海通国际电新2023年光伏近况梳理
上游价格下行利润加速传导，关注N型新技术
Upstream Price Decline and Profit Transmission Accelerated, Pay Attention to N-type New Technology

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光伏宏观：行业/出口景气度跟踪

中国： 1-4月我国光伏新增装机量48.31GW，同比增长186%

欧盟： 净零工业法案对我国光伏出口影响有限。

美国： 近期组件扣留趋势不断下降，被扣留组件逐步获释。

全球： 我们预计2023年全球新增光伏装机355GW，同比增长53%.

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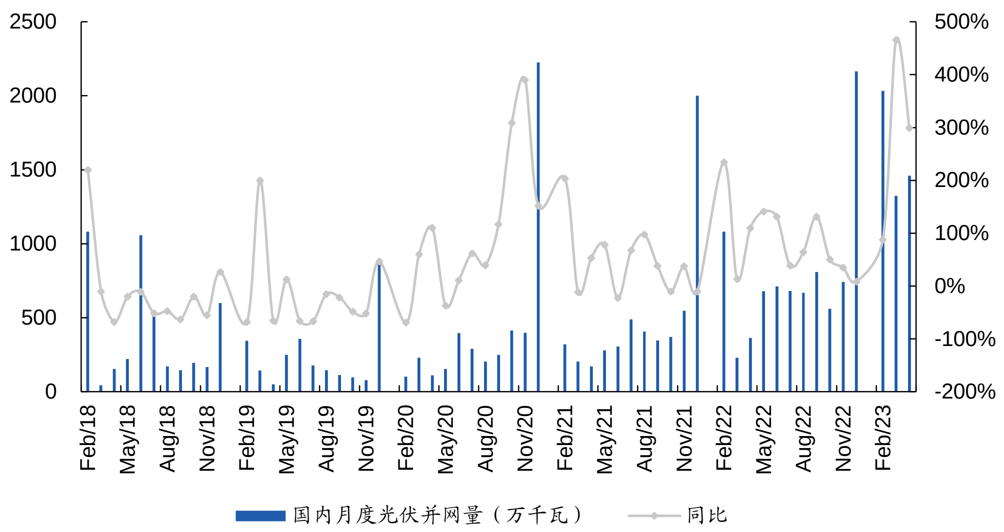
国内： 1-4月我国光伏新增装机量48.31GW，同比增长186%

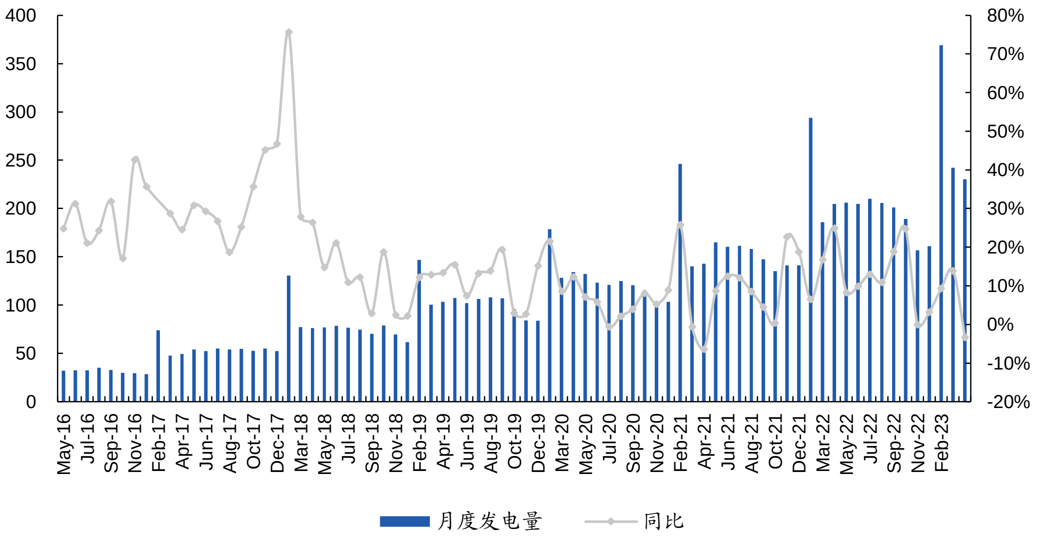
- 5月19日，国家能源局发布1-4月份全国电力工业统计数据，1-4月光伏新增装机48.31GW，较去年同期增长186%。今年4月新增光伏14.65GW。截至4月底，全国累计发电装机容量约26.5亿千瓦，同比增长9.7%。其中，风电装机容量约3.8亿千瓦，同比增长12.2%；太阳能发电约4.4亿千瓦，同比增长36.6%。
- 我们认为1-4月装机量高增速主要系年初组件价格下行，国内部分项目在满足回报率要求后随即启动，刺激了装机的高速增长。

