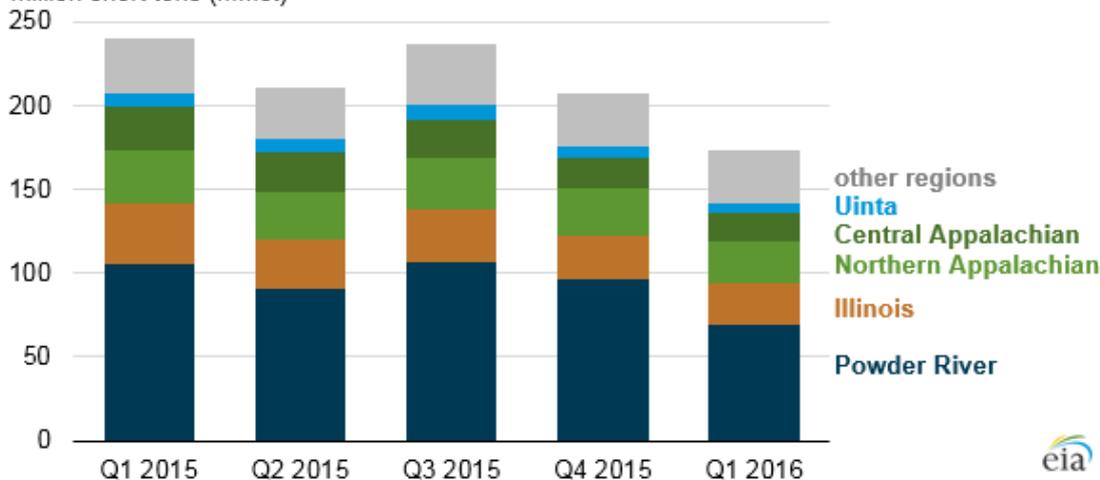
Coal production has declined because of increasingly challenging market conditions for coal producers. Electricity generation accounts for more than 90% of domestic coal use. In addition to complying with environmental regulations and adapting to slower growth in electricity demand, coal-fired generators also are competing with renewables and with natural gas-fired electricity generation during a time of historically low natural gas prices.

A 17% decrease in coal production from the previous quarter marked the largest quarter-over-quarter decline since the fourth quarter of 1984. Above-normal temperatures during the winter of 2015–16 were a key reason for the large decrease in coal production during the first three months of 2016. Throughout the fourth quarter of 2015, electric power plants received more coal than they consumed, leading to a net increase of 34 MMst in coal stockpiles, the highest fourth-quarter net increase on record.

High coal inventories encouraged electric power plants to consume coal from their stockpiles in the beginning of 2016, resulting in lower new coal orders. Decreases in coal purchases have reduced overall coal rail traffic because most producers ship coal by rail. Based on data from the American Association of Railroads, coal carloads in the first three months of 2016 were about 20% lower than in the final three months of 2015.

U.S. quarterly coal production by basin (Q1 2015 - Q1 2016)

million short tons (MMst)



Source: U.S. Energy Information Administration, Weekly Coal Report, and U.S. Mine Safety and Health Administration

Regionally, production from the Powder River Basin (PRB) decreased the most between the fourth quarter of 2015 and the first quarter of 2016. First-quarter coal production of 69 MMst from the PRB was the lowest level since the second quarter of 1995.

The decline in coal demand is not limited to any geographic region. Texas, Michigan, Illinois, and Oklahoma accounted for an average quarterly demand of 37 MMst of PRB coal in 2015, or about 40% of the total PRB coal market. Demand for PRB coal in these four states fell to 19 MMst in the first quarter of 2016.

自 20 世纪 80 年代初以来煤炭季度产量的最低点

U.S. quarterly coal production (Q1 1978 - Q1 2016)

million short tons (MMst)



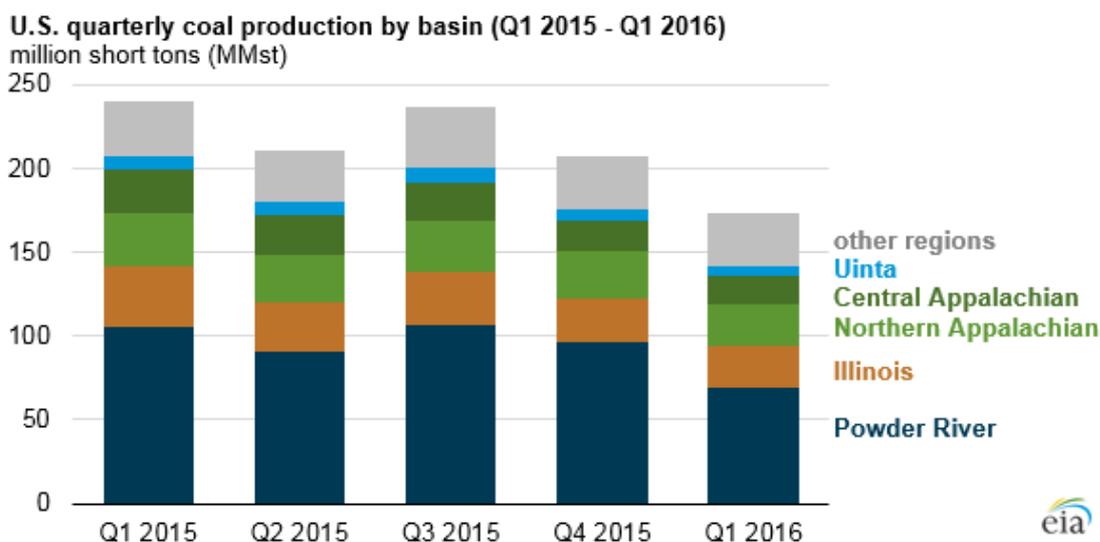
资料来源：美国能源信息局，煤炭每周报告，以及美国矿山安全与健康管理局

煤炭产量在 2016 年头三个月内达到了 1.73 亿短吨 (173MMst)，这是美国自 1981 年第二季度煤矿大罢工以来的最低季度水平。在供应区域，蒙大拿州和怀俄明州粉河盆地的煤炭产量较上一季度下降了最大吨位及百分比。

由于煤炭生产企业所面临的日益严峻的市场形势，煤炭的产量有所下降。电力生产占到了国内煤炭使用的 90% 以上。除了遵守环境法规以及适应电力需求的放缓增长，燃烧发电机组还需要在天然气价格达到历史性低点的时间段内与可再生能源以及燃烧天然气的电力生产进行竞争。

煤炭生产较上一季度下降了 17%，这标志着自 1984 年第四季度以来季度环比最大的下降值。2015-16 年的冬季所出现的高于正常的温度是 2016 年头三个月煤炭生产出现大量减少的一个重要的原因。在 2015 年的第四季度期间，电厂获得的煤炭比它们消耗得更多，导致煤炭库存净增长达到了 34MMst，这是有记录以来最高的第四季度净增长额。

较高的煤炭库存量促使发电厂在 2016 年初消耗其储存煤，从而导致新的煤炭订单的减少。煤炭购买量的下降导致整个煤炭铁路运输的减少，因为大多数生产者是通过铁路来运输煤炭的。根据美国铁路协会的数据显示，煤炭 2016 年第一季度的荷载量相较于 2015 年最后三个月的荷载量下降了 20% 左右。



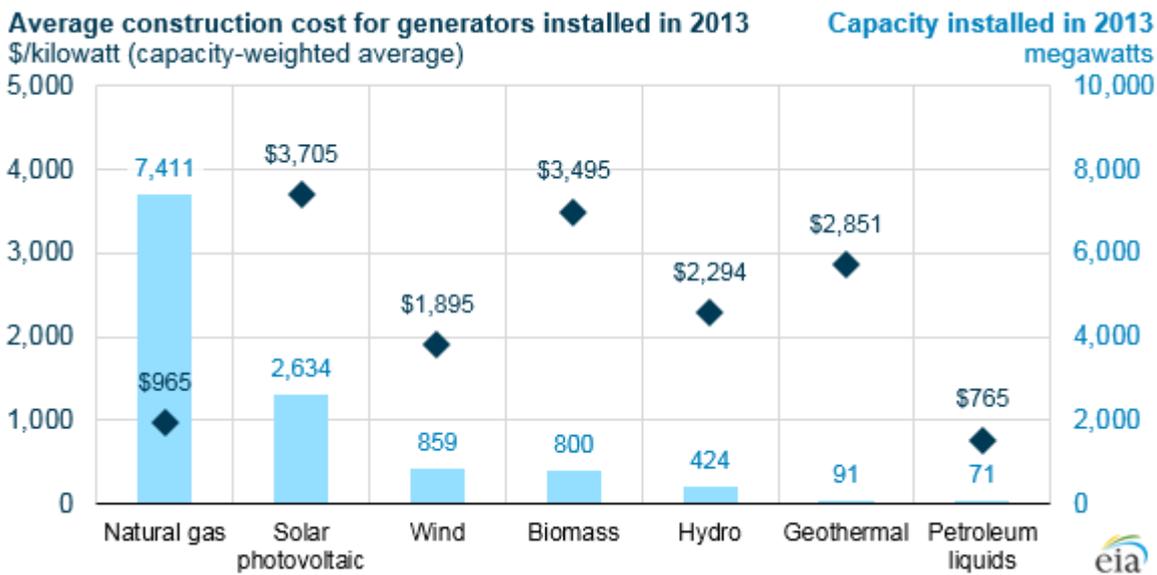
资料来源：资料来源：美国能源信息局，煤炭每周报告，以及美国矿山安全与健康管理局

从地区来看，粉河盆地（PRB）在 2015 年第四季度至 2016 年第一季度之间产量下降额最大。PRB 第一季度煤炭 69MMst 的煤炭产量是自 1995 年第二季度以来的最低水平。

煤炭需求的下降并不局限于任何地理区域。德克萨斯州、密歇根州、伊利诺伊州和俄克拉荷马州在 2015 年对 PRB 煤炭的季度需求量达到了 37MMst，占到了总的 PRB 煤炭市场的 40% 左右。而在 2016 年第一季度这四个州对 PRB 煤炭的需求量下降至 19MMst。

Electricity (电力)

EIA publishes construction cost information for electric power generators



Source: U.S. Energy Information Administration, Form EIA-860, Electric Generator Construction Costs

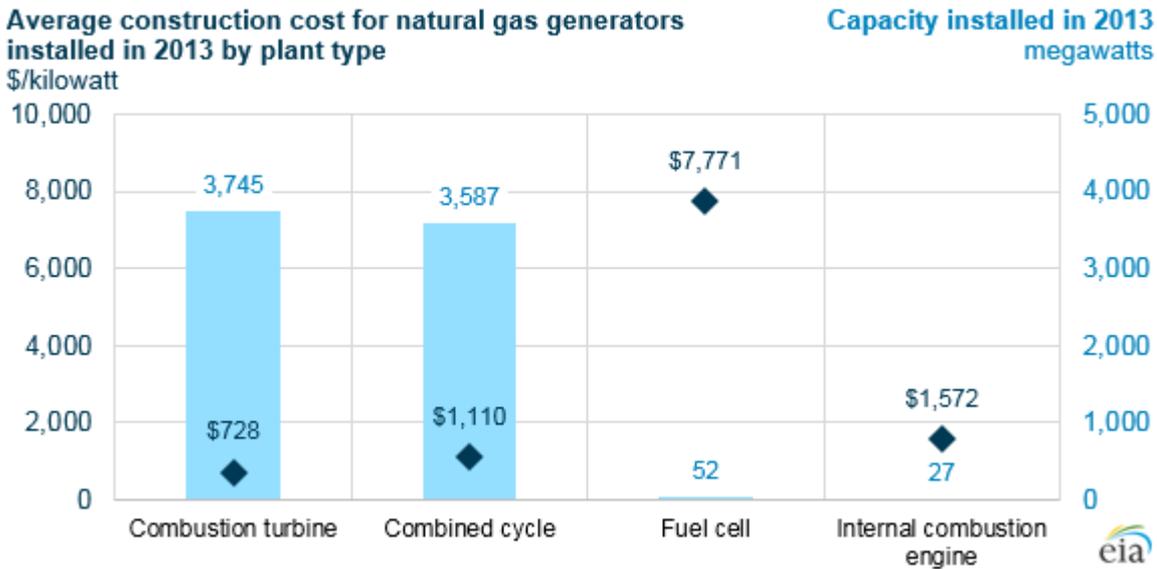
Note: Average costs are weighted by nameplate capacity. Solar photovoltaic (PV) data are based on reported alternating current (AC) capacity and do not include distributed generation capacity.

