

## 中国对冲基金网

标题: Energiewende 德国的能源转型 [\[打印本页\]](#)

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【导读】

福岛核泄漏事件发生后, 德国立即关闭了7所核反应堆, 加速了能源转型计划, 而这项雄伟的能源计划风险犹存。

**Germany's energy transformation**

**德国的能源转型**

### Energiewende

#### 能源大变身

German plans to cut carbon emissions with renewable energy are ambitious, but they are also risky

德国计划通过可再生能源削减碳排放。雄伟的能源计划风险犹存。

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A new dawn

一缕新曙光

“THE quieter the evening, the more you hear it,” says Wilfried Bockholt, mayor of Niebüll in North Friesland. He mimics the sound of a 55-metre-long rotor whirling round a windmill’s mast. He is a driving force behind the “citizens’ wind park”, but he has mixed feelings. A region famed for broad horizons is now jagged with white spires. “They alter the landscape completely,” he laments.

北弗里兰县的尼必尔市市长Wilfried Bockholt说, “夜愈是寂静, 风车的声音就愈震耳。”他随即模仿了长达5米的风车翼片在桅杆上急速旋转的声音。Bockholt是“市民风电场”背

后的推动力量，然而于此项目，他却是喜忧参半。曾以视野广阔盛名的尼必尔，现今却挤满了高低起伏的**白色**风车。他抱怨道，“风车完全改变了这儿的**景色**。”

North Friesland’s wind boom is part of Germany’s Energiewende (energy transformation), a plan to shift from nuclear and fossil fuels to renewables. It was dreamed up in the 1980s, became policy in 2000 and sped up after the Fukushima disaster in March 2011. That led Angela Merkel, the chancellor, to scrap her extension of nuclear power (rather than phasing it out by 2022, as previous governments had planned). She ordered the immediate closure of seven reactors. Germany reaffirmed its clean-energy goals—greenhouse-gas emissions are to be cut from 1990 levels by 40% by 2020 and by 80% by 2050—but it must now meet those targets without nuclear power.

北弗里兰县蓬勃发展的风力是德国能源转型计划的一部分，该计划旨在将德国利用的能源从核能、矿物燃料转变为可再生能源。能源转型计划构想于上世纪80年代，于2000年出台相关政策，并在2011年3月福岛灾难发生后加快了**计划**进程。上届政府曾计划在2022年前彻底废除核能，而福岛事故促使现任总理安吉拉·默克尔**放弃延期废弃核能**。她下令立即关闭7座核反应堆。德国重申了本国的清洁能源计划，即在2020年和2050年，温室气体排放量分别比1990年减少40%和80%，但如今德国需在**没有核能**的情况下完成目标。

The rest of the world watches with wonder, annoyance—and anticipatory Schadenfreude. Rather than stabilising Europe’s electricity, Germany plagues neighbours by dumping unpredictable surges of wind and solar power. To many the Energiewende is a lunatic gamble with the country’s manufacturing prowess. But if it pays off Germany will have created yet another world-beating industry, say the gamblers. Alone among rich countries Germany has “the means and will to achieve a staggering transformation of the energy infrastructure”, says Mark Lewis, an analyst at Deutsche Bank.

其他国家看德国的眼神里带有一丝惊奇，些许厌恶，幸灾乐祸。德国理应维护欧洲供电的稳定，现今却用廉价出售琢磨不定的风能、太阳能给邻国添堵。对多数人而言，能源转型计划就是用德国强大的制造业来进行一场疯狂的赌博。然而一旦有所回报，德国将创建另一个世界级行业，“赌徒们”如是说。在所有发达国家中，德国是唯一“有方法、有决心完成能源基础设施交错转型”的国家，德意志银行的分析师Mark Lewis说道。

Much could go wrong. Wholesale electricity prices will be 70% higher by 2025, predicts the Karlsruhe Institute of Technology. Germany must build or upgrade 8,300km (5,157 miles) of transmission lines (not including connections to offshore wind farms). **Intermittent wind and sun power creates a need for backup generators, while playing havoc with business models that justify investing in them.** Hans-Peter Keitel, president of the Federation of German Industry, likens the Energiewende to “open-heart surgery”.