图表： 1-4月我国光伏新增装机量48.31GW，同比增长186%



资料来源：国家能源局、HTI

图表： 4月光伏发电量230.9亿度，同比减少3.3%



资料来源：国家能源局、HTI

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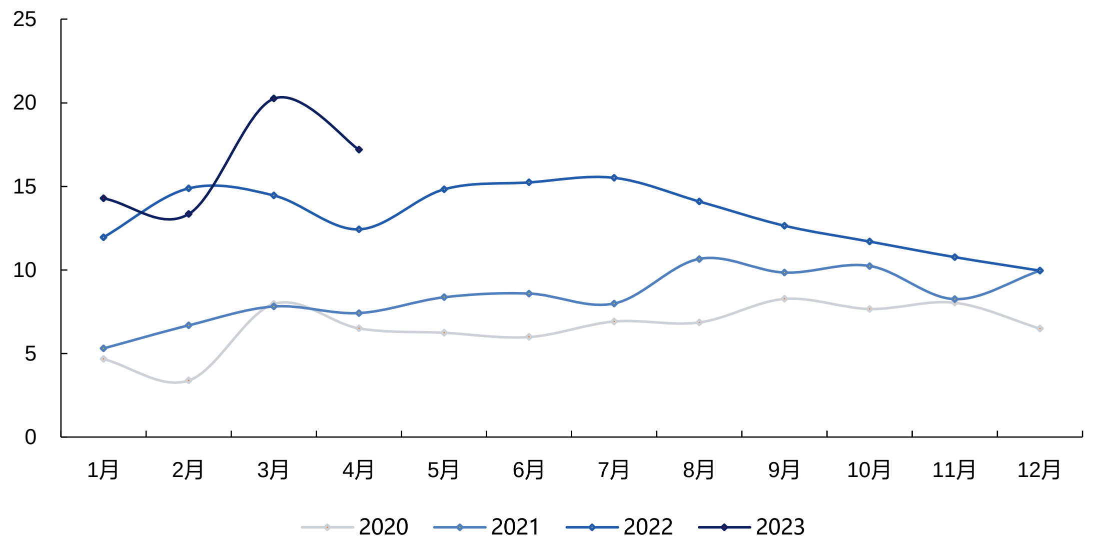
海外：1-4月组件累积出口69GW，同比+41%

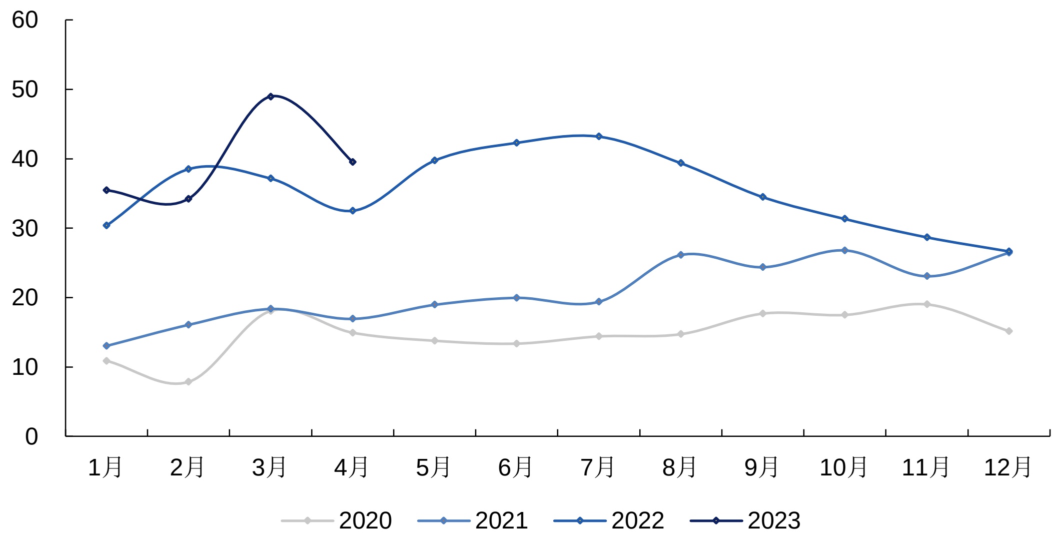
- PV InfoLink海关数据显示 ，4月份中国出口约18GW的组件，环比3月下降14.8%，同比增长约53%；1-4月组件累积出口69GW，同比+41%。
- 欧洲市场方面，欧洲4月进口10.6GW中国光伏组件，环比下降约15.2%，同比增长约36%。2023年欧洲累积进口光伏组件40GW，占中国组件出口的40%，为我国光伏组件最主要的海外市场。欧洲4月份组件进口环比下降，或许是因为欧洲当地消纳能力有限，受到库存影响而开始减少拉货。

图表：组件出口数量（单位：GW）



资料来源：盖锡咨询、海关总署、HTI

图表：组件出口金额（单位：亿美元）



资料来源：盖锡咨询、海关总署、HTI

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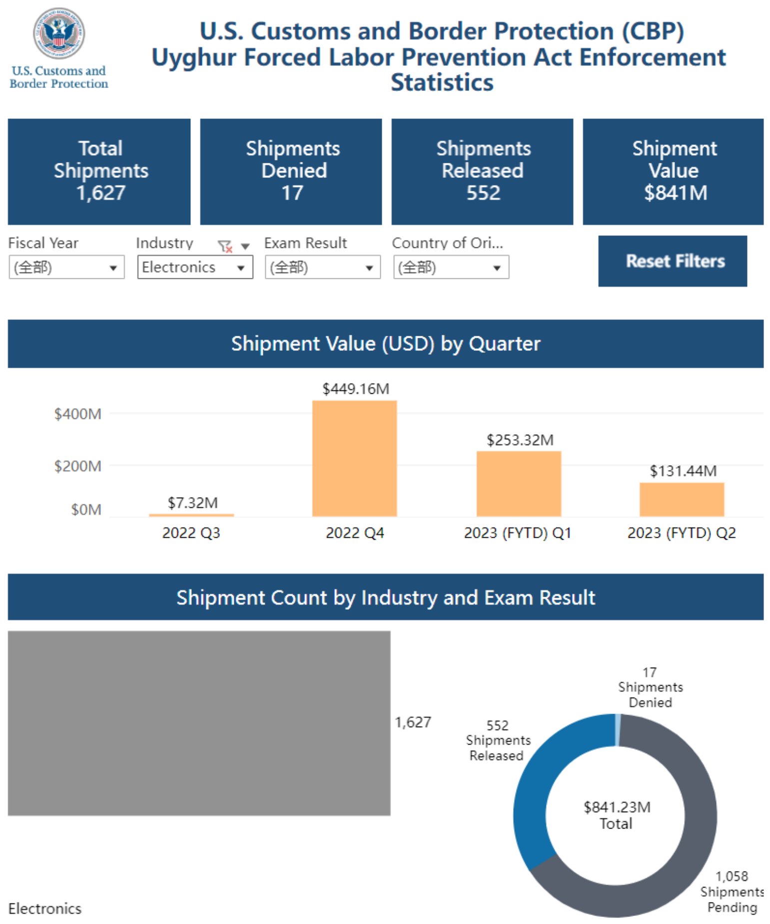
美国：组件扣留趋势不断下降，被扣留组件逐步获释