Many factors influence the economic competitiveness of electricity generation technologies; however, two fundamental factors are the cost of constructing generators and the cost of operating them. The U.S. Energy Information Administration (EIA) recently began collecting construction costs for new electric generators at utility-scale power plants. The publication released today covers generators installed in 2013 and includes average costs by technology type or region. EIA expects to publish 2014 construction cost information in August 2016 and 2015 information in October 2016.

Industry reports and other EIA publications have included various estimates of electricity generation technology capital costs, but this is the first time EIA has collected and reported actual construction costs, which include capital and financing costs, for all new generators. Government grants, tax benefits, or other incentives are excluded from these costs. Because the data are business-sensitive and protected, the analysis presents averaged costs for select groupings and excludes certain generation technologies to avoid disclosure of individual company data. The reported costs reflect a snapshot of market prices for generation technologies at the time the projects were developed and built.

Construction costs alone do not tell the full story of the relative economics of each electricity generation technology. For fuel-consuming electricity generation technologies, fuel costs often make up a substantial portion of the plant's total costs. For nonfuel-consuming technologies such as wind and solar plants, the initial construction cost constitutes most of the plant's total costs. In addition, federal, state, and local programs may provide incentives to lower the cost of certain technologies. Finally, different types of plants often run at different utilization rates, which affects the relative economics of generation technologies. As costs, market conditions, and government policies have drastically changed over the years, so has the pattern of capacity additions.

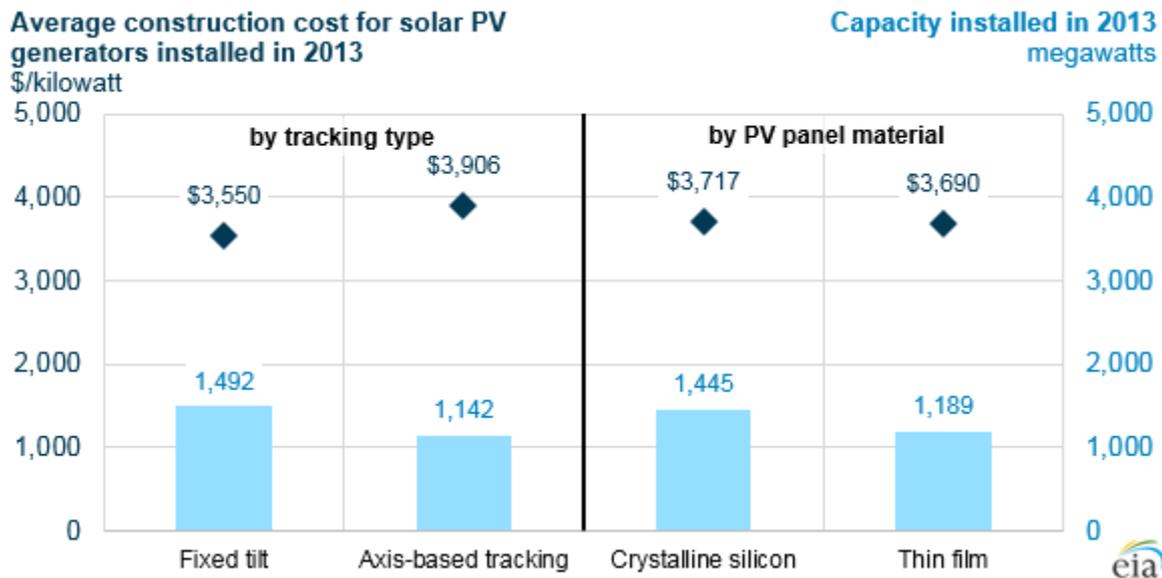
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Source: U.S. Energy Information Administration, Form EIA-860, Electric Generator Construction Costs

Note: Average costs are weighted by nameplate capacity.

Natural gas. Most of the electricity generation capacity added in 2013 came from natural gas technologies with average construction costs of \$965 per kilowatt (kW) of installed nameplate capacity. Most of the natural gas electricity generators installed in 2013 were combustion turbine and combined-cycle plants. Combustion turbine plants, which typically serve as peaker plants and run mainly during times of peak demand, are less expensive to build than combined-cycle plants but more expensive to operate because of their relatively low energy conversion efficiency (the inverse of which is known as the heat rate). Combined-cycle plants, which include at least one combustion turbine and one steam turbine, are more efficient and less expensive to run than combustion turbines. For that reason, combined-cycle plants usually have much higher utilization rates than combustion turbines and typically serve as intermediate or baseload plants. Combustion turbine and internal combustion engine plants can often be built quickly (within a year) and can help meet near-term localized supply or reliability needs.



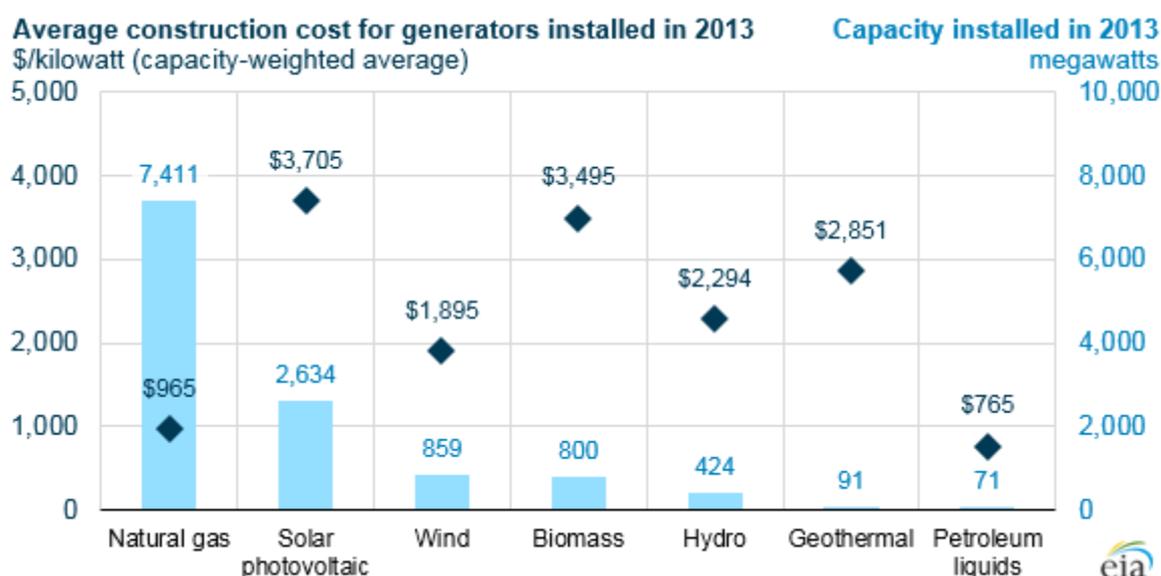
Source: U.S. Energy Information Administration, Form EIA-860, Electric Generator Construction Costs

Note: Average costs are weighted by nameplate capacity. Solar PV data are based on reported alternating current (AC) capacity and do not include distributed generation capacity.

Solar. Solar additions in 2013 had average construction costs of \$3,705/kW. Solar photovoltaic (PV) projects using an axis-based tracking system were more expensive per kilowatt than fixed-tilt projects but are generally used for larger projects. Tracking systems can increase system output, which may justify the somewhat higher costs. The average costs for projects using thin-film panels versus crystalline silicon panels were similar, but the new thin-film plants have a much larger capacity on average (74 MW) than the new crystalline silicon plants (7 MW), which likely influenced the per-kilowatt costs, along with other factors. The solar PV data are based on reported alternating current (AC) capacity and may differ from other cost and capacity estimates that use direct current (DC) ratings of PV panels. The data, which are for utility-scale plants only (nameplate capacity of 1 MW or more), do not include distributed solar installations, such as those found on residential and commercial rooftops.

Wind. The average construction cost of wind generators was \$1,895/kW, the lowest of all renewable technologies. Despite this cost advantage, the reported new wind capacity in 2013 was less than 900 MW, a significant drop from additions of 13,084 MW in 2012, primarily because of the expiration of the federal production tax credit at the end of 2012. The tax credit was renewed in early 2013, but given the lead times for a wind project and a change in the tax credit's eligibility requirements, very few wind plants were completed in 2013.

美国能源信息管理局发布发电厂工程造价信息



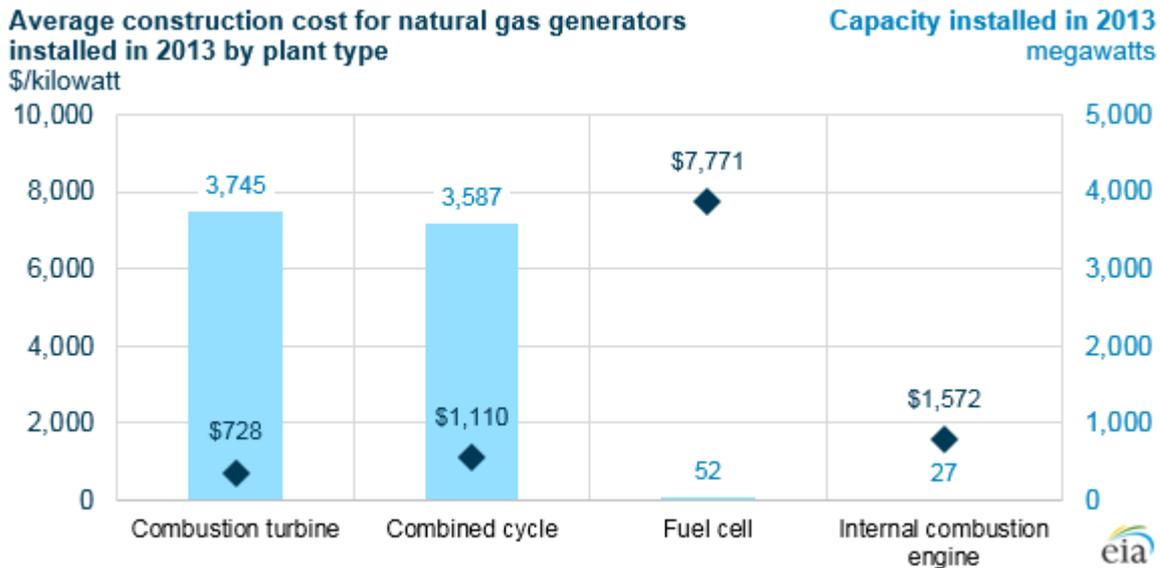
来源：美国能源信息管理局，EIA -860 发电厂造价成本

注：平均成本加权由铭牌额定值来确定。太阳能光伏（PV）数据基于所发现的交流电（AC），并不包括分布式发电能力。

许多因素都影响着发电技术的经济竞争力；然而，两个基本因素分别是发电厂的造价成本和操作成本。美国能源信息管理局（EIA）近期开始收集在大型发电站新发电厂造价成本的相关信息。今天所发布的信息包括 2013 年安装的发电厂以及技术类型或地区的平均成本。EIA 预计将在 2016 年 8 月发布 2014 年的造价信息，在 10 月，发布 2015 年的造价信息。

行业报告和其他的 EIA 出版物中都包含有各种发电技术的资本成本，但这是 EIA 第一次收集和报告实际的造价成本，包括所有新发电厂的资金和融资成本。政府拨款、税收优惠或其他的奖励都排除在这些成本之外。因为这些数据具有商业敏感性，保护得较好，这些分析结果显示了选择分组的平均成本，将某些发电技术排除在外，避免披露个别公司的数据。在项目研发和建设时，这些报告中的成本反映了发电技术市场价格的初始印象。