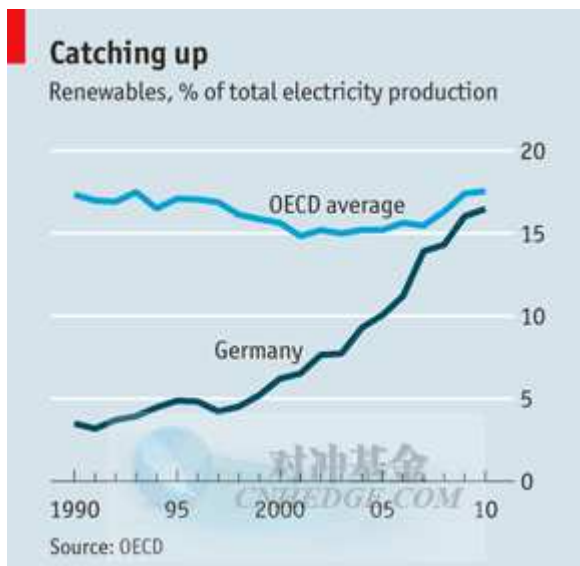
仍有很多地方会出现差池。据卡尔斯鲁厄理工学院预测，截至2025年，**批发电价**将整体上涨70%。德国必须修建或升级8300千米(5157英里)的电力传输线，其中不包括将海上风电站连到电网的线路。风能、太阳能发电存在间接性，在搅乱专为其投资建立的商业模型的，同时也产生了对备用发电机组的需求。德国工业联合会主席Hans-Peter Keitel就将能源转型计划比作“开胸手术”

In May Mrs Merkel sacked the environment minister, Norbert Röttgen, after he led her Christian Democrats to a disastrous defeat in a regional election. His successor is Peter Altmaier, a canny parliamentarian who will share responsibility with the economy minister, Philipp Rösler. In fact Mrs Merkel has taken charge herself. She convenes energy summits with leaders of the 16 states, and promises to incorporate grid operators’ plans into federal law by the end of the year. But even she admits the Energiewende is a “Herculean task”.

今年五月，Norbert Röttgen代表基民盟竞选州长失败，默克尔随后解除了其环境部长职位，并任命精明谨慎的国会议员Peter Altmaier接任。Altmaier将同财政部长Philipp Rösler共担重任。事实上，默克尔早已亲自接管此事。她召集16个州的州长举行州长能源峰会，并向各州长保证，将会在今年年底前，把电网运营商的计划纳入联邦法律。但就连她自己也不得不承认能源转型计划是一项异常艰巨的任务。

## Power from the people

人民的力量



The plan will require two transformations, one micro and one macro. The first is an unruly, subsidy-fed explosion of wind, solar and biomass power, a “strange mixture of idealism and greed,” as one energy boss calls it. The second is the effort to pull this into a system providing reliable and affordable electricity. Protagonists of the micro version see themselves as democratising economic and political power. The renewable-energy law entitles anybody who puts in a solar panel or a windmill to sell surplus power to the grid, receiving a generous “feed-in tariff” guaranteed over 20 years. This gives renewable electricity priority over conventional power. Not surprisingly, renewables grew ten times faster than the OECD average from 1990 to 2010 and now account for 20% of electricity output (see chart). The government’s target is 35% by 2020. Germany gets more electricity from renewable sources than any other big country.

能源转型计划将需要从微观和宏观两个层面进行转化。前者是依靠政府的补贴，大力开发风能、太阳能以及生物能源，某能源老总称之为一个“理想主义和贪婪主义奇怪的混合物”。后者指为把开发出的能源转入一个能够提供可靠且可负担的电流体制所做的努力。微观版的支持者视自己为民主化经济和政治力量。每位通过太阳能板或风车向电网出售剩余电力的公民，都可凭借《可再生能源法》赋予的权利，在未来20多年内享受“上网电价补贴政策”。这使人们在可再生能源与传统能源二者中，优先考虑前者。1990年至2010年间，德国的可再生能源增幅比世界经合组织(OECD)的平均值快十倍自然也不足为奇，如今可再生能源占德国发电量的20%。德国政府的目标是，在2020年将该比率扩大至35%。德国利用可再生能源产电量居所有大型国家之首。

The return on capital can top 20% a year in the best spots. But do not confuse harvesters of sun and wind with electricity plutocrats. “One important goal is to break the monopoly” of the four big power companies that dominate the market, says Hermann Albers, president of the Federal Wind Energy Association. Municipal utility companies plan to boost their share of electricity production from a tenth to at least a fifth by 2020. More than 100 municipalities want to be “100% renewable”.

最佳地点的年资本回报率可超过20%。可您甭想用电力财阀们来唬弄太阳能和风能的收获者们。联邦风能协会会长Hermann Albers说，“重要目标之一是打破四大电力公司主导市场的垄断”。市政公用事业公司计划在2020年前，将自己在电力生产中占得比率从10%，至少提高至20%。逾100个直辖市希望实现“100%利用可再生能源”。

The number of “energy co-operatives” has risen sixfold since 2007, to 586 last year. Solar parks have migrated from farms and family houses to apartment blocks. “Roof exchanges” match owners with investors. Niebüll allows only wind farms in which residents can buy stakes, lest landowners become local fat cats and others rebel against the project. In 2010 over 50% of renewable-energy capacity was in the hands of individuals or farmers, according to trend:research, a consultancy. The big four had just 6.5%.