- 日前，美国海关和边境保护局（CBP）发布了与UFLPA有关的2022年扣留统计数据。去年被扣留的货物价值7.099亿美元，相当于2GW的组件。
- 美国组件扣留趋势不断下降，从2022Q3的约1300MW降至2022Q4的约700MW。根据最新数据，在2023年1-2月，有约410MW组件（价值1.34亿美元）被美国海关扣留。所有被扣留的产品中，约41%最终被放行， 但仍有58.2%的货物在等待CBP或进口商采取行动，只有0.8%的被扣货物被拒。
- 美国组件清关速度加快，被扣留组件逐步获释。根据 pv magazine，被美国扣押的数百个装载约 100MW 隆基太阳能组件的集装箱已被释放，天合光能绝大多数被扣押的光伏产品也已经释放完毕。
- 中国产品通关加速有望推动美国光伏项目建设。woodmac 指出 2023 年一线厂商的东南亚产能已全部订满，我们预计美国 2023 年装机有望达 40GW+，同增约100%。

图：所有被扣留的产品中，约41%最终被放行， 但仍有58.2%的货物在等待CBP或进口商采取行动，只有0.8%的被扣货物被拒。



资料来源：美国海关和边境保护局，HTI

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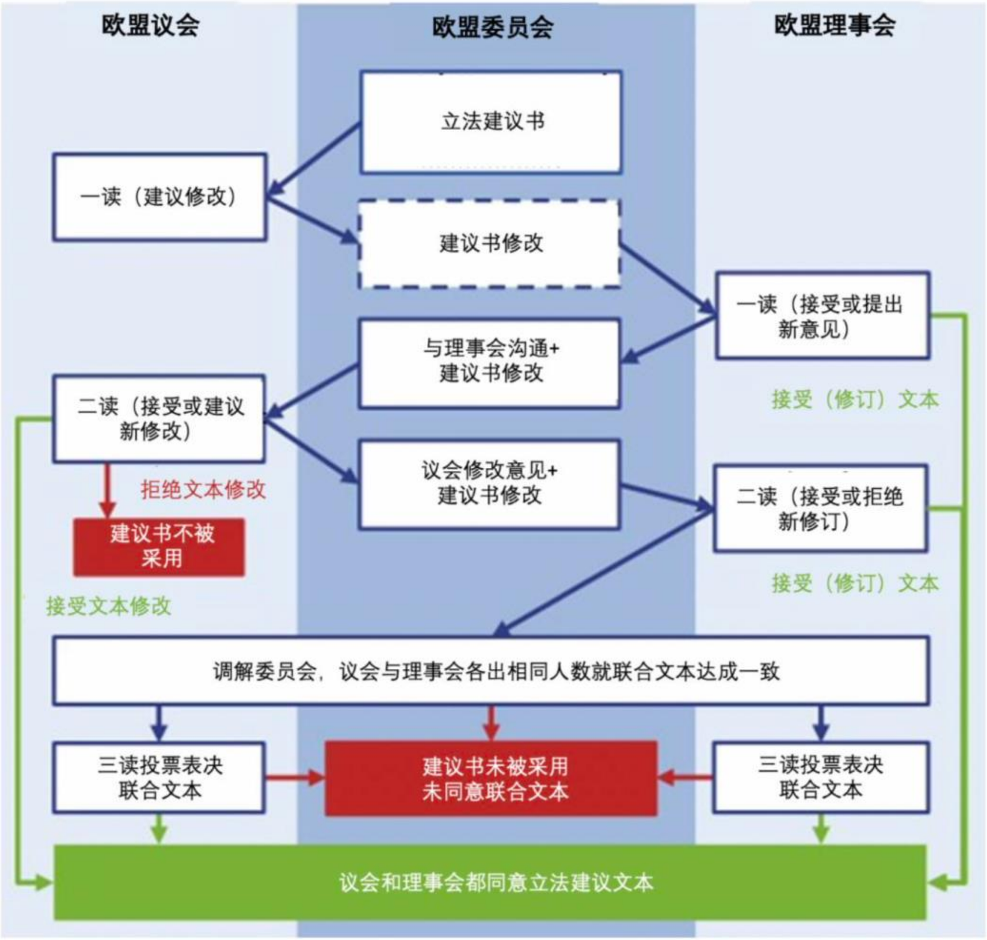
欧洲：净零工业法案对我国光伏制造业影响有限

- 净零工业法案对我国光伏制造业影响有限，主要系：
- 一、目前法案仍是提案阶段，离正式立法还需要很长时间。欧盟立法程序复杂漫长。当前欧盟仅发布《净零工业法案》的提案，后续还需经过多轮修改并投票，从提案到正式立法通常需要1至2年时间；
- 二、法案内容尚存较大争议：欧盟贸易委员会认为该法案可能违反WTO规则，同时提高绿色转型成本。除剑指中国外，法案反映出的欧盟绿色贸易保护主义也将波及美国、日本等盟友，预计将在立法阶段招致更多反对声音。
- 三、公共招标降级影响有限。有关单一国家供应份额超65%的相关产品在招标评级中将会被降级的问题，主要针对的是公共采购，目前占比较小
- 四、欧洲产学界对法案所能发挥作用比较悲观。分析认为，与美国《通胀削减法案》相比，欧盟的法案缺乏有力吸引净零产业本地投资的补贴细节，加之欧盟的能源价格高于美国，或将难以挽留相关企业“脱欧向美”的投资步伐。