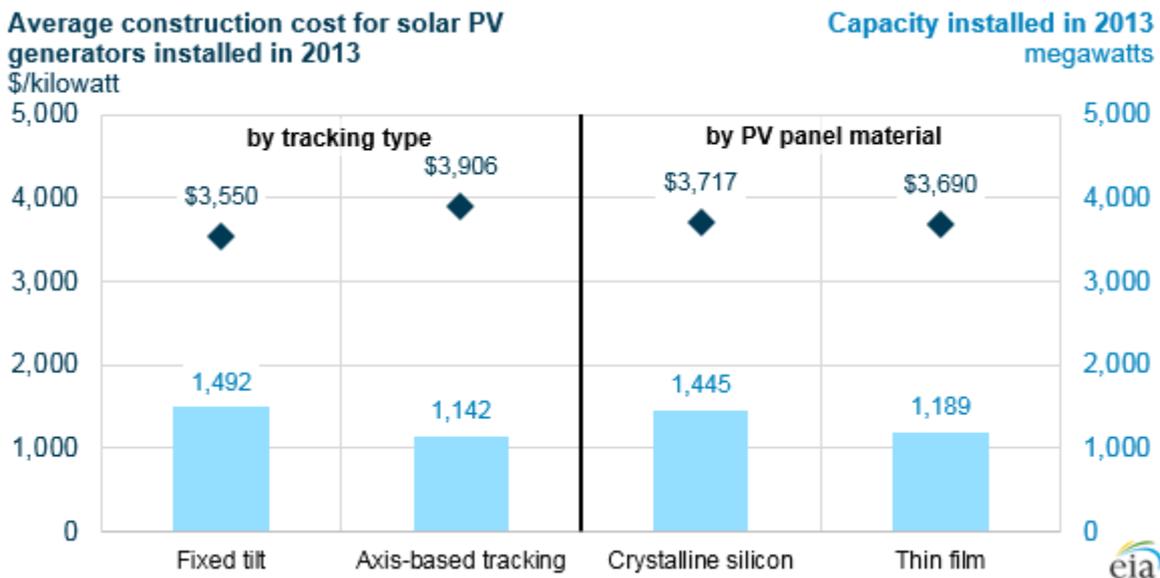
单独的建造费用不会告知每个发电技术相对经济的全部信息。消耗燃料的发电技术，燃料成本往往占了工厂总成本的很大一部分。不耗燃料的发电技术，诸如风能太阳能发电站，初始的建设成本占了发电站总成本的大部分。此外，联邦、州和地方的项目可能会施行一些激励措施，来降低某些技术的使用成本。最后，不同类型的发电站经常会以不同的利用率运行，这会影响发电技术的相对经济性。多年来，随着成本、市场环境和政府政策的彻底改变，增加产能的模式也在改变。



来源：美国能源信息局，EIA -860 发电厂造价成本

注：平均成本加权由铭牌容量确定。

天然气。2013 年，大部分的发电产能的增加是由天然气技术支持的，安装的铭牌容量平均每千瓦 (kW) 建设成本为 965 美元。同年，安装的大部分天然气发电厂都是燃气轮机和联合循环发电厂。燃气轮机装置通常会作为峰化器装置，主要在需求高峰期运行，这些装置都比联合循环发电厂的造价便宜，但由于他们能量转换效率相对较低（这种倒转是由于热率而被人知晓的），所以操作起来成本会比较高。联合循环发电厂包括至少一个燃气轮机和汽轮机，运行时比燃气轮机更有效且成本更低。因此，联合循环发电厂经常会比燃气轮机有更高的利用率，通常作为中级发电厂或基荷发电厂来使用。燃气轮机和内燃机通常可以迅速建立起来（一年以内），以满足短期内的局部供应或可靠性的需求。



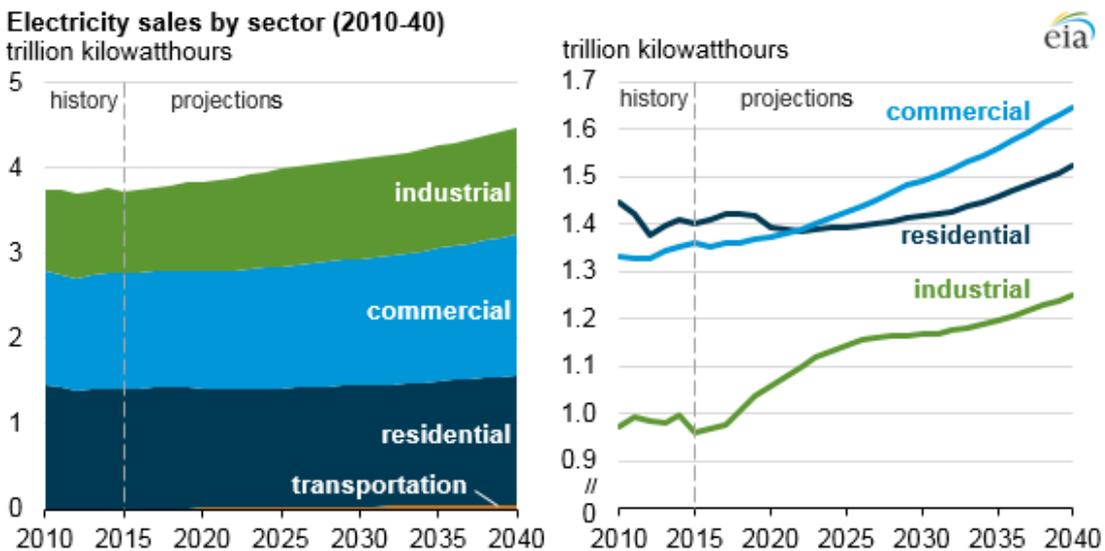
来源：美国能源信息局，EIA -860 发电厂造价成本

注：平均成本加权由铭牌额定值来确定。太阳能光伏（PV）数据基于所发现的交流电（AC），并不包括分布式发电能力。

太阳能。2013 年，太阳能补充的平均建设成本是 3075 美元每千瓦。太阳能光伏（PV）项目会使用一个基于轴线的追踪系统，该项目每千瓦的成本比固定倾斜角项目的成本更高，但它通常会用于大型项目。该跟踪系统可以增加系统输出，这可能会证明在某些方面成本更高的体现。这些项目很类似，它们都使用使用薄膜太阳能电池板与晶体硅电池板，但是新的薄膜组件电池板的平均电容（74 兆瓦）比晶体硅电池板电容（7 兆瓦）大，这和其他的因素都可能影响每千瓦电量的造价成本。太阳能光伏是基于所记录的交流电（AC）的，它可能与其他使用直流电（DC）的光伏电板在成本和容量估计方面有所不同。这些数据仅适用于公共事业规模的发电厂（铭牌容量 1 兆瓦以上），不包括在住宅区和商业区屋顶上所看到分布式太阳能装置。

风能。风力发电厂的平均建设成本是 1895 美元每千瓦，其成本是所有可再生能源技术中成本最低的。尽管建设成本占优势，但根据报道，2013 年新的风能发电少于 900 兆瓦，远低于 2012 年新增的 13084 兆瓦，主要是因为 2012 年年底联邦生产税收抵免到期了。2013 年年初，税收优惠恢复了，但鉴于风力项目而设定了到期时间，同时，在对税收抵免资格的要求上也有所改变，很少有风能发电厂在 2013 年建设完成的。

Total U.S. electricity sales projected to grow slowly as electricity intensity declines



Source: U.S. Energy Information Administration, Annual Energy Outlook 2016

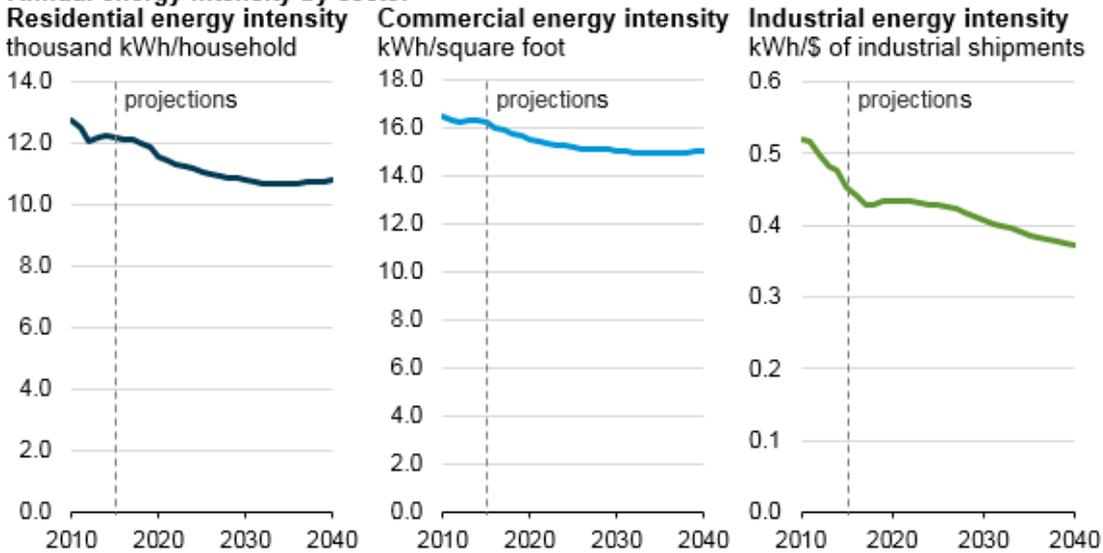
Electricity sales, as projected in the U.S. Energy Information Administration's most recent Annual Energy Outlook (AEO2016) Reference case, increase in each sector through 2040. In 2015, 3.7 trillion kilowatt-hours (kWh) of electricity were sold, and total electricity sales are projected to rise 0.7% annually through the projection period. The residential sector currently purchases the most electricity, with a 38% share of total electricity sales in 2015. However, sales in the commercial sector are projected to surpass those in the residential sector in the early 2020s.

The AEO2016 Reference case, which reflects current laws and regulations, includes the U.S. Environmental Protection Agency's Clean Power Plan (CPP). The CPP allows state regulators to encourage customers to purchase specified energy-efficient technologies as a part of state compliance strategies. The AEO2016 Reference case

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assumes that consumers will receive subsidies of 10% or 15% between 2020 and 2025 for certain energy efficient appliances, equipment, and building envelope improvements.

Annual energy intensity by sector



Source: U.S. Energy Information Administration, Annual Energy Outlook 2016

The residential sector currently is the largest electricity-consuming sector, with 1.4 trillion kWh sold in 2015. Electricity sales in the residential sector are projected to grow by 0.3% per year in the Reference case from 2015 through 2040 as the number of households increases by 0.8% per year. Residential energy intensity is expected to decline, with the average purchased electricity per household falling 11.3% from 2015 to 2040. Federal efficiency standards for most major end uses, including lighting, space cooling and heating, and water heating, as well as state and local building energy codes, are the main reasons for the electricity intensity decline.

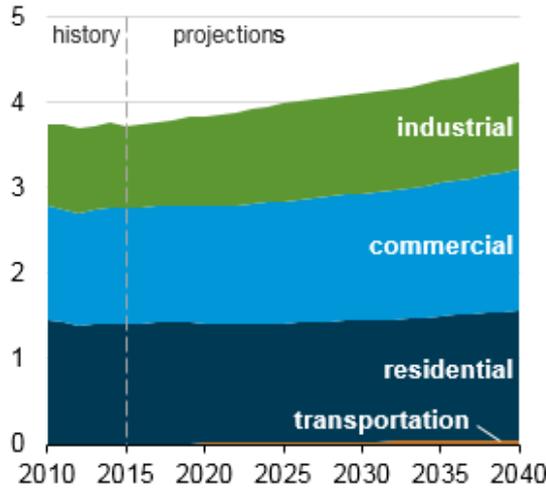
Electricity sales to commercial consumers are projected to increase at an average annual rate of 0.8% from 2015 to 2040. Commercial sector electricity intensity (electricity sales per square foot of floorspace) is projected to decline 0.3% per year as total commercial sector floorspace increases 1.1% per year. Federal energy efficiency standards, as well as technological improvements in lighting, refrigeration, space heating, and space cooling, contribute to the decline in electricity intensity.

Electricity sales to industrial consumers are projected to rise 1.1% per year on average, from 1.0 trillion kWh in 2015 to 1.2 trillion kWh in 2040. With the value of industrial shipments projected to grow 1.9% per year in the Reference case, industrial sector electricity intensity, or electricity sales per dollar of industrial shipments, declines at an average annual rate of 0.8% from 2015 to 2040. The decline in projected electricity intensity results from the adoption of more energy-efficient technologies and structural changes in the economy toward less electricity-intensive industries.

