光伏领跑基地推进行业发展

PV TOP-RUNNER PROJECT PROMOTES INDUSTRY DEVELOPMENT

水电水利规划设计总院

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1. PV industry in China enters Quality Improvement Stage

（一）光伏发电在我国和全球市场的地位逐步提升
(1) Continuously more important position in domestic and global market

- 在我国电力系统中的作用提升 Increasing role in China's power system
  - 2017年光伏新增规模5306万千瓦，发电量1182亿kWh，占全部发电量的1.8%
  - In 2017, PV had a newly installed capacity of 51,060MW, with a power generation of 118,200GWh, accounting for 1.8% of the total power generation.
  - 2018年上半年新增2431万千瓦，发电量824亿千瓦时，同比增长59%
  - In the first half of 2018, PV had a newly installed capacity of 24,310MW, and a power generation of 82,400GWh with the year-on-year growth of 59% .

一、光伏发展进入提质增效阶段
1. PV industry in China enters Quality Improvement Stage

- 在全球光伏市场中地位重要 Important position in the global PV market.
  - 光伏发电年度新增装机连续5年全球第一，累计装机连续3年全球第一
  - The newly installed PV power capacity has been the first in the world for five consecutive years, and its cumulative installed capacity has been the first in the world for three consecutive years.
  - 2017年我国新增光伏装机占全球比例超过50%
  - In 2017, China's newly installed PV power capacity accounted for more than 50% of the global total.
- 产业链建设能力不断提升 Enhanced production capacity of industry chain.
  - 2017年我国硅片、光伏电池和组件产量占全球总量均超过70%
  - In 2017, the production of China's silicon wafers, PV cells and modules accounted for more than 70% of the global total.
  - 单晶和多晶组件转换效率不断提升，每年增长约0.5个百分点
  - Efficiency of solar modules increases with around 0.5 percent annually.





一、光伏发展进入提质增效阶段

1.PV industry in China enters Quality Improvement Stage

（二）光伏发电发展目标和方向进一步明确

(2) Further clarified targets and directions of PV development

- 宏观目标 Long-term Targets
  - 加快推进绿色发展，构建清洁低碳、安全高效的能源体系
  - Accelerating the development of clean, low-carbon, safe and efficient energy system
- 发展重点 Focus
  - 从提高规模转为提质增效，全面推进技术进步和成本下降
  - From scale development to quality and efficiency improvement, comprehensively promoting technology improvement and cost reduction
- 近期发展目标 Recent Targets
  - 推进技术进步、产业升级，降低发电成本、减少补贴依赖，实现行业健康有序发展
  - Promoting the development and upgrade of technology, reducing the dependence on subsidies

二、领跑基地实施推进行业发展
2.Top-Runner project promotes PV industry development

- 领跑基地 PV Top-Runner project
  - ✓ 建设目标：技术进步、产业升级、提质降本
  - ✓ Targets: Technology development, industry upgrade, quality improvement and cost reduction
  - ✓ 实践过程：2015年起，三批次逐轮推动 Three batches from 2015

第一批：推动以基地形式提高技术能力，降低非技术成本

1st batch: promoting technology requirement; reducing the non-technology costs

第二批：提高技术要求，提出进一步促进成本降低的竞争方式

2nd batch: further raising requirements of technology; further cost reduction

第三批：分类并举，促进技术进步与成本降低

3rd batch: divided to application projects and technology projects; further tech. improvement and cost reduction