图：欧盟委员会立法程序复杂且漫长



资料来源：欧盟委员会欧盟排放交易系统手册，HTI

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全球：预计2023年全球新增光伏装机355GW

- 由于组件价格下降以及2021年和2022年推迟的项目装机，我们预计今年中美欧光伏需求仍将维持较高增速。
- 我们预计2023年全球装机量355GW，同比增长53%；其中中国140GW，美国40GW，欧洲70GW，印度17GW，巴西15GW，其他73GW。

表：预计2023年全球新增光伏装机355GW

新增光伏装机量（GW）	2021	2022	2023E	2024E	2025E	CAGR
中国	55	87	140	175	200	38%
美国	27	20	40	43	46	14%
欧洲	26	41	70	82	96	39%
印度	12	14	17	25	28	24%
巴西	5	12	15	19	24	48%
其他	35	57	73	83	96	29%
合计	160	232	355	427	490	32%

资料来源：PVInfolink，CPIA，HTI

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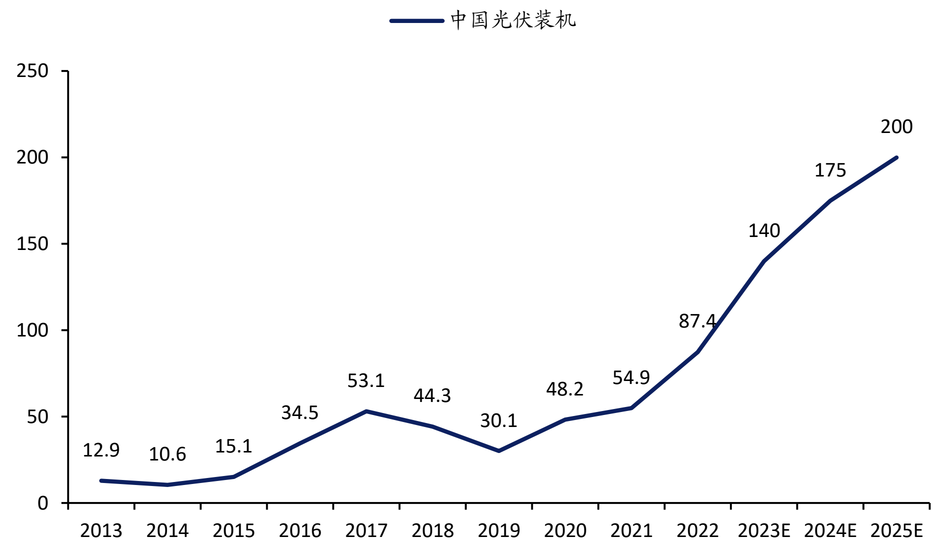
中国：预计2023年全球新增光伏装机140GW，同比+60%

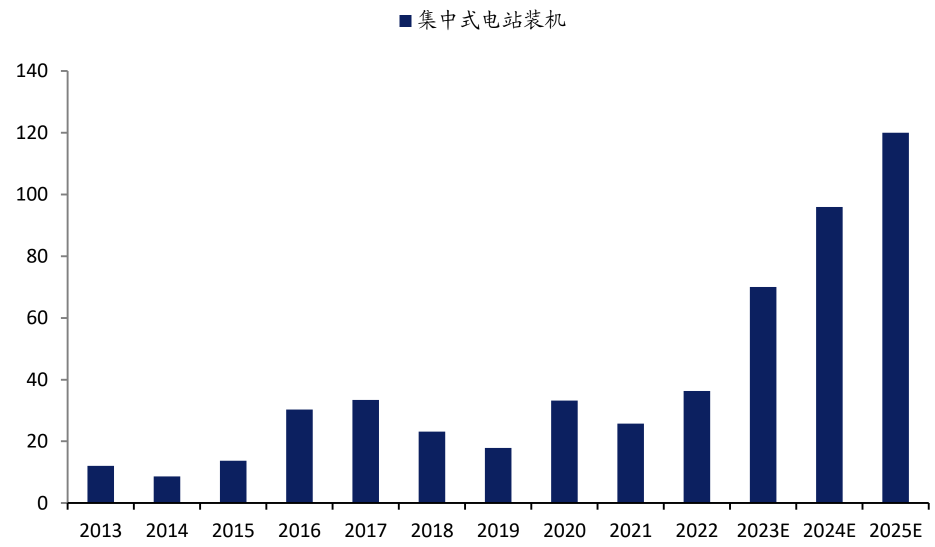
- 2022年国内需求87.4GW，2023年预计可达140GW+，同增约60%。
- 2023年硅料降价带动往年组件高价下积压的地面电站需求爆发，我们判断积压的需求将于在2023、2024年爆发。我们预计2023年地面电站需求70GW，同增约90%；分布式70GW，同增约35%，国内整体需求140GW以上，同增约60%。

图表：中国年度装机（GW)



资料来源：国家能源局、HTI

图表：中国年度集中式装机（GW)



资料来源：观研咨询、CPIA、国家能源局、HTI

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光伏近况梳理：产业链短期承压，关注N型新技术

PART 1 产业链短期承压，关注N型新技术

PART 2 关注标的

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Part1光伏产业链：产业链短期承压，关注N型新技术

硅料： N型硅料相对紧缺，NP价差有望拉大；

硅片： 5月高纯石英砂价格企稳，硅片双龙头共同降价；

光伏玻璃： 价格处于底部，二季度价格有望触底反弹，关注**福莱特玻璃。**

电池片/组件： N型技术百花齐放，TOPCon迅速落地；关注**Maxeon、爱旭股份**。

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产业链：产业链短期承压，关注N型新技术

- 硅料：5月份价格快速下行，连续四周跌幅超10%，目前已降至118，将提前触达100元支撑位
- 硅片：硅片价格在上月支撑力度仍然较强，整体排产有小幅富余，本月以中环为代表价格迎来快速调整，隆基随后也已快速跟进
- 电池：迅速扩产的产能背景下，同时伴随产业链上下游整体处在价格下行区间，价格有所下调。
- 组件：两极分化延续，一体化组件厂优势明显，专业化组件厂继续面临订单和利润都被挤压的风险。在整体降价趋势下，仍有下降空间。