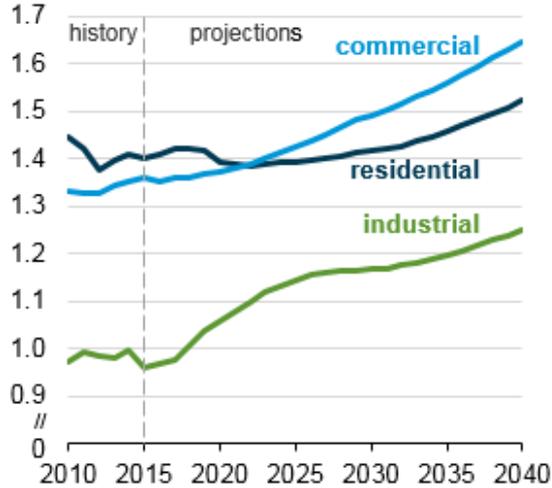
A recent extension of federal tax credits for residential and commercial solar photovoltaic (PV) systems, combined with the expected continuation of declining PV prices, spurs increased adoption of residential and commercial PV in the AEO2016 Reference case projection. Total building PV capacity grows at 8.6% annually in the AEO2016 Reference case. Generation from residential PV systems reaches 90 billion kWh, and commercial system generation reaches 36 billion kWh by 2040. Residential and commercial electricity sales would be 5.0% and 1.7% higher, respectively, in 2040 without the electricity generated by rooftop PV systems.

由于电耗减少，美国总售电量预计将缓慢增长

Electricity sales by sector (2010-40)
trillion kilowatthours



trillion kilowatthours



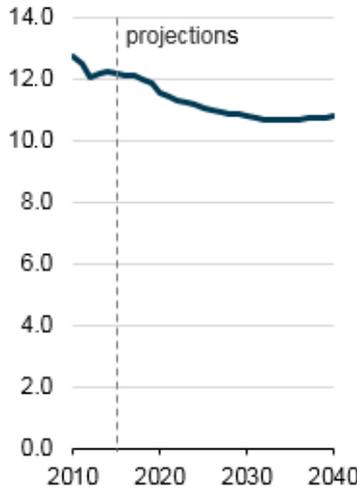
资料来源：美国能源信息管理局，2016 年度能源展望

正如美国能源信息管理局最新年度能源展望（AEO2016）的参考案例所提到，到 2040 年，美国售电额在每个区域都会增加。在 2015 年，有 3.7 万亿千瓦时（kWh）的电量售出，在本预测期内，售电总额预计将每年增长 0.7%。目前，购买电力最多的是住宅区域，于 2015 年占据电力销售总额 38% 的份额。然而，在 21 世纪 20 年代初，在商业区域的售电额预计将超过住宅区域。

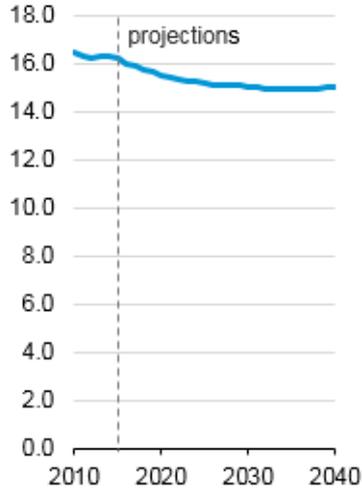
AEO2016 参考案例反映了当前的法律法规，包括有美国环境保护署的清洁能源计划（CPP）。CPP 允许国家监管机构鼓励消费者，让他们购买指定的节能技术，以此作为国家合规策略的一部分。AEO2016 参考案例假定，在 2020 年到 2025 年之间，消费者对某些节能电器、设备以及建筑的修建改善将获得 10% 或

Annual energy intensity by sector

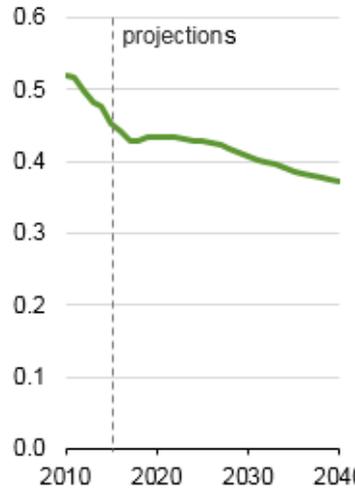
Residential energy intensity
thousand kWh/household



Commercial energy intensity
kWh/square foot



Industrial energy intensity
kWh/\$ of industrial shipments



15%的 2010 2020 2030 2040 2010 2020 2030 2040 2010 2020 2030 2040 补贴。

资料来源：美国能源信息管理局，2016 年度能源展望

目前，住宅区的电能消耗最多的一个区域，并于 2015 年消耗了 1.4 万亿千瓦时的电量。在参考案例中，住宅区的售电额预期在 2015 到 2040 年间将每年增长 0.3，家庭用电每年增长 0.8%。住宅区的能耗强度预期会减少，从 2015 年到 2040 年，平均每户的电力购买量会减少 11.3%。联邦的能效标准最主要的最终用途，包括照明、供热和供冷、水供暖，以及州和地方的建筑能源效益守则，这些都是能耗下降的主要原因。

对于商业消费者来说，售电额预期会在 2015 到 2040 年间以平均每年 0.8% 的速度迅速增长。由于总商

业区的面积每年增长 1.1%，商业区的能耗强度（每平方英尺面积的售电额）预期将每年减少 0.3%。联邦能耗标准以及在照明、制冷、供热和供冷方面技术的进步，都会导致能耗下降。

对于工业消费者来说，售电量预期将平均每年增长 1.1%，由 2015 年的 1 万亿千瓦时增长到 2040 年的 1.2 万亿千瓦时。在参考案例中，工业出口货物的价值预期将每年增长 1.9%，工业区每美元货物的能耗强度，或所需售电量将在 2015 到 2040 年间，以平均每年 0.8% 的速度下降。这一预期的能耗强度下降是由于采用了更节能的技术和经济结构的变化，使得用电量大的工业减少更为剧烈。

近期，联邦对住宅和商业太阳能光伏（PV）发电系统的税收优惠扩展，以及光伏价格预期将持续下跌，使得 AEO2016 案例预期中，对住宅和商业光能使用接受度更高。在 AEO2016 参考案例中，总的建筑光伏产能以每年 8.6% 的速度增长。到 2040 年，民用太阳能系统产能可达到 900 亿千瓦时，商业电力系统产能可达到 360 亿千瓦时。2040 年，在没有屋顶光伏系统发电的情况下，住宅和商业售电额将分别高出 5.0% 和 1.7%。

Election fact check: Do green schemes drive up electricity prices?

A comprehensive new Clean Energy Council report has highlighted how little renewable energy policies and other “green schemes” have historically contributed to Australia’s rising electricity prices, in comparison to other factors like over-investment network infrastructure.

The linking of high electricity bills to climate schemes like the Renewable Energy Target and emissions trading has been a favourite weapon of the Coalition since Tony Abbott was its leader.

Years later it is still regularly trotted out by federal environment minister Greg Hunt, who argues that the ALP’s plan to boost the renewable energy target and re-introduce an ETS will amount to “a massive new electricity tax.”

But according to the CEC’s 2015 Clean Energy Australia Report, released on Tuesday, the majority of recent spikes in the cost of electricity have been driven by network investment in poles and wires, much of which may have been unnecessary.

As you can see in the chart below, network costs make up more than 43 per cent of charges in domestic electricity bills, while 7.4 per cent of costs are attributed to “environmental policies”. The cost of transporting electricity across the country via the poles and wires network has made up more than half of power bills in recent years, the report says.

BREAKDOWN OF CHARGES IN DOMESTIC ELECTRICITY BILLS, 2014-15



“The majority of ...previous cost rises were driven by investment in the poles and wires of the electricity network,” the report says.

“How much of this was necessary investment and how much was network ‘gold plating’ ... is unclear,” it adds. “But with the benefit of hindsight, a six-year stretch of falling demand for electricity meant that more was invested in our poles and wires than was ultimately required.”

	2014-15 BASE YEAR		2015-16 CURRENT YEAR		2016-17		2017-18	
	c/kWh	\$/year	c/kWh	\$/year	c/kWh	\$/year	c/kWh	\$/year
Environmental policies	1.79	94	2.10	110	2.16	113	2.09	110
LRET	0.49	26	0.59	31	0.74	39	0.91	48
SRES	0.47	25	0.46	24	0.42	22	0.42	22
FIT schemes	0.73	38	0.91	48	0.84	44	0.61	32
Other state schemes	0.10	5	0.13	7	0.15	8	0.15	8
Regulated networks	13.53	710	12.32	647	12.01	630	12.03	631
Transmission	1.80	95	2.14	113	2.13	112	2.13	112
Distribution	11.73	615	10.18	534	9.88	518	9.90	519
Competitive market	13.40	703	14.13	742	14.67	770	15.53	815
Wholesale and retail								
TOTAL	28.72	1507	28.55	1499	28.83	1513	29.65	1556

Interestingly, the report says that power prices – which have stabilised over the past year – are projected to remain “mostly unchanged” over the next three years, despite remaining “a politically-charged battleground.”

Indeed, it notes that the price of electricity may actually fall slightly in some states in 2016, due to decreasing network costs in the short term – savings it suggests may be connected to increased adoption of renewable energy sources like rooftop solar.

“As storage becomes cheaper and more mainstream, it is expected that the interaction of solar and battery storage will help to shave off some of the expensive demand peaks, such as on very hot days when air-conditioning is being widely used,” the report says. “This will help to reduce overall costs for consumers.”

电力真相检验：绿色计划抬高了电价吗？

一份综合新清洁能源委员会的报告强调，在比较其他如投资网络基础设施等因素后，认为可再生能源政策和其他“绿色计划”从历史观点而言对澳大利亚的电力价格上涨几乎没有影响。

高额电费与如可再生能源目标的气候计划和排放交易的关系已经成为自 Tony Abbott 成为联盟领导后最喜欢的武器。

几年后，它仍然常常被联邦环境部长 Greg Hunt 所提及，他认为工党提高可再生能源目标和重新引入 ETS 的计划将相当于“大规模的新电力税。”

但根据星期二公布的 CEC 的 2015 澳大利亚清洁能源报告，最近的电力成本大多数是由电线杆和电线网络投资所带动的，其中大部分可能是不必要的。

正如下图所示，网络成本在国内电力账单中占 43% 以上，而 7.4% 的成本归因于“环境政策”。报道称，在最近几年，全国各地的电力输送电力的成本已经超过了电力费的一半。

BREAKDOWN OF CHARGES IN DOMESTIC ELECTRICITY BILLS, 2014-15



报告称：“大多数以前的成本上升是由电力网的电线杆和电线的投入所带动的”。

“现在并不清楚有多少投资是有必要的，以及有多少是网络‘镀金’的，”它补充说。“但事后看来，六年的电力需求下降意味着我们在电线杆和电线上的投资比最终需要多的多。”

NATIONAL SUMMARY OF POWER PRICE COMPONENTS¹¹

	2014-15 BASE YEAR		2015-16 CURRENT YEAR		2016-17		2017-18	
	c/kWh	\$/year	c/kWh	\$/year	c/kWh	\$/year	c/kWh	\$/year
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Wholesale and retail								
TOTAL	28.72	1507	28.55	1499	28.83	1513	29.65	1556

有趣的是，报告指出电力价格在过去一年已经稳定下来，并预计在接下来的三年里将保持“基本不变”，尽管留有“政治控制的战场”。

事实上，它指出，由于短期内降低网络成本，2016年在一些国家电力价格可能会略有下降，这表示它可能与增加采用的可再生能源有关，如屋顶太阳能。

“随着存储变得越来越便宜，预期太阳能电池和电池存储的相互作用将有助于减少一些昂贵的需求高峰，如在非常炎热的天气下，空调被广泛使用，”该报告说。“这将有助于降低消费者的整体成本。”

Wind turbine manufacturers look beyond Xinjiang to expand

Dabancheng wind farm’s location in a natural wind tunnel in China’s Xinjiang province makes it one of the best situated in the world. It is also a showcase for the turbine manufacturer Goldwind, which became the largest supplier in the world after installing so much turbine capacity in 2015 that it overtook Vestas of Denmark.