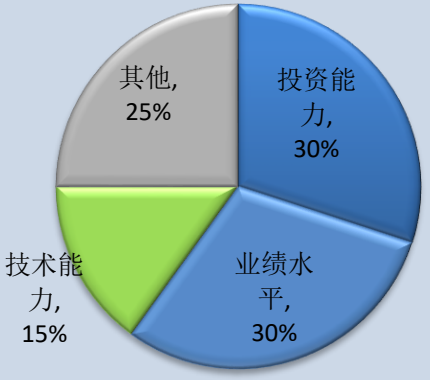
二、领跑基地实施推进行业发展

2.Top-Runner project promotes PV industry development

（一）领跑基地建设推进光伏发电技术进步

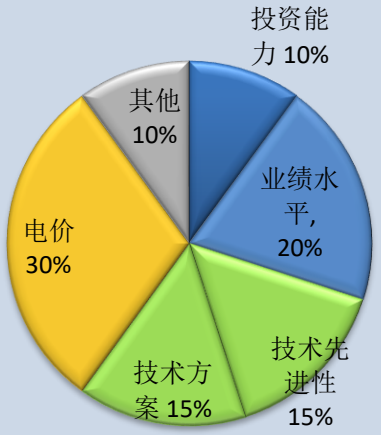
(1) Promotion on PV technology

- 第一批 1st batch：
  - 基地形式提高技术能力，技术能力分值占比15%
  - 15% for technology scores (Green part)
  - 技术指标要求达到“领跑者”指标（单晶17%、多晶16.5%）
  - Top-Runner standard of efficiency: 17% for mono-Si, 16.5% for poly-Si modules



第一批 1st batch

- 第二批 2nd batch：
  - 提高技术要求，鼓励使用前沿电池、提升技术方案先进性（技术能力及方案分值占比30%）
  - The use of cutting-edge cells and advanced technical solutions are encouraged (30% for technology related scores, green parts).
  - 组件转换效率平均值达到17.5%（入选企业申报值）
  - Average efficiency: 17.5% (proposed values by the selected companies).



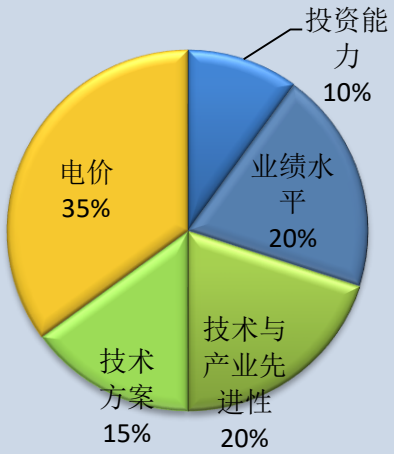
第二批 2nd batch



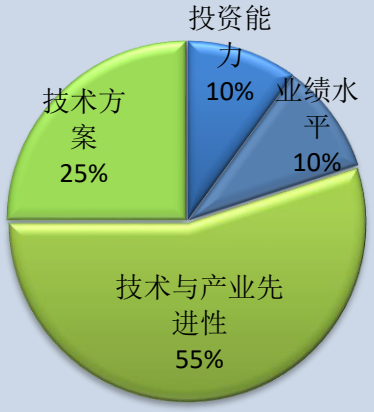


二、领跑基地实施推进行业发展
2.Top-Runner project promotes PV industry development

- 第三批 3rd batch：
  - 进一步提高技术要求，鼓励选择先进技术、优化系统方案
  - Technical requirements are further raised and advanced technologies and optimized system solutions are encouraged
  - 应用领跑基地技术与产业先进性及技术方案分值占比35%，技术基地技术与产业先进性和技术方案分值占80%
  - Application projects: 35% for technology related scores; Technology projects: 80% for technology related scores. (Green parts)



第三批应用基地
3rd application projects



第三批技术基地
3rd technology projects





二、领跑基地实施推进行业发展

2.Top-Runner project promotes PV industry development

- **第三批应用基地入选技术特点：**
- **Features of selected technical route of 3rd application projects**