图：光伏主材价格

2023年5月29日-6月4日 光伏产业链价格周报

PV infoLink国内价格	本周	上周	一月	三月	去年同期	年初至今
致密料	118	-9.23%	-30.59%	-48.70%	-54.44%	-37.89%
单晶182mm硅片	3.90	-6.02%	-33.22%	-37.30%	-42.48%	0.00%
单晶210mm硅片	5.75	-4.17%	-25.71%	-29.88%	-37.02%	15.00%
单晶182mm PERC电池片	0.89	-3.26%	-16.82%	-18.35%	-24.89%	11.25%
单晶210mm PERC电池片	0.98	-2.00%	-13.27%	-10.09%	-15.52%	22.50%
单面单晶182mmPERC组件	1.60	-1.84%	-5.88%	-8.57%	-17.10%	-12.57%
单面单晶210mmPERC组件	1.61	-2.42%	-5.85%	-8.00%	-16.58%	-12.02%
双面182mmTOPCon组件	1.72	-1.71%	-5.49%	-7.53%		
光伏玻璃3.2mm	26.00	0.00%	0.00%	1.96%	-8.77%	-1.89%
光伏玻璃2.0mm	18.50	0.00%	0.00%	0.00%	-15.91%	-5.13%
EnergyTrend 国内价格	**本周**	**上周**	**一月**	**三月**	**去年同期**	**年初至今**
单晶182mm硅片	3.70	-10.84%	-35.65%	-40.51%	-45.43%	-2.63%
单晶210mm硅片	5.90	-1.67%	-22.37%	-28.05%	-34.81%	18.00%
单面182/210mmPERC电池	0.90	-2.17%	-15.89%	-16.67%	-23.40%	12.50%
双面182/210mmPERC电池	0.98	0.00%	-13.27%	-9.26%	-16.24%	22.50%
光伏玻璃3.2mm	26.00	0.00%	0.00%	1.96%	-8.77%	-1.89%
光伏玻璃2.0mm	18.50	0.00%	0.00%	0.00%	-11.90%	-5.13%

资料来源：PVinfoLink，EnergyTrend, HTI

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硅料：N型硅料相对紧缺，NP硅料价差有望拉大。

- N型硅料的生产技术壁垒较高。随着TOPCon和异质结的放量，多晶硅的品质要求将由太阳能级产品逐渐向电子级产品趋近。目前N型硅料与P型硅料差价达2-4元/公斤，只有部分厂商（如通威、大全）具备量产N型硅料的能力。
- 预计N型硅料与P型硅料的价差将进一步扩大。随着TOPCon的放量，高品质料的需求大幅增加，中低效硅料富余程度加剧。而新增产能品质不及预期，这也可能导致高品质料价格相对坚挺，N型硅料与P型硅料的价格差距可能会继续加大。

图表：太阳能特级与电子一级多晶硅国家标准

	太阳能级多晶硅特级标准	电子级多晶硅电子1级标准
施主杂质浓度/109(ppba)	≤0.68	≤0.15
受主杂质浓度/109(ppba)	≤0.26	≤0.05
氧浓度/(atoms/cm3)	≤0.2 × 10^7	≤1X10^16
碳浓度/(atoms/cm3)	≤2.0 × 10^16	≤4.0 × 10^15
少数载流子寿命/μs	≥300	≥1000
基体金属杂质含量/(ng/g)	≤15	≤1.0
表面金属杂质含量/(ng/g)	≤30	≤5.5

资料来源：国家标准，HTI

图表：主要厂商N型硅料储备

公司名称	N型出货占比(%,22E)	N型产能储备
大全新能源	10%以下	新疆产能的60%-70%，内蒙产能100%
通威	10%-20%	全产能90%+
新特	10%	新疆产能的10%，预计23年技改达100%，包头产能100%

资料来源：各公司公告，HTI

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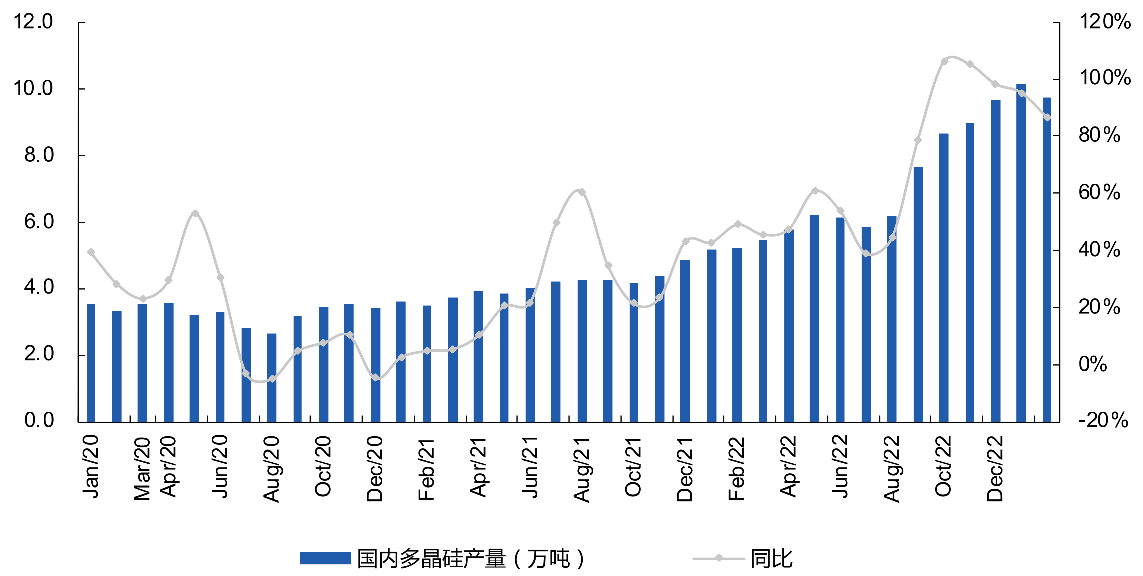
硅料：上半年供需偏紧，价格相对有所支撑