Wu Gang, Goldwind’s founder and chairman, sweeps his hands gracefully to show how the wind courses through

the narrow corridor between the Junggar basin and the Taklamakan desert, where Marco Polo wrote of hearing the voice of a genie calling from the whirlwinds.

Today more than 300 towers rise from the dusty desert floor, churned by that constant wind. Dabancheng is an engineer's heaven, studded with prototypes of nearly every generation of turbine technology, both Chinese-made and foreign. "I joke when I'm in Europe — I tell young people who want to know the history of European windpower technology to come to Dabancheng," Mr Wu says.

Whether or not those young enthusiasts make the trip, Goldwind is coming to them. Last year, China accounted for half the world's wind power installation. It now has a third of the world's total wind power generation capacity.

Goldwind is not the only company on the rise: five of the top 10 wind turbine manufacturers are Chinese according to FTI Consulting, a business advisory firm. Many cut their teeth in a protected market, after local rules effectively locked many foreign turbine manufacturers out of the Chinese market. Saturation in the domestic market now means that Goldwind and its fellow Chinese producers are looking to compete overseas. Pressure from Chinese exports is already fuelling a round of consolidation among established European players. Siemens of Germany, for example, is in talks to buy Spanish turbine maker Gamesa.

At home in Xinjiang province, Goldwind's home market, wind power capacity doubled in 2015, reaching 26 per cent of the region's total power generation capacity. However, a bottleneck in transmission lines out of the region means that almost half its installed wind power went unused in the first quarter of 2016.

"Xinjiang is pretty much maxed out in terms of installed wind capacity," says Sebastian Meyer, research director for renewable energy consultancy Azure International.

To maintain its position as the world's largest wind turbine supplier Goldwind will have to increase sales in other Chinese provinces, notorious for their local protectionism, where it will also have to compete directly with its domestic rivals Guodian, Ming Yang and CSIC. Meanwhile curtailment — the amount of installed wind power capacity not being used by the grid — is rising, as provinces race to meet Beijing's renewable energy targets.

Mr Wu remembers the 1980s as an era of international wind power co-operation. He became fascinated by the potential for wind power while working on an experimental project in Xinjiang funded by the Dutch government. That experimental farm is now Dabancheng.

He is quick to point out that being big in China does not necessarily translate into strength overseas. "We are number one in the world in terms of market share, but we are well aware that we still lag behind multinationals like Siemens, GE and Vestas," he says.

"Take Vestas. Their products are sold in more than 30 countries. Ours are only sold in 17 countries. This is a gap. As a Chinese company, we lag far behind our foreign competitors in internationalisation."

But Goldwind is catching up. It hires local sales and installation teams overseas and also finances wind farms to sell to power producers after they are up and running.

Listed in Hong Kong and Shenzhen, the company has powerful backers, including state-owned dam builder China Three Gorges Corp and insurer Anbang Group, which has made a string of aggressive acquisitions over the past year. Most of Goldwind's technology is licensed from Germany's Vensys, although Goldwind has made alterations to the original designs.

Mr Wu says Goldwind's real competitor is not other wind power producers but coal. Currently, wind power generation in the north of China (home to strong and regular winds) costs slightly less than thermal power generation in the south, where coal is more expensive and emissions standards are stricter. However, coal is cheapest in Xinjiang and northern China, leaving wind power at a disadvantage in its most favourable region.

Further technological improvements and increased economies of scale could help to narrow the gap, Mr Wu believes. "Our competitors are not the foreign companies," he says, citing UN goals that non-fossil energy should

represent 85 per cent of primary energy consumption globally by 2050. “Thermal power is competing with us. The competition between wind and fossil energy is far greater than the competition within the wind industry.”

中国风电设备企业进军海外市场

全球十大风力发电机制造商中，有 5 家是中国企业。随着国内市场逐渐饱和，如今这些企业希望到海外开辟市场。

地处中国新疆一处天然风道的达坂城风电场是世界地理位置最佳的风电场之一。这里也是展示风力涡轮机制造商金风科技(Goldwind)的一个橱窗。2015 年，凭借巨大的新增风电装机容量，金风科技超过丹麦的维斯塔斯(Vestas)，成为世界最大风机供应商。

金风科技创始人和董事长武钢以优美的姿势，用双手向我们展示强风穿过准噶尔盆地与塔克拉玛干沙漠之间狭窄走廊的情形。马可·波罗(Marco Polo)曾写道，他在途经此地时，听到了旋风中精灵的呼唤。

如今，在这片不断遭受强风侵扰、尘土飞扬的沙漠上，300 多座塔架拔地而起。达坂城是工程技术人员的天堂，这里散布着几乎每一代涡轮机技术的样机，既有中国的，也有外国的。“在欧洲时我曾开玩笑——对那些想了解欧洲风电技术历史的年轻人说，来达坂城吧，”武钢说。

不管那些年轻的风电迷后来是否真的来过达坂城，金风科技正向他们走来。去年，中国的新增风电装机容量占全球总量一半。如今，中国占到全球风电总装机容量的三分之一。

金风科技的崛起并非孤例：富事高商务咨询(FTI Consulting)的数据显示，全球十大风力涡轮机制造商中，有 5 家是中国企业。地方法规实际上把许多外国涡轮机制造商拒于中国市场之外，许多风机企业在受到保护的国内市场发展壮大。如今，国内市场饱和意味着，金风科技及其他中国同行希望能参与海外市场竞争。中国风机出口带来的压力已经在加快欧洲老牌制造商之间的新一轮整合。例如，德国的西门子(Siemens)正在洽购西班牙风机制造商 Gamesa。

2015 年，金风科技国内大本营新疆的风电装机容量翻了一番，达到该地区总发电装机容量的 26%。然而，向该地区以外输送电力遇到的瓶颈意味着，2016 年第一季度近一半风电装机容量未被利用。

可再生能源咨询公司安元易如(Azure International)研究总监麦振兴(Sebastian Meyer)表示：“在风电装机容量方面，新疆已处于严重过剩状态。”

为维持作为世界最大风力涡轮机供应商的地位，金风科技必须扩大在中国其他省份的销售，在这些地方保护主义盛行的省份，金风不得不直接与国内竞争对手——国电(Guodian)、明阳风电(Ming Yang)以及海装风电(CSIC)展开竞争。与此同时，随着各省竞相实现北京方面提出的可再生能源目标，弃风问题（未实现并网的风电装机容量）正愈演愈烈。

武钢记得上世纪 80 年代是国际风力发电合作的时代。他在由荷兰政府资助的新疆试验项目工作时，开始着迷于风力发电的潜力。这座试验风电场就是如今的达坂城。

他很快指出，在中国做大不一定意味着在海外成为强手。“在市场份额方面，我们是世界第一，但是我们清楚地知道我们仍然落后于西门子、通用电气(GE)和维斯塔斯等跨国企业，”他称。

“以维斯塔斯为例。他们的产品在超过 30 多个国家出售。我们的产品只在 17 个国家出售。这就是差距。作为一家中国企业，我们在国际化方面远远落后于我们的外国竞争对手。”

但是金风正在迎头赶上。该公司在海外聘请当地的销售和安装团队，还在风电场建成并投产后为它们提供资金把电力出售给发电商。

在香港和深圳上市的金风，背后拥有强大的支持者，其中包括国有的大坝建造商中国长江三峡集团公司(Three Gorges Corporation)、以及在过去一年中完成了一系列积极收购的保险商安邦集团(Anbang Group)。金风的多数技术都来自德国 Vensys 的授权，尽管金风对原有设计进行了改良。

武钢称，金风真正的竞争对手不是其他风电制造商，而是煤炭。目前，中国北方（风力强大且有规律）风力发电的成本略低于南方的燃煤发电，南方的煤炭价格更昂贵且排放标准更严格。然而，新疆和华北的

煤炭价格最低，使得风力发电在最适合的地区处于劣势。

武钢认为，进一步的技术改进和规模经济递增可能会有助于缩小差距。“我们的竞争对手不是那些外国公司，”他称，并援引联合国的目标——到 2050 年非化石能源应该占到全球一次能源消费的 85%。“火力发电正在与我们竞争。风力和化石能源之间的竞争远比风电行业内部的竞争激烈得多。”

Germany overhauls its flagship energy policy

Germany promises more renewables but big utilities take back control, writes Arne Jungjohann

Germany is a world leader in renewable energy deployment. Driven by a long-term renewable energy policy that dates back decades and, more recently, a nuclear power phase-out, the country is spearheading a transition to renewables commonly known as the Energiewende (energy transition).

For many years, the policy instrument of choice was a feed-in tariff (FIT). It guaranteed a fixed payment for (in most cases) 20 years and priority grid access for renewables. The policy provided high investment certainty and triggered tremendous growth in renewable power generation capacity.

When the initial law was introduced in 1990, the role of renewables in Germany's power mix was negligible. By 2015, renewable electricity made up 32% of consumption and had grown at speed exceeding all expectations. The government repeatedly had to upgrade its targets to keep up with renewables growth.

But a couple of weeks ago, the German government put forward plans to overhaul the Energiewende's flagship policy. The planned reform of the Renewable Energy Sources Act includes a switch from feed-in tariffs to auctions.

Sigmar Gabriel, Energy Minister and party leader of the Social Democrats, hails the reform as a paradigm shift in the way renewables are funded: “More competition, continuous growth with effective steering, restrictions on costs, stakeholder diversity and dovetailing with grid expansion - these are the coordinates for the next phase of the energy transition.”

With the reform, the government reiterates previously set goals to increase the share of renewable electricity to 40-45% in 2025, to 55-60% in 2035 and to at least 80% by 2050.

But to keep a steady hand on the rise in renewable power, a “deployment corridor” will set limits on how much renewables capacity may be added per year. These limits are set per technology: For onshore wind, a gross amount of 2,800 megawatts is to be auctioned each year over the next three years (2017, 2018 and 2019), increasing thereafter.

For solar, 600 megawatts will be auctioned each year, and the overall corridor of 2,500 megawatts per year will remain (the remainder being built under FITs). For offshore wind, the overall target is 15,000 megawatts by 2030.

For biomass, 150 megawatts are annually up for auction in 2017, 2018 and 2019. Small renewables installations like rooftop solar will continue to receive feed-in tariffs (with small changes). The government believes this will ensure that citizen cooperatives and project developers remain active in operating small renewables plants.

These limits have been attacked for protecting old coal power plants at the expense of renewables. But the government argues it is making renewables deployment more predictable, thereby facilitating grid expansion and improving planning security for Germany's neighbours and for the energy industry. After all, Chancellor Merkel promised the Energiewende must not destroy German utilities.

Critics argue that the government is putting the brakes on the Energiewende. Green campaigners see the limits for onshore wind power, the most cost-competitive renewable technology, as a sign that the government is trying to slow the rapid growth of renewables.

In light of past growth rates, the concern seems justified. Since 2010, Germany has increased the share of

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renewables in electricity demand by annually 3.1% on average. If this growth path continued, the country would reach more than 60% renewables by 2025. With the new proposal, however, the government wants to ensure that renewables growth does not exceed its 2025 target of 40% to 45%.

Anna Leidtreiter of the World Future Council expects these changes will fundamentally threaten Germany's leadership position within energy and climate politics, but also lead to significant job losses and reduce business opportunities for entrepreneurs.

The switch from feed-in tariffs to auctions would weaken investment opportunities for small investors, energy cooperatives, farmers and enterprises, she says. "Citizens are essentially the backbone of the energy transition in Germany. Energy cooperatives alone have invested about 1.3 billion euros (9.5 billion yuan) in RE projects, thus generating revenues for communities, regions and citizens," Leidtreiter argues.

Indeed, the Energiewende has democratised Germany's power sector in the last few decades. Due to its inclusive design, the policy has enabled new stakeholders to enter the market. They have leveraged significant private investment over the past decade.

More than 800 energy cooperatives as well as private investors, farmers, banks and enterprises owned almost 90% of total installed renewables capacity at the end of 2012. In contrast, traditional utilities and energy suppliers invested very little and thus lost market shares.