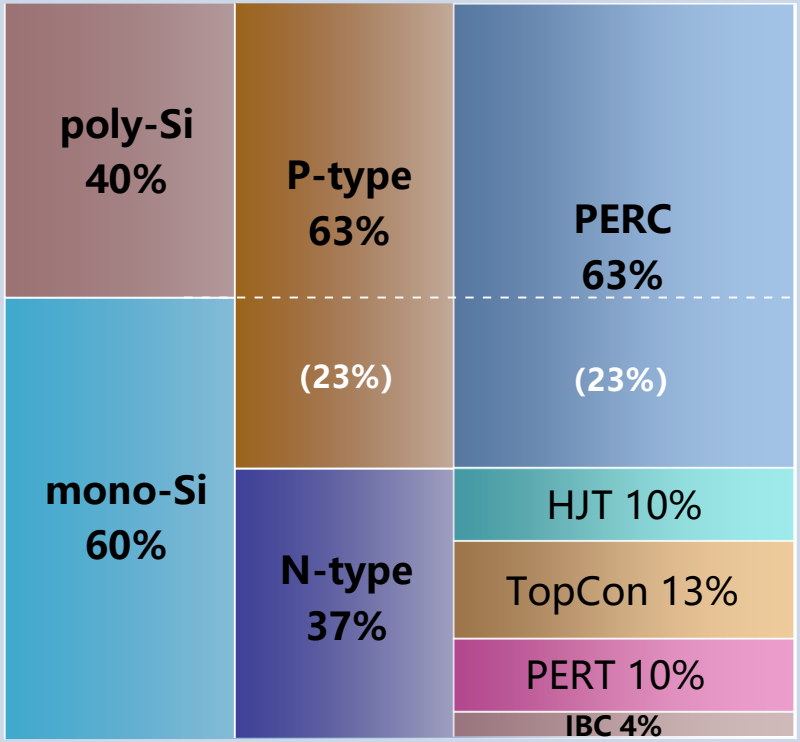
  - ✓ 入选企业承诺采用的组件转换效率平均值达到单晶18.9%、多晶18%
  - ✓ Proposed module efficiencies reach 18.9% for mono-Si and 18% for poly-Si
    - 相对于市场准入门槛单晶16.8%和多晶16%分别提升2.1个百分点和2个百分点
    - These values are 2.1% and 2% (absolute value) higher than the market requirements.
    - 相较于第一期和第二期领跑基地平均水平分别提升了1.8个百分点和1.2个百分点
    - Also 1.8% and 1.2% (absolute value) higher than the average values of 1st and 2nd batches
  - ✓ 单晶技术路线规模占比达到约85%
  - ✓ The use of mono-Si modules accounts for 85%
  - ✓ 申报采用双面组件规模占比达到约45%，双面组件逐渐成为光伏发电成本下降的重要技术手段之一
  - ✓ The use of bifacial modules accounts for 45%