- 2023年1-5月多晶硅产量分别为10.14、9.76、10.5、11.05、11.56万吨。4月份，小幅增量主要来自协鑫颗粒硅、丽豪半导体等企业的产能增量释放以及个别检修维护企业的复产增量。5-6月将加速投产，1-5月多晶硅产量共计53.01万吨，同比增加90%，硅料供应非常充足。下半年随着新玩家投产放量，行业集中度将有所降低。
- 尽管Q2有少量新产能释放，但硅料厂仍需要3-6个月的产能爬坡及品质提升。在硅片环节高开工率的支撑下，硅料价格支撑力度较强。短期来看，4-5月份硅料和硅片企业开工率相对正常，且新增释放量较少，预计上半年硅料价格预计会小幅下跌。

图表：国内多晶硅月度产量（万吨）



资料来源：PVinfoLink，HTI

图表：主要厂商投产节奏表

序号	企业名称	项目	2023新增产能	投产时间预期
1	通威	乐山新产能三期	12	Q2-Q3
2	新特能源	新疆准东一期	10	Q2
3	东方希望	宁夏一期	12.5	Q1-Q2
4	大全	包头一期	10	Q2
5	保利协鑫	包头10万吨颗粒硅	7.8	H2
6	青海丽豪	年产10万吨多晶硅项目一期	5	Q3
7	晶诺	新疆胡杨河一、二期	5	H1
8	宝丰	甘肃酒泉	5	Q2-Q3
9	润阳	宁夏石嘴山	5	Q2
10	信义光能	云南曲靖	5	H2
11	合盛硅业	新疆乌鲁木齐一期、二期	20	H1
12	内蒙东立	年产4.8万吨多晶硅项目	4.8	H2
13	弘元绿能	内蒙古包头10万高纯晶硅项目	5	Q2
14	天宏瑞科	8万吨电子级粒状多晶硅	8	H2
15	准东其亚	年产40万吨多晶硅项目	5	H2
	合计		120.1	——

资料来源：各公司公告，HTI

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硅片：高纯石英砂价格逐渐维持高位企稳状态

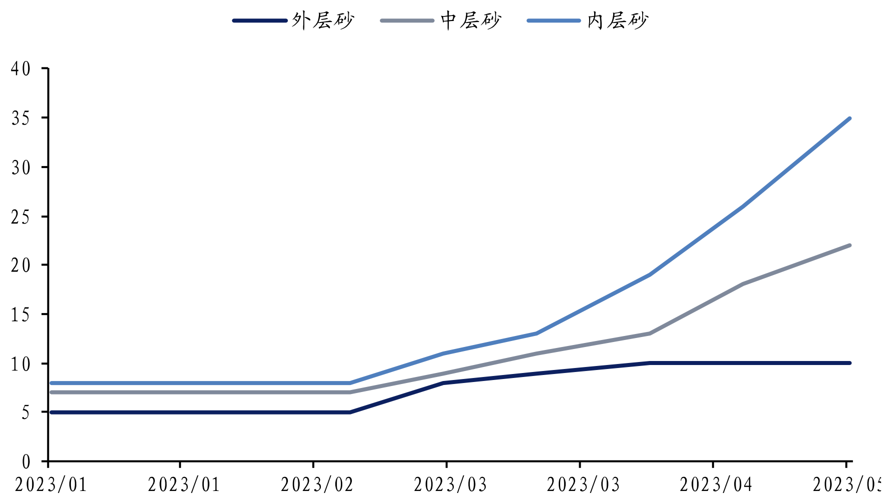
- N型渗透率的提升将增加石英砂的单耗。N型硅片的坩埚单耗比P型硅片高33%左右。TOPCon使用的N型硅片对纯度要求更高，因此需要更频繁地更换坩埚：同样的坩埚，N型硅片的使用寿命会比后者P型硅片的使用时间约为100小时，相当于单耗增加33%。
- 高纯石英砂价格有望维持涨势。有色金属网数据显示，截至5月28日，高纯石英砂（石英坩埚外层用）价格区间为7-12万元/吨，今年年初外层砂价格约为5万元/吨；高纯石英砂（石英坩埚中层用）价格为19-23万元/吨，年初中层砂价格为6-7万元/吨。目前内层砂价格为34万元/吨至37万元/吨，较4月价格涨势趋稳。

图表：N-P型硅片耗用坩埚数差别

	N型硅片	P型硅片
坩埚利用小时数（h）	300	400
坩埚生产需要的石英坩埚单耗（只/月）	2.4	1.8

资料来源：PVinfoLink，HTI

图表：高纯石英砂单价（万元/吨）



资料来源：石英股份公告，HTI

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硅片：2023-2024年高纯石英砂紧俏延续，扩产消息短期影响有限

海通國際 HAITONG

- 我们预计2023-2024年高纯石英砂供需将处于紧平衡状态，内层砂由于生产壁垒较高，可能会出现一定缺口。我们预计2023年石英砂可供给9.8万吨，整体石英砂供给紧平衡，进口内层砂供给维持偏紧态势。
- 进口高纯砂供应紧张，国产砂占比提升。石英砂主要用作单晶拉直过程中用的坩埚，坩埚一般分内中外三层，业内普遍配比为内中外3：4：3。进口砂纯度较高，主要用作内层直接接触炉料，对单晶棒的品质影响较大；目前国产砂品质仍较低，只能用作中外层。现由于内层进口砂供给偏紧，同时海外高纯石英砂厂商扩产意愿较低，内层的配比有降低的趋势。
- 4月底西比科宣布2亿美元扩产计划，但考虑到实际新增产能落地远需时日，短期内极端短缺逻辑仍将维持。