Up to now, the Renewable Energy Act has been a tremendous success story. As the International Renewable Energy Association (IRENA) says, Germany has shown the world that such a high level of renewables can be integrated without systemic problems, thanks to strong grid infrastructure and cross-border exchange links.

But the Energiewende as we know it is at a crossroads. So far citizens, communities and new investors have been the biggest drivers for the energy transition. If the caps and the switch from feed-in tariffs to auctions are implemented, large corporations will dominate the market.

The reform would exclude many potential investors, including citizens, whose billions of euros would be welcomed to finance the transformation to a low-carbon economy. A recent analysis by the Climate Policy Initiative (CPI) concludes that more than 30 billion euros a year could be available for investment in the expansion of renewable energy capacity in Germany as long as the country shifts policy effectively to deal with the next phase of the energy transition and keeps investment open.

These concerns are being discussed in Berlin. For international observers, it is important that broad sections of the country know that ownership matters in the energy sector.

The law is expected to be passed before the summer recess by the Bundestag (lower house) and the Bundesrat (upper house). It will be the government's final major piece of energy legislation before the federal elections in 2017. The Energiewende will move forward.

Whether or not the reform puts Germany on track to cut greenhouse gas emissions by 40% by 2020 in comparison to 1990 remains to be seen. Either way, slowing down renewables growth to protect old coal plants is not what the world expects from a global climate leader. Germany's next government will have to address the challenge of a coal phase-out and how to expand the Energiewende to the heat and transport sector.

德国拟调整“能源转型”旗舰政策

德国考虑将现有的补贴电价方式转换为竞价上网模式。

德国可谓是全球可再生能源利用的表率。早在几十年前，德国就开始推行长期的可再生能源政策，近来更是在逐步淘汰核能。也就是说，德国在能源转型的路上一直走在世界前列。

多年以来，德国一直采用的都是（可再生能源）电价补贴政策，从而保证了过去的 20 年时间里，可再生能源（在多数情况下）能够享有固定的收入和优先入网的机会。这项政策提高了投资收益的确定性，

大大刺激了可再生能源发电总量的提升。当 1990 年政策刚刚开始落实时，可再生能源发电量在德国发电总量中所占的比例几乎可以忽略不计。而到了 2015 年，可再生能源电力在总消费量中的比例则上升到 32%，而且增长速度超乎想象。为此，德国政府不得不多次提高目标，以便与可再生能源电力增长的速度相匹配。

然而就在几周前，德国政府宣布推出新计划，对现有的“能源转型”旗舰政策进行全面分析检测。计划对《可再生能源法》（Renewable Energy Sources Act）进行的其中一项改革就是将现有的补贴电价方式转换为竞价上网模式。德国能源部长、社会民主党领导人西格玛尔·加布里埃尔（Sigmar Gabriel）认为，这项改革将彻底改变可再生能源的融资模式。他表示：“加强竞争，才能有效引导持续增长，严控成本，股东多样化，与电网扩张紧密结合——这才是符合下一阶段能源转型需要的运营方式。”根据这项改革，德国政府重申了不同时期可再生能源在电力总量中占比的发展目标——2025 年达到 40% 到 45%，2035 年达到 55% 到 60%，2050 年至少达到 80%。

但是为了保证可再生电力能源的稳定增长，将通过“新增装机容量范围”对每年可再生能源新增装机进行限制。技术不同，设限的量级也不同：对陆上/近海风能来说，今后三年（2017、2018 和 2019 年）每年的竞价总量为 280 万千瓦，之后还会继续上调。对于太阳能来说，每年的竞价总量为 60 万千瓦，而每年 250 万千瓦的新增装机容量范围将会保持不变（剩余部分将依照上网电价补贴政策进行建设）。对于海上风能而言，总装机目标是到 2030 年达到 1500 万千瓦。对于生物能来说，2017、2018 和 2019 年每年的竞价上限为 15 万千瓦。而类似屋顶太阳能板这样的小型可再生能源装置将继续享受电价补贴政策（只是具体数额会发生小幅变化）。德国政府相信，这样的政策能够保证民间合作组织和项目开发商对小型可再生能源发电设施的积极性。

但是也有人对这样的限制提出了批评，认为这项政策意图减缓可再生能源的增长速度，保护落后的燃煤电厂。但是德国政府称，这是为了让可再生能源利用变得更可预测，从而推动电网扩张，提高德国邻国以及整个能源行业的规划安全性。不管怎么说，德国总理默克尔（Merkel）承诺“能源转型”计划不会损害德国公共设施利益。

批评家认为德国政府此举是在为“能源转型”计划减速。环保运动人士认为，对陆上风能这种最具成本竞争力的可再生能源设限就是在限制可再生能源的快速发展。

从以往增速来看，这种担忧也许是有道理的。从 2010 年开始，德国将电力总需求中可再生能源占比的年均增速提高 3.1%。若照此速度发展下去，2025 年时德国可再生能源发电比例就将超过 60%。但是根据这项新议案，政府希望的是确保可再生能源增长不超过其 2025 年占比 40% 到 45% 的目标。

世界未来委员会（World Future Council）的安娜·立德特雷特认为，这些变化不仅会从根本上威胁德国在能源和气候政治领域的领导地位，而且可能造成大量失业，减少商机。这种“补贴变竞价”的方式将大大减少小型投资者、能源合作社、农民和企业的投资机会。立德特雷特说：“民众才是德国能源转型的中坚力量。仅能源合作社就已经在可再生能源项目中投资近 13 亿欧元，为社区、地方和民众创造了巨大的利益。”

事实上，过去几十年，“能源转型”计划已经让德国的能源行业变得更加民主。其包容性也使新的利益相关者有机会进入能源市场。而过去十年，这些投资者为德国的能源行业注入了大量的私人资本。截至 2012 年底，德国的可再生能源总装机中，有将近 90% 都归属于 800 多家能源合作社，以及私人投资者、农民、银行和企业家。与之相反，传统公共事业单位和能源供应商却鲜有投资，因而逐步丧失了自己的市场份额。

迄今为止，《可再生能源法》（Renewable Energy Act）已经取得了巨大成功。正如国际可再生能源协会（IRENA）说的那样，德国已经向全世界证明，依靠强大的电网基础设施和跨境交易链接，我们完全可以在没有系统性问题的情况下，完成高水平的可再生能源建设。

但是正如我们所了解的那样，目前“能源转型”计划前路未明。普通公民、社区和新型投资者仍然是当今能源转型的最大推动力。如果这种“补贴转竞价”的资本模式一旦落实，大型企业将立刻垄断市场。

而包括普通民众在内的很多潜在投资者（比如普通民众）将被关在门外，一同被关在门外的还有低碳经济转型所需的数十亿欧元投资。气候政策行动（Climate Policy Initiative）总结说，只要德国政府政策变化能够有效应对下一阶段的能源转型，保证投资环境的开放性，那么德国可再生能源市场扩张每年将至少获得300亿欧元的投资。上述讨论都是在柏林进行的。对我同事克雷格·莫瑞斯（Craig Morris）这样的国际观察人员来说，重要的是，大多数德国人要明白，能源领域的所属权问题至关重要。

据悉，该项法案有望在今年夏天德国上下议会休会期之前通过。这也将成为2017年德国大选之前政府推出的最后一项主要的能源立法行动。可以确定的是，“能源转型”计划一定会继续进行下去。不过谈到最终的效果，还是要看这项改革能否帮助德国在2020年前将温室气体排放量在1990年水平的基础上降低40%。然而，我们并不愿意看到一个全球气候运动的领袖国家通过牺牲可再生能源增长来保护落后的火力发电企业。所以说，下届德国政府将面临两项重要难题：一是逐步淘汰煤炭火力发电，二是在供热和运输领域继续推进“能源转型”计划。

How China plans to curb new coal-fired power

China has introduced a new colour-coded alert system to flag up financially risky coal investments, reports Feng Hao

China's central government has ranked its provinces according to the financial risks posed by investments in coal-fired power, an effort to curb chronic overcapacity in the sector.

The traffic light warning system comes a year after the central government devolved powers on environmental impact assessments related to coal projects.

In the past year, coal mining companies and coal-power generators have been amassing debt, increasing the extent to which stranded coal assets creating financial instability.

But rather than curbing coal-fired power expansion, many provinces appear to be encouraging it, with potentially chaotic consequences for China's targets on renewable energy.

In response, the National Energy Administration (NEA), a government body presiding over energy policy, and the National Development and Reform Commission (NRDC), an administrative body with control of economic regulations, have published a joint index aimed at highlighting the distribution of risk across the country. This follows a government announcement made in April calling a halt to excessive investment in coal-fired power.

The index is composed of three categories, red, amber and green, based on the following criteria: abundance of installed capacity, constraints on local resources (such as water) and economic returns.

Fourteen provinces have been given red alerts that highlight the poorest economic returns; and 17 classed as green, where the risk is least severe (see map below).

Provinces given red warnings must slow down approvals of new coal-fired power projects immediately, while utilities are obliged to exercise caution when approving new projects, and ensure that new projects come online over a longer period of time.

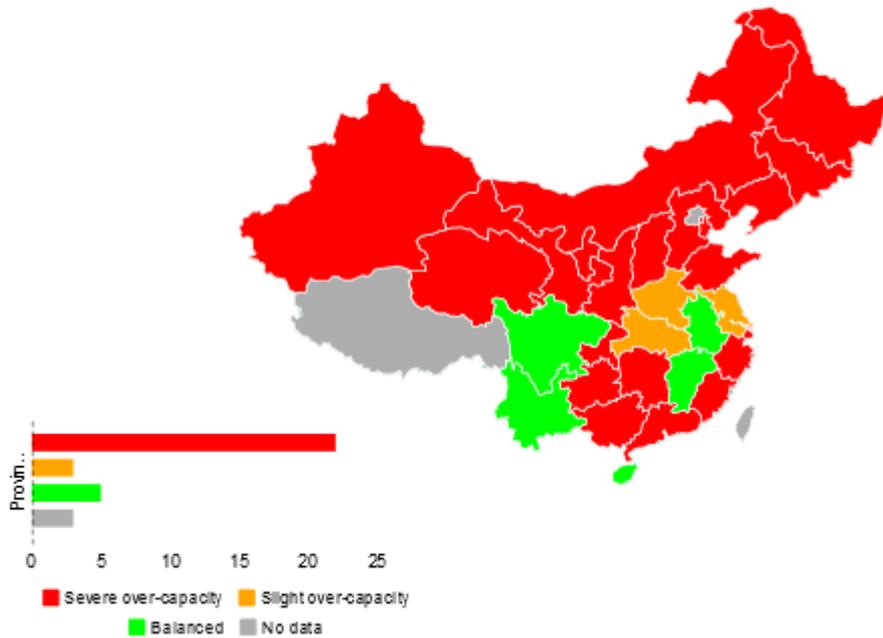
An amber warning signals that provincial governments and businesses should approach new projects with caution. China also has a target to peak carbon emissions by 2030 or before, a goal that would become more complicated if the country's regions allow lots of new coal-fired power stations to be built despite overcapacity.

The index is based on the predicted “reserve rate” three years from now. The reserve rate is the generating capacity available in the event of a generation plant going down or other supply disruptions. Under the new alert system, a glut of reserve is classed as red; while a balanced supply and demand, or undersupply and low reserve capacity, is classed as green.