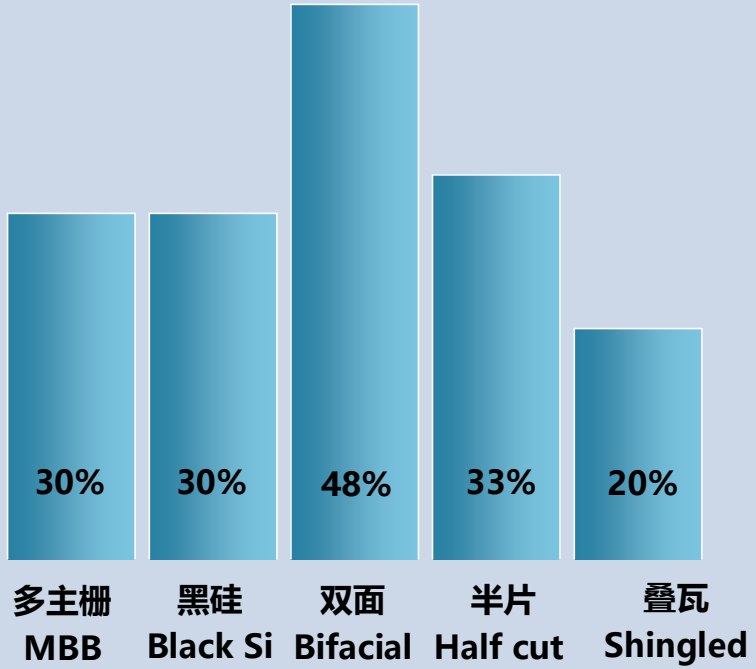


第三批技术基地申报技术路线特点
Features of applied technical routes of 3rd technology projects

主要技术路线占比图
Share of technical route



附加技术路线占比图
Share of additional technical route

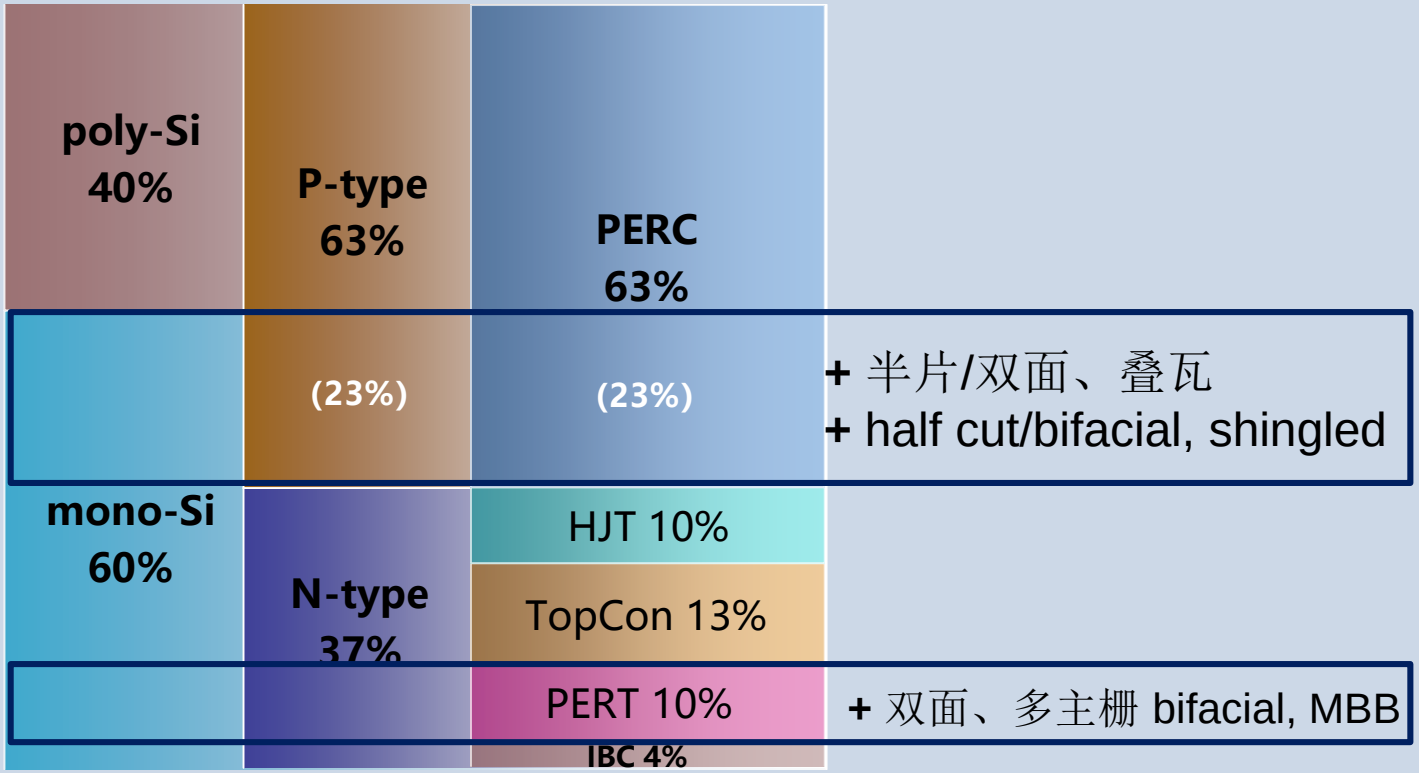


- ✓ 申报容量单晶占60%，多晶全部为P型材料 60% for mono-Si; poly-Si are all p-type
- ✓ P型全部采用PERC技术，N型路线多样 All the P-type cells use PERC; various route for N-type
- ✓ 约一半申报容量采用双面技术，其余各种技术采用比例各占总量约3成
- ✓ Half modules are bifacial; other additional technologies account for around 1/3 respectively

技术基地入选技术路线
Features of selected technical routes of 3rd technology projects

主要技术路线占比图

Share of technical route



入选项目
Selected Routes

4个项目
4 projects

2个项目
2 projects

- ✓ 入选企业承诺采用的组件平均转换效率达到单晶20.6%
- ✓ Average efficiency of selected routes reaches 20.6%
- ✓ 比本期应用领跑基地单晶产品的组件效率平均值还高出了1.7个百分点
- ✓ Efficiency is 1.7% (absolute value) higher than the average value of 3rd application projects

二、领跑基地实施推进行业发展
2.Top-Runner project promotes PV industry development





（二）领跑基地建设推进光伏发电成本下降

(2) Reduction of PV costs

- 第二批：7个基地（除奥运廊道）比届时标杆电价降幅为0.15-0.29元/kWh（平均0.21元/kWh），下降幅度15.3-36.3%（平均22.9%)

- 2nd batch: The electricity tariffs for the 7 bases (except the Olympic corridor) are 0.15-0.29 yuan/kWh (with an average of 0.21 yuan/kWh) lower and 15.3%-36.3% (with an average of 22.9%) lower.