表：石英砂需求测算

石英砂需求	2021	2022	2023E	2024E
装机(GW）	160	230	360	450
硅片产量(GW）	192	276	432	540
单GW需单晶炉（台）	80	80	80	80
单炉坩埚需求（个/年）	24	24	26	26
单个坩埚重量(kg）	85	85	85	85
石英砂单耗（kg/kg）	1.25	1.25	1.25	1.25
单GW石英砂需求（吨）	204	204	221	221
光伏石英砂总需求（万吨）	3.9	5.6	9.5	11.9
内层砂需求（万吨）	1.2	1.7	2.9	3.6
外层砂需求（万吨）	2.7	3.9	6.7	8.4

资料来源：公司公告、石英股份、欧晶科技、Solarzoom、HTI

表：石英砂供给测算

		2021	2022	2023E	2024E
进口砂	美国尤尼明	1.3	1.3	1.5	1.7
	挪威TQC	1.1	1.2	1.2	1.2
	石英股份				0.5
内层砂合计		2.4	2.5	2.7	3.4
国产砂	石英股份	2	3.6	5.5	9
	菲利华			0.6	1.5
	其他	0.8	0.9	1	1.2
外层砂合计		2.8	4.5	7.1	11.7
总供应量		5.2	7	9.8	15.1
内层砂供需缺口		1.2	0.8	-0.2	-0.2
外层砂供需缺口		0.1	0.6	0.4	3.3

资料来源：公司公告、石英股份、欧晶科技、Solarzoom、HTI

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电池：技术百花齐放，TOPCon率先落地

➢ 当前市场PERC电池平均量产转化效率约23.5%，已逼近效率极限，光伏电池主流技术将逐步由P型转为N型。而N型电池效率提升潜力大、投资成本不断降低，本轮光伏技术变革将由P型电池转向N型电池。TOPCon电池当前量产效率已达25%以上，在N型电池中量产性价比最高。

图表：各主要电池片技术路线比较

	PERC	TOPCon	HJT	IBC
平均效率	23.5%以上	24.8%以上	25%以上	25%以上
主要企业	主流厂商	捷泰、隆基、晶澳、天合、通威	华晟、金刚、日升	SUNPOWER、爱旭、隆基
优势	性价比高	性价比高	工序少、电池参数好	效率高
量产	非常成熟	已逐步量产	成本较高，量产难度较大	量产难度大，只适合分布式场景
技术难度	容易	已具备量产条件	难度高	难度高
投资设备	便宜	较便宜	较贵	较贵
与现有产线兼容性	当前主流产线	兼容	完全不兼容	不兼容

资料来源：各公司公告，HTI

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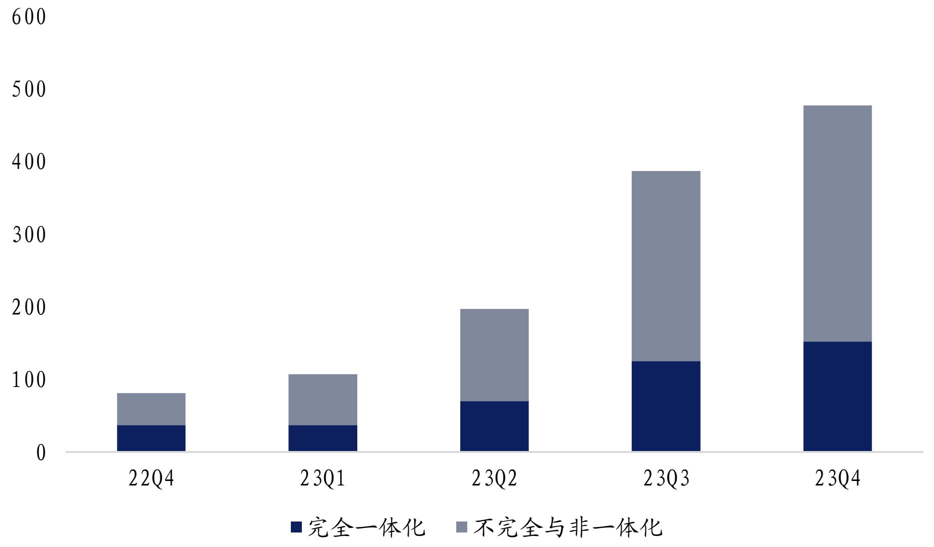
电池：技术百花齐放，TOPCon率先落地

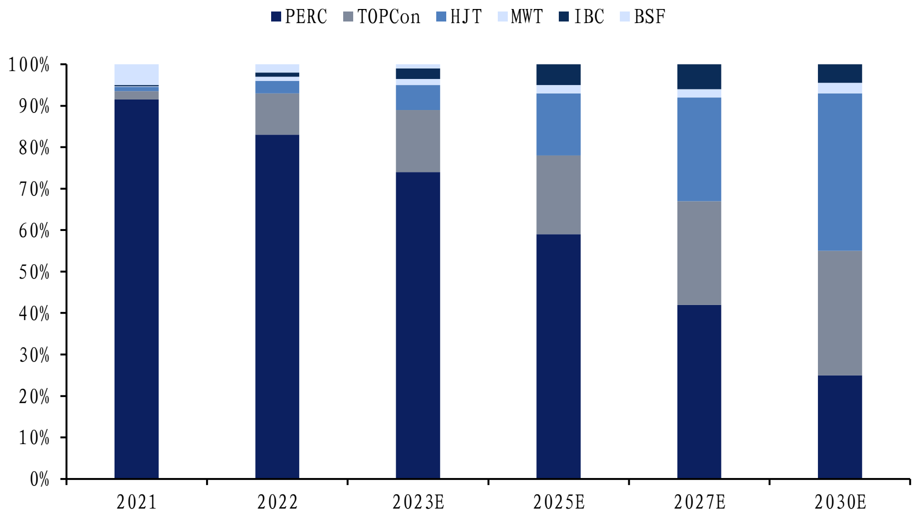
- 2023年N型技术百花齐放，TOPCon产能率先落地。预计2023年Topcon市占率有望达30%，对应全年125GW+的TOPCon出货量。2022年下半年N型电池片产能陆续释放，根据CPIA，2022年底N型电池片占比合计达到约9.1%，其中TOPCon电池片占比约8.3%，HJT电池片占比约0.6%，XBC电池片占比约0.2%。
- 在N型产能有限以及PN价差存在的背景下，预计今年PERC仍是市场主流，但Topcon电池渗透率会加速，我们预计2023年Topcon市占率有望达30%，对应全年125GW+的TOPCon出货量。从产能释放的节奏来看， 新增TOPCon 产能较集中在23Q3释放，上半年TOPCon电池片相对紧缺。