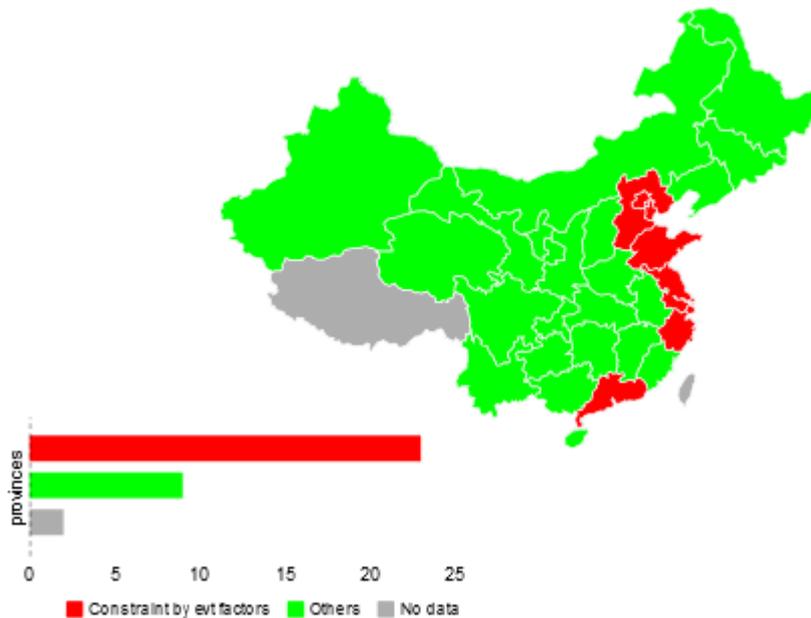
Economic viability is used as one of the index criteria, and is based on the predicted return on investment of new coal-fired power capacity three years in the future. This calculation is compared with the rate of return from interest rates in medium to long-term government bonds.

Where returns are expected to be lower than government bonds, the risk is classed as red; a similar level of return to government bonds is classed as amber; while a higher return than bonds guarantees a rating as green in the traffic light rating system.

Provinces with Surplus Installed Capacity



Provinces with Environmental Constraints



中国发布煤电投资风险指数

能源局和发改委最新推出了煤电风险预警指标体系，对于各省煤电规划建设的前景做出研判。

2016年4月，被标注为“特急”的发改委、能源局文件接连下发，为过热的煤电建设踩下急刹车。除了此前中外对话披露过的要求各省暂缓建设煤电项目的指令之外，能源局和发改委还最新推出了煤电风险预警指标体系，对于各省煤电规划建设的前景做出研判。两项政令的出台，仅仅相隔20天。

预警结果显示，33个省级电网区域（包括蒙东、蒙西和冀北、冀南）中的28个区域的预警状态为“红色”，仅江西省、安徽省和海南省为绿色状态。这就意味着，这些省区的煤电产能过剩严重，规划建设新的项目是不明智之举。

煤电规划建设风险预警的指标体系由三部分构成：煤电建设经济性预警指标、煤电装机充裕度预警指标和资源约束指标。预警程度由高到低分为红色、橙色、绿色三个等级。红色预警省份的地方政府应暂缓核准煤电项目，企业慎重决策项目开工，在建项目要合理安排建设投产时序；橙色预警省份的地方政府和企业则被要求慎重决策建设煤电项目。

值得注意的是，最终的风险预警结果由三个指标的最高评级确定，换句话说，经济、资源、环境，任意一个方面出现红色，都有“一票否决”的可能。

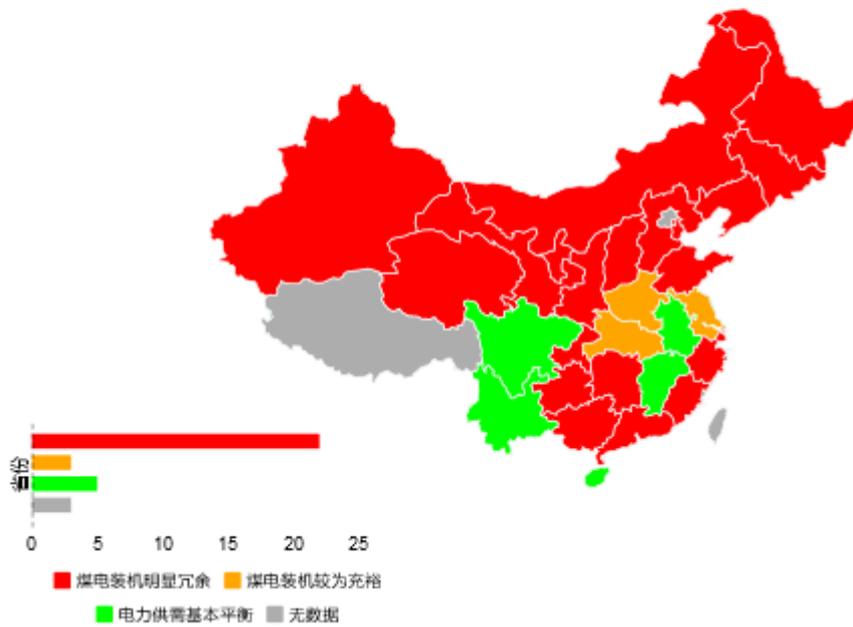
煤电装机充裕度预警指标是基于3年后各省（区、市）电力系统备用率来设定的：煤电装机明显冗余、系统备用率过高的为红色预警；煤电装机较为充裕、系统备用率偏高的为橙色预警；电力供需基本平衡或有缺口的，系统备用率适当或偏低的为绿色。

资源约束指标是基于各省（区、市）的大气污染物排放、水资源量、煤炭消费总量以及其他相关资源情况，只分红色、绿色两个等级。大气污染形势严峻、水资源量不足、煤炭消费总量亟需控制，或者存在其它资源约束煤电规划建设的，该项指标为红色，其余为绿色。

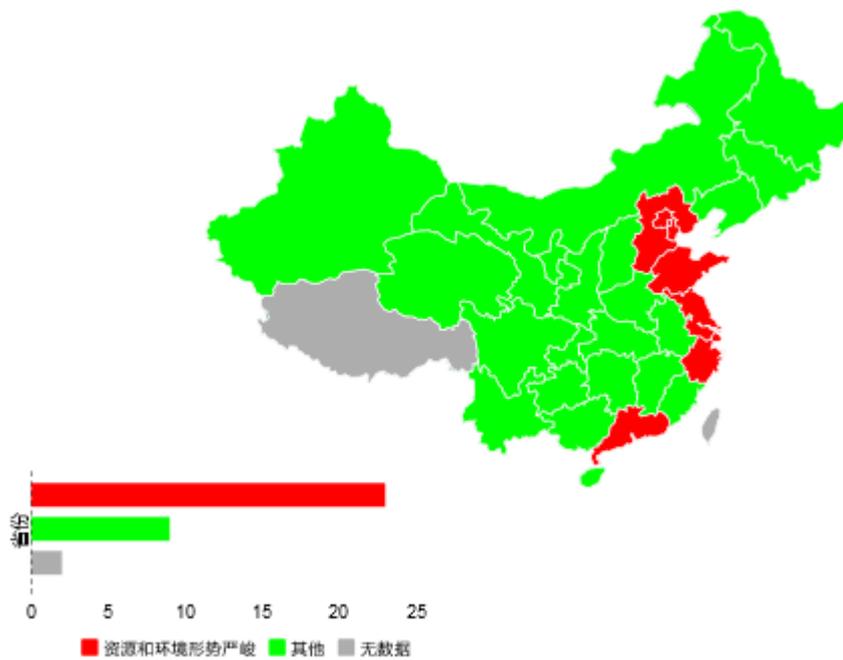
煤电建设经济性预警指标是基于3年后各省（区、市）新投运煤电项目的投资回报率。投资回报率低于当期中长期国债利率的为红色预警；在当期中长期国债利率至一般项目收益率（电力项目通常为8%）为橙色预警；高于一般项目收益率的为绿色。在这项指标中，共有14个地区为红色预警，其余17个地区的预警结果是绿色。这意味着，这14个省区的火电项目的投资回报率3年后仍然低于中长期国债利率。

中外对话以地图的形式呈现了煤电装机充裕度和资源约束两大指标。

煤电装机充裕度预警指标地图



资源约束指标地图



Canadian Solar and Flextronics partner on 360MW module factory in Brazil

Chinese solar firm Canadian Solar and OEM giant Flextronics are working together on an US\$80 million module

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manufacturing facility in Sao Paulo, according to the Brazilian Solar PV Association, Absolar.

Canadian Solar chief executive Shawn Qu attended a ceremony officially announcing the plans to build the 360MW crystalline silicon module factory, at the end of last week, according to Rodrigo Sauaia, director of Absolar.

The plant, to be located in Sorocaba in the state of São Paulo, will create 400 direct jobs and is expected to start producing modules this year.

This is Canadian Solar's first factory in Brazil. In May the firm reported that its utility-scale solar PV project pipeline in Brazil stood at 384MW, having won capacity in the various Brazilian solar auctions over the last two years.

In May, tracker firm NEXTracker, Which is now owned by Flextronics, received certification for compliance with Brazilian domestic content rules for its manufacturing operations, opening access to favourable credit lines for the company.

Domestic solar manufacturing is particularly pertinent in Brazil due to the requirement to source local equipment to get funding from the Brazilian Development Bank (BNDES).

Sauaia told PV Tech that the factory announcement is “very important” news for the Brazilian market.

阿特斯阳光电力与伟创力就巴西 360MW 组件厂取得合作

根据巴西太阳能光伏协会 Absolar，中国太阳能公司阿特斯阳光电力(Canadian Solar)与 OEM 巨头伟创力(Flextronics)正合作在圣保罗建设一个八千万美元组件制造厂。

根据 Absolar 总监 Rodrigo Sauaia，阿特斯阳光电力首席执行官瞿晓铨上周末出席仪式，正式宣布计划建设该 360MW 晶硅组件厂。

该工厂位于圣保罗索罗卡巴，将创造四百个直接就业岗位，预计今年开始生产组件。

这是阿特斯阳光电力在巴西的首家工厂。五月，该公司报告其巴西公共事业规模太阳能光伏项目储备达 384MW，过去两年已在各个巴西太阳能招标赢得装机容量。

五月，现在由伟创力持有的跟踪器公司 NEXTracker 获得认证，其制造业务符合巴西本地生产配额要求，该公司可获取有利的信贷额度。

国内太阳能制造在巴西特别适合，由于要求当地设备才能获得巴西国家开发银行(BNDES)的资助。

Sauaia 在接受 PV-Tech 采访时表示，该工厂公告对于巴西市场是“非常重要的”消息。

Hive Energy to develop new PV project in Cuba

Hive Energy is set to become the first British company to net a major PV project contract in Cuba. As part of the deal, Hive Energy will develop a 50MW installation — which will stand as the first utility-scale site to be developed in the country.

Once completed, the project is expected to generate up to 93GWh of electricity annually. The site is slated to be finished by 2018.

Cuba has plans to spend US\$3.5 billion over the coming years to build its renewable-energy sector. In 2015, only 4% of Cuba's electricity came from renewable sources, but by 2020, the island plans to deliver over 20% utilisation of renewable energy.

Giles Redpath, CEO at Hive Energy, said: “Hive Energy strives to deliver solar power to the frontiers of new markets. We are excited and delighted to be working with Cuba's UNE to support their plans for a future powered

by renewable energy. Delivering the first utility scale solar project in the Caribbean is just one step towards the island achieving this goal”.

The solar project will be constructed by Hive Energy in the Mariel Free zone, a new port that has been designed to serve as a regional hub for the island.

Bernardo Fernandez, Hive Energy’s director of operations across Mexico, Central America and the Caribbean, added: “The country can definitely benefit from the inclusion of renewable energies in their energy matrix. The current prices that PV offers will not only clean up the generation but will also provide a much cheaper energy source than their current alternative.”

Hive Energy 拟在古巴开发新光伏项目

Hive Energy 将成为首家在古巴获得一份主要光伏项目合同的英国公司。作为该协议的一部分，Hive Energy 将开发一个 50MW 的安装项目——这将作为在该国开发的首座公共事业规模电站。

一旦竣工，预计该项目每年将产生高达 93GWh 的电力。该电站计划于 2018 年竣工。

古巴日前计划未来几年斥资三十五亿美元打造其可再生能源领域。2015 年，古巴只有 4% 的电力来自可再生能源，但是到 2020 年，该岛计划交付逾 20% 的可再生能源利用率。

Hive Energy 首席执行官贾尔斯·雷德帕思(Giles Redpath)表示：“Hive Energy 致力于为新市场的前沿提供太阳能发电。我们很高兴并很荣幸与古巴的 UNE 合作，支持他们的未来由可再生能源供电的计划。交付加勒比地区首个公共事业规模太阳能项目仅仅是该岛实现这一目标的一个步骤。”

该太阳能项目将由 Hive Energy 在马里埃尔自由区，一个旨在作为该岛区域枢纽的新港口建设。

Hive Energy 的墨西哥、中美洲和加勒比地区业务总监贝尔纳多·费尔南德斯(Bernardo Fernandez)补充道：“该国肯定可以获益于其能源结构中包括可再生能源。光伏目前提供的价格将不仅治理发电，还比目前替代选择提供更便宜的能源。”

D. E. Shaw Renewable Investments to acquire 31MW PV plant in California

D. E. Shaw Renewable Investments announced that it has acquired the Portal Ridge solar project from First Solar, Inc. Portal Ridge is a 31MW solar facility located in Lancaster, California, with 20-year power purchase agreements with Pacific Gas and Electric Company and Southern California Edison.