二、领跑基地实施推进行业发展
2.Top-Runner project promotes PV industry development

- 第三批 3rd batch：
  - 10个应用基地入选主体平均电价较标杆电价降幅为0.198-0.295元/kWh（平均0.244元/kWh），下降幅度31.5-42.5%（平均36.6%）
  - The electricity tariffs for the 10 selected application bases are 0.198-0.295 yuan/kWh (with an average of 0.244 yuan/kWh) lower and 15.3%-42.5% (with an average of 36.6%) lower.
  - 格尔木基地最低入选电价低于当地燃煤标杆电价（0.325元/kWh）
  - Golmud Base has the lowest electricity tariff of 0.31 yuan/kWh, which is lower than the benchmark tariff for local coal-fired power plants (0.325 yuan/kWh).

基地名称 Base Name	所在地区标杆电价 Local Benchmark Tariff (Yuan/kWh)	入选电价情况统计 Tariff for Selected Base	
		最低电价（元/kWh） Lowest Tariff	平均电价（元/kWh） Average Tariff
1 大同二期 Datong Phase II	0.65	0.39	0.408
2 寿阳 Shouyang	0.75	0.44	0.466
3 渭南 Weinan	0.75	0.48	0.508
4 海兴 Haixing	0.75	0.44	0.455
5 白城 Baicheng	0.65	0.41	0.428
6 泗洪 Sihong	0.75	0.49	0.514
7 格尔木 Golmud	**0.55**	**0.31**	**0.316**
8 达拉特 Dalat	0.55	0.34	0.353
9 德令哈 Delingha	0.55	0.32	0.340
10宝应 Baoying	0.75	0.46	0.474





二、领跑基地实施推进行业发展
2.Top-Runner project promotes PV industry development

（三）第三批领跑基地优选成果及进展

Results and progress of 3rd batch Top-runner projects

- 加速技术跨越式发展和制造产业升级
- Accelerating technology development and industry upgrade

  - 自推动领跑基地以来，组件年转换效率提升值由每年0.5个百分点左右提升至每年1个百分点左右。
  - Inspired by the Top-Runner projects, the annual increase of conversion efficiency is improved from 0.5% per year to about 1% per year.

  - 单多晶市场占比持续调整。应用基地中单晶产品规模占比约85%、技术基地均采用单晶产品。
  - The market share of mono-Si and poly-Si continuously adjusted. In application projects, mono-Si module accounts for about 85%, in technology project, all the modules are mono-Si.

  - 新一代光伏制造企业迅速成长。在全球出货量长期名列前茅的大型制造企业之外，一批厂商快速崛起，在应用领跑基地供货意向中占据20%以上规模，并在技术基地中脱颖而出
  - A new generation of photovoltaic manufacturing companies is growing rapidly.





二、领跑基地实施推进行业发展
2.Top-Runner project promotes PV industry development

（三）第三批领跑基地优选成果及进展
Results and progress of 3rd batch Top-runner projects

- 通过竞争降低电价需求 Cost reduction by competition
  - 通过基地间竞争降低土地、电网接入等非光伏技术成本，其中土地较普通项目下降50%以上。
  - Competition among different bases reduces the non-technology costs. The costs of earth is 50% lower than the normal projects
  - 通过投资主体竞争，入选企业收紧收益预期，进一步降低电价需求。本期应用基地年度补贴需求仅为7亿元左右。
  - Competition among different companies reduces the power price. The subsidies of the application projects are only around 700 million.
- 10个应用基地在6月30日前陆续开工，目前白城基地、泗洪基地已实现部分容量并网，其余各基地建设工作也在有序进行中。
- All the 10 bases in application projects start the construction before June 30th. So far parts of the Bachen and Sihong bases have already connected to the grid. The construction of other bases are in progress.





三、领跑基地工作思路展望
3.Prospects

- 领跑基地工作目标与行业发展目标协同
- Top-Runner project has the same target as the industry development
  - 提质增效，降低成本
  - Improving quality and efficiency, reducing costs
- 技术进步与产业升级 Technology development and industry upgrade
  - 产品、系统 Product and system
- 保障措施 Guarantee
  - 客观准确体现成果 Objectively and accurate results
  - 全过程 The whole process





谢　谢!

Thank you for your attention!