去年“能源合作项目”数目为586个，是2007年的六倍。太阳能电场也从田间地头、独立住宅迁到了公寓大楼。电场主通过“屋顶交换”项目找到匹配的投资者。尼必尔市仅容许风力农场居民购买股份，以免地主摇身变成地方“肥猫”，使其他人反对该项目。据资讯公司 trend-research称，2010年可再生能源产能的一半以上都落入个体或农民手中。四大电力公司仅占6.5%。

This is perking up sleepy regions. Farmers are likelier to remain on the land. Services, from consultants who guide investors through the subsidy jungle to specialist windmill repairmen, have taken root in towns. The taxes paid by Niebüll's wind park are one of the town's main sources of revenue; in smaller settlements they may be almost the only local source.

这也使那些尚未采取行动的地区开始跃跃欲试。农民们更愿意留在农村。各项服务已在城镇扎根：从在堆积如山的补助里为投资者引路的顾问，到专业风车维修工。尼必尔风力电厂纳的税费成了城市主要**收入来源之一**，而在一些小地方，风场也许几乎是地方税收的唯一来源。

The micro-level works almost too well. Schleswig-Holstein plans to generate three times as much renewable energy as it consumes and to export the surplus south and west. Southern states are keen to produce their own renewable power, too. Bavaria talks of self-sufficiency. The states' windpower targets add up to double the federal government's goal of 36 gigawatts by 2020.

微观层面的似乎运作的太一帆风顺了。席勒斯威格-霍尔斯坦计划生产的可再生能源是原来需求量的三倍，并计划将剩余电量**运输**至德国南部、西部的城市。南方各州也热切期望能自己生产可再生电力。巴伐利亚州提出要自给自足。截至2020年，各州的风能目标合计为联邦政府36千瓦兆目标的两倍。

Solar power, which consumes half the total subsidy but provides just a fifth of renewable electricity, is racing ahead of target. The Energiewende raises costs, unsettles supply and provokes resistance at grass-roots level. The system coped with the first influx of renewable energy, says Rainer Baake, who heads a lobby group called Agora Energiewende. But the next 20% will require a transformation.

太阳能的发展超出目标，它耗费总补助额的二分之一，却**只**提供可再生电力的五分之一。能源转型抬高了成本，搅乱了供给，还激起**基层**的反抗情绪。游说组织“能源转型集会”的领导人Rainer Baake说，现有体制应对了首批可再生能源的涌入，然而接下来的20%就需要转变。

One fight is over who will pay. The most energy-intensive consumers are shielded from the feed-in tariff, leaving ordinary folk, including pensioners and the unemployed, to foot the bill. The nuclear shutdown pushed up industry's electricity bills relative to its competitors, argues Annette Loske of VIK, which represents big consumers. The political assault on their exemption undermines the confidence they need to invest. An even bigger worry is supply interruptions, which can disrupt factories even if they last for fractions of a second. VIK says they have risen 30% in the past three years. The odds of outright power cuts have jumped.

第一阶段的战役已结束，谁来为之埋单？能源消耗量最大的用户受上网电价的保护，留下平民百姓，领养老金的老人已经失业人员负担费用。来自大客户代理商VIK的Annette Loske辩解道，与竞争对手相比，核电站的关闭抬高了工业的电费。大客户本需要树立信心，而针对大客户免税的政治攻击却渐渐削弱了这份信心。断电则是另一份更大的烦恼，供电哪怕只中断几分之一秒都会扰乱工厂作业。VIK称，在过去三年里断电频率已上升至30%。突然停电的几率猛增。

Renewables can depress wholesale prices, eg, when the sun creates a midday jolt. This discourages investors in the flexible, gas-powered generation needed to provide backup for windless, cloudy days. “The market dynamics are completely destroyed,” says Peter Terium, boss of RWE, one of the big four. There is talk of paying generators to offer capacity, not supply power. But such payments would add another subsidy distortion to the market.

可再生能源会压低批发电价，比如在正午太阳当头时。这也从灵活性上令投资者**灰心**，因为天然气发电器需要在无风的阴天里提供后备支援。“市场动态完全被破坏了”，四大电力公司之一的RWE老总Peter Terium说。也有人讨论，电力公司有偿提供产能，而非电力。但这样的支付方式**会被市场曲解为另一项补贴**。

The €20 billion national-grid plan is another macro-project meant to channel micro-level exuberance. It assumes that the biggest need will be to supply northern wind power to southern and western consumers. Yet if so, perhaps renewables should be tempered elsewhere. “We have to synchronise infrastructure and renewables”, by allowing new wind and solar projects only where the grid can take delivery of what they produce, says Stephan Kohler, head of the German Energy Agency. Upgrading the grid, to beyond Germany as well as within it, would



reduce waste and the risk of instability.