The installation, which was developed by First Solar, was acquired by an affiliate of DESRI in partnership with Bright Plain Renewable Energy. The site will be constructed by Blattner Energy Inc. pursuant to an engineering, procurement, and construction (EPC) agreement, and is expected to generate over 90,000MWh of clean energy annually for customers in South California.

Financing for the acquisition, construction, and maintenance of the project was issued by CoBank, ACB, and KeyBank National Association — along with a commitment for tax equity financing from an affiliate of U.S. Bancorp Community Development Corporation.

Bryan Martin, managing director and head of US private equity at the D. E. Shaw group, said: “We are excited to partner with First Solar as we expand DESRI’s renewable energy footprint on the West Coast. DESRI has a strong presence in California with multiple projects in construction and operation. We are delighted to add Portal Ridge as we work to provide clean and cost-efficient green energy to the state’s residents and businesses.”

D. E. Shaw Renewable Investments 拟收购加州 31MW 光伏电站

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D. E. Shaw Renewable Investments 宣布，其日前从 First Solar, Inc 手中收购 Portal Ridge 太阳能项目。Portal Ridge 是位于加州兰卡斯特的一个 31MW 太阳能设施，与太平洋煤气电力公司(Pacific Gas and Electric Company)和南加州爱迪生公司(Southern California Edison)签署为期二十年的购电协议。

该安装项目由 First Solar 开发，被 DESRI 子公司与 Bright Plain Renewable Energy 联合收购。该电站将由 Blattner Energy Inc. 依照设计、采购和施工协议建设，预计每年为南加州客户产生逾 90,000MWh 清洁能源。

CoBank、ACB 和 KeyBank National Association 为该项目发放采购、建设和维护融资——U.S. Bancorp Community Development Corporation 旗下子公司承诺税收股权融资。

D. E. Shaw 集团总经理兼美国私募股权负责人布赖恩·马丁(Bryan Martin)表示：“我们很高兴与 First Solar 合作，在西海岸扩大 DESRI 的可再生能源足迹。DESRI 在加州具有强大的影响力，许多项目在建及运营。我们很高兴在我们的工作中加入 Portal Ridge，为该州的居民和企业提供清洁并具有成本效益的绿色能源。”

Northeast Brazilian Bank creates credit line for micro and mini renewable projects

Brazilian public bank Banco do Nordeste (Northeast Bank) has created a credit line to allow companies to install solar PV and other distributed generation renewable energy sources in the mini (75kW-5MW) and micro-generation (>100kW) segment.

Firms eligible to benefit from the new credit line named ‘SOL FNE’ will be from the agro-industrial, industrial, commercial and service sectors, as well as farmers, cooperatives and associations. However, residential consumers will not be included.

Rodrigo Sauaia, director of Brazil’s solar industry association (Absolar), told PV Tech that the Bank only operates in the Northeastern regions and the northern parts of the states of Minas Gerais and Espirito Santo.

The ‘SOL FNE’ credit line uses funds from the Northeast Constitutional Financing Fund (FNE) and has a payment period of up to 12 years with a one year grace period.

Sauaia said it includes financing up to 100% of the investment on such distributed generation systems. Meanwhile interest rates are between 6.5-11% per year depending on the client and its characteristics.

Sauaia added: “This interest rate is very attractive for projects. Maybe in Europe this is considered a little bit high, but it is not in Brazil.”

Sauaia said inflation stood at a little more than 10.3% last year so the interest, which he described as a "special condition" is not significant.

Additionally the PV system can be used as a financial guarantee to access the financing. This means that if the client is unable to meet the requirements of the loan that finances the system, it does not have to provide another real guarantee such as money or goods. Instead the Bank can use the energy system as a financial guarantee to be installed with a different client.

Sauaia said that clients taking advantage of the new financing opportunity will also benefit from the reduced electricity bills from generating their own energy. For example a company using rooftop PV to reduce their electricity expenses by 80-90% will be able to use their avoided costs to pay the loan without taking any money out of their pocket.

Sauaia added: “ABsolar will be working hard to bring the same rationale the same type of financing model to

other regions of the country so they can bring forward the model of PV distributed generation to commercial and industrial clients and clients in rural areas.”

Due to the lack of coverage for residential consumers, Sauaia said ABSolar is looking to bring other public sector banks to the table to discuss better conditions for financing the end consumer residential customers who want to install PV systems on their roofs.

The financing line is part of the Distributed Generation Development Program for Energy (ProGD), launched by the Ministry of Mines and Energy in December 2015, the aim of which is to encourage consumers to produce their own renewable energy, with a particular focus on solar PV.

With ProGD incentives, the forecast is that by 2030, 2.7 million consumer units may have energy generated by themselves, between residence, trades, industries and the agricultural sector, which can result in 23,500MW (48 TWh produced) clean and renewable energy.

Northeast Brazilian Bank 为微型和小型可再生能源项目创立信贷额度

巴西公立银行 Banco do Nordeste (Northeast Bank)日前创立一个信贷额度，使公司能够在微型(75kW-5MW)和小型发电(>100kW)领域安装太阳能光伏及其他分布式发电可再生能源。

有资格获益于名为“SOL FNE”的新信贷额度的公司可以来自农工业、工业、商业和服务业，以及农民、合作社和协会。然而，住宅消费者将不包括在内。

巴西太阳能产业协会(Absolar)总监 Rodrigo Sauaia 在接受 PV-Tech 采访时表示，该银行将仅在东北部区以及米纳斯吉拉斯州和圣埃斯皮里图州北部地区运营。

“SOL FNE”信贷额度使用 Northeast Constitutional Financing Fund (FNE)的资金，付款期长达十二年，宽限期为一年。

Sauaia 表示，其包括对这类分布式发电系统的投资的 100%融资。与此同时，根据客户及其特点，年利率为 6.5-11%。

Sauaia 补充道：“这一利率对于人们而言非常具有吸引力。也许在欧洲，被认为有点高，但在巴西不是。”

Sauaia 表示，去年通货膨胀略高于 10.3%，因此该利率，他描述为“特殊情况”，并不很大。

此外，光伏系统可作为财务担保来获得融资。这意味着，如果客户无法满足为系统融资的贷款需求，其不必提供另一个真正担保，如金钱或货物。取而代之，银行可以使用该能源系统作为财务担保，使不同的客户安装。

Sauaia 表示，利用新融资机会的客户也将获益于通过自己产生能源而减少电费。例如，使用屋顶光伏减少其电费开支 80-90%的公司，将能够使用其可避免成本来支付贷款，不用从口袋里掏钱。

Sauaia 补充道：“ABSolar 将努力工作将相同类型的融资模式的相同基本原理带到该国其他地区，因此其他地区可以向商业和工业客户以及农村地区客户提供光伏分布式发电模式。”

由于没有覆盖住宅客户，Sauaia 表示，ABSolar 正寻求引进其他国有银行，商讨为希望在其屋顶安装光伏系统的终端消费者住宅客户融资的更好条件。

该融资是 2015 年十二月矿产能源部推出的能源分布式发电计划(ProGD)(点击查看 PV-Tech 此前相关报道)的一部分，该计划旨在鼓励消费者自己生产可再生能源，特别侧重于太阳能光伏。

有了 ProGD 鼓励，预计到 2030 年，住宅、贸易、工业和农业领域的两百七十万消费者可能自己产生能源，这有望造就 23.5GW(48 TWh)清洁和可再生能源产量。

Pakistan proposes solar FiT revisions

Pakistan's National Electric Power Regulatory Authority (NEPRA) has published proposed revisions to its feed-in tariffs (FiTs) for solar energy projects of between 1-100MW capacity.

The Notice of Suo Moto Proceedings revealed the new tariffs and analyst firm Mercom Capital Group has converted the figures into US\$ in the following table:

Pakistan: Proposed Solar Tariff				
Description	Southern Region		Northern Region	
	PKR/kWh	~\$/kWh	PKR/kWh	~\$/kWh
Tariff 1-13 Years	11.128	0.105	11.783	0.111
Tariff 14-25 Years	5.588	0.053	5.917	0.056
Levelized Tariff for 25 Years	9.924	0.094	10.507	0.099

Source: NEPRA Mercom Capital Group

Pakistan's proposed FiT review for Solar. Credit: Mercom Capital Group

The South region includes the whole of Sindh and Baluchistan Provinces and South Punjab while the rest of Pakistan's provinces account for the North.

NEPRA will now consider whether to determine a new upfront tariff for solar power projects or to determine a benchmark levelized tariff for competitive bidding by the relevant agency, and whether the proposed costs are reasonable.

Stakeholders now have less than two weeks to provide an intervention to the proposals. A hearing will also be held on 21 July in Islamabad.

巴基斯坦提议修订太阳能上网电价补贴

巴基斯坦国家电力监管局(NEPRA)日前公布, 建议修订其装机容量为 1-100MW 的太阳能项目的上网电价补贴。

Notice of Suo Moto Proceedings 公布新补贴, 分析公司 Mercom Capital Group 在左侧表格中将这些数字转换为美元。

南部地区包括整个信德省和俾路支省, 以及旁遮普南部, 而巴基斯坦其余省份为北部地区。

NEPRA 现将考虑是确定太阳能发电项目的新前期补贴, 还是平均化补贴基准, 以及拟议的成本是否合理。

利益相关者现在有不到两周的时间可以为该提议提供干预。还将于七月二十一日在伊斯兰堡举行听证会。

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Source: NEPR
Mercom Capital Group

巴基斯坦拟议的太阳能上网电价补贴审查。图片来源：Mercom Capital Group

White House 's ' first executive push for energy storage' could raise US\$1 billion investment

The White House announcement of new developments and investment in energy storage has been characterised as “the first executive office push for energy storage” that will “undoubtedly galvanize” the industry, in a new GTM Research brief by the firm's energy storage director Ravi Manghani.

As part of the initiatives propounded by the Obama administration, investors are announcing US\$130 million in new funding commitments for energy storage. According to the report, in aggregate, these new commitments could lead to around US\$1 billion in investments in energy storage.

Apart from significant financing announcements, other key takeaways from the federal government announcement are its commitment to increasing its storage and microgrid capacity through programmes that will both provide funding for rural microgrids and enable federal and military bases to be more resilient. Furthermore, the US Department of Energy is promoting the standardisation of energy data which will be more economical for the industry and individual stakeholders, as well as creating an accessible pool of information that will ensure efficiency and consistency across the industry.

In addition, sixteen developers and power companies in at least eight states have announced new storage procurement and deployment targets for the next five years on the back of the announcement, to aid in the push for what is known as the second wave of energy storage; in 2015, the US doubled its installed capacity of energy storage to 500MW.

白宫“首次行政推进储能”有望筹集十亿美元投资

在 GTM Research 储能总监 Ravi Manghani 的新简报中，白宫在储能方面的新发展和投资公告日前被定性为“行政办公室首次推动储能”，这将“无疑激励”该行业。

作为奥巴马政府提出的计划的一部分，投资者宣布对储能 1.3 亿美元新资金承诺。根据该报告，总的来说，这些新承诺可能引起对储能投资约十亿美元。

除了重要的融资公告，联邦政府公告的其他关键部分是其承诺，通过将为农村微电网提供资金并且使联邦军事基地更具弹性的计划，增加储能和微电网装机容量。此外，美国能源部正在推动能源数据的标准化，对于整个行业和个人利益相关者而言这将更经济，并且创建大量信息，以确保行业的效率和一致性。

此外，至少八个州的十六个开发商和电力公司已宣布该公告后五年新的储能采购和部署目标，以推动第二波储能，2015 年，美国翻倍其储能安装量至 500MW。