200亿欧元的国家电网计划是另一项用来调节微观层面繁荣发展的宏观项目。该计划认为，当务之急是将北方的风电输送至南部、西部的消费者家中。倘若如此，其他地区的可再生能源理应有缓解。我们只能批准那些设立在电网覆盖范围内的新风电、太阳能项目，“我们不得以此来协调基础设施同可再生能源的关系”，德国能源机构主席Stephan Kohler表示。升级德国境内外的电网将会减少资金浪费，降低不稳定的危险。

But the vision is contested. Expansion of the grid has been thwarted by bureaucrats' inertia, politicians' foot dragging and activism by those who hate transmission masts as much as they do nuclear power. Even upgrades to existing lines can mobilise opposition, as in Quickborn, south of Niebüll. Hard-core decentralists deny that power must be transmitted over long distances. “You can put the grid development plan directly in the bin,” says Matthias Willenbacher of Juwi, a big builder of solar and wind projects. Bavaria's aspirations encourage such hopes. When the federal government tried to speed up cuts in the feed-in tariff for solar power, several states put up a fight, forcing a partial retreat. The renewables lobby, like the industrial one, demands stable investment conditions. Solar power will be competitive without subsidies by 2020, the solar lobby insists.

但这种想法颇具争议。官僚主义者的慵懒，政客们的磨磨蹭蹭以及恨核能亦恨输电杆子的激进主义，使得电网的扩张一度遭到阻挠。即便是升级现有电路也会引起抗议，就如南尼必尔的quickborm发生的那样。顽固不化的分散主义者对电力必须长途传输的说法予以否认。大型太阳能、风能项目建造商Juwi的Matthias Willenbacher说，“你可以直接把电网发展计划扔垃圾箱里”。巴伐利亚州“自给自足”的愿望鼓励了这种希望。当联邦政府试图加速降低太阳能发电的强制入网价格时，一些州挺身而出反抗之，最终迫使政府作出部分退让。和工业游说团一样，可再生能源游说团需要稳定的投资环境。太阳能游说团坚称，截至2020年底，即便是没有政府补贴，太阳能发电也会颇具竞争力。

Germany is groping for a mix of top-down direction-setting and bottom-up buy-in for itsEnergiewende to work. The federal government may limit foes of transmission projects to one court challenge. But consultation with citizens is vital, reckons Mr Matthiessen. TenneT, which operates the grid in Schleswig-Holstein, wants to extend the wind park idea to the transmission network, offering stakes in a line along the west coast. But Mr Bockholt, Niebüll's mayor, sounds a warning: Schleswig-Holstein's plans to harvest its wealth of wind will soon “reach the limits of what is tolerable”.

为保证能源转型能起作用，德国正在探索一条自上而下发布号令与自下而上逐级买进的混合路子。联邦政府有权向法庭对转换项目的妨碍者提出异议。但Matthiessen先生认为，同市民商量才是最重要的。运行席勒斯威格-霍尔斯坦州电网的TenneT公司，想将风力电场的理念延伸为电力传输系统，就在向市民发售西海岸沿岸一条电路线的股权。但是尼必尔市市长Bockholt先生对此发出警告：席勒斯威格-霍尔斯坦州的丰富电力收获计划将很快“达到可承受的极限。”

It is hard to think of a messier and more wasteful way of shifting from fossil and nuclear fuel to renewable energy than the one Germany has blundered into. The price will be high, the risks are large and some effects will be the opposite of what was intended. Greenhouse-gas emissions are likely to be higher than they would have been for quite a while to come. But that does not mean the entire enterprise will fail. Politicians cannot reinvent the Energiewende on the run, but they can stay a step ahead of the risks and push back against the costs—and they are beginning to do so. In the end Germany itself is likely to be transformed.

在将矿物燃料、核燃料向可再生能源转换上，德国已经误打误撞的走出了自己的路子，很难再想出一个比德国的更棘手、更耗资的方式。转型价格将高居不下，转型风险巨大、而有些地方也可能事与愿违。在未来很长一段时间内，温室气体排放量极有可能比预期中要高。但是这并不意味着能源转型这项事业将崩溃瓦解。能源转型计划已付诸实行，政客们虽无力改造，却能像德国人正开始做的那样，预测风险，并压缩开支。最终可能发生转变的或许是德国自身。

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