图表：TOPCon产能预估（GW）（完全一体化：硅片产能≥电池产能）



资料来源：InfoLink技术趋势调研报告，HTI

图表：2022-2030E各型光伏电池市场占有率（%）



资料来源：CPIA、HTI

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电池：HPBC/ABC凭高效率、高美观度有望抢占高端分布式市场

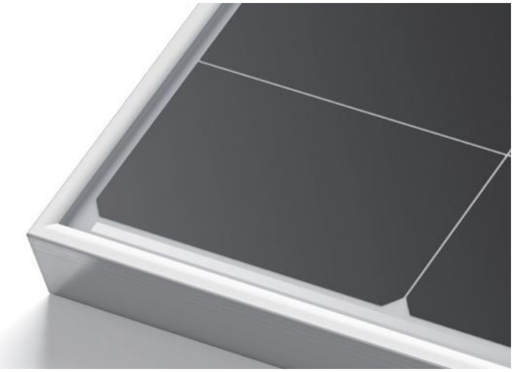
- XBC电池：2023年开启规模化量产。XBC电池具有转换效率高的特点，但生产工序较为繁琐、良率提升难、整体成本较高，早期以海外企业小规模产能为主；XBC电池具有正面无栅线无遮挡、美观、转换效率高的优点。
- 隆基HPBC降本及效率超预期。2022年11月3日，隆基发布基于HPBC技术的HiMO6产品，使用成本更低的P型硅片同时达到N型效率，量产电池效率为25.0%-25.3%，超过市场预期的24.5%。同时浆料使用银+铝浆，非硅成本更低。
- 爱旭ABC效率行业领先，有望赚取高端市场的溢价。爱旭ABC电池量产效率为26.5%，高于其他技术路线，浆料已做到无银化；但ABC电池单GW投资设备成本更高，拉高电池整体生产成本。ABC采用全黑设计，外观更美观，适用各种分布式场景，凭借其高效率的优势，有望赚取高端市场的溢价。

图表：HPBC及ABC产能产量（GW）

产能		2021	2022E	2023E
隆基绿能	HPBC	0	10	34
爱旭股份	ABC	0.3	6.5	6.5
产量		**2021**	**2022E**	**2023E**
隆基绿能	HPBC	0	2.0	20.0
爱旭股份	ABC	0	0.8	6.0

资料来源：各公司公告，HTI

图：新型技术路线对比



BC电池组件

PERC电池组件

资料来源：隆基绿能官网，HTI

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玻璃：双龙头引领扩产，光伏玻璃产能预警，龙头恒强

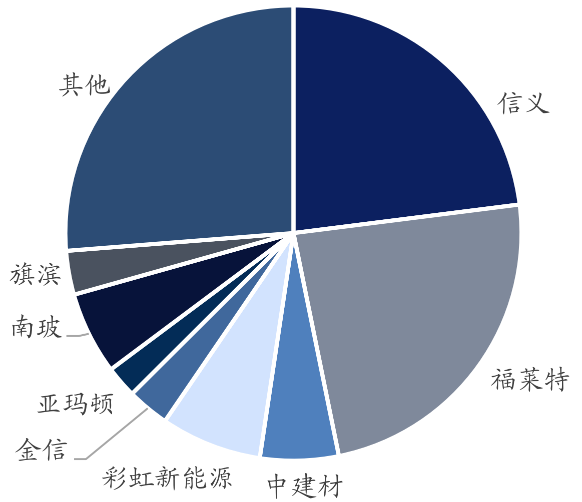
- 信义+福莱特双龙头格局稳固，产能加码强者恒强。产能方面2022年底信义福莱特均超2万吨/日，2022年主要扩产厂商为福莱特、信义两大龙头，2023年产能持续扩张，信义新增产能预计超1.72万吨/日，福莱特新增预计1.2万吨/日，二三线厂商也在不断扩产，新进入者旗滨2023年产能或超1万吨/日，新进厂商产能扩张迅速
- 工信部、国家发改委发布《关于进一步做好光伏压延玻璃产能风险预警的有关通知》，随后多省跟随发布本省光伏玻璃生产线预警信息处理意见，涉及光伏玻璃产能合计为26150t/d，其中近9000t/d产能收到风险预警。目前产能审批环节影响凸显明显，行业集中度变化有待继续观察，龙头扩张势头恐有所放缓。

图表：双寡头2023年新产能统计

企业	地区	2023年新增产能	2023Q1	2023Q2E	2023Q3E	2023Q4E
信义光能	芜湖	9000		3000	3000	3000
	张家港	1000	1000			
	曲靖	2400				2400
	北海	4800		1200	1200	2400
福莱特	南通	4800		2400	2400	
	滁州	7200	1200	2400	1200	2400
合计		29200	2200	9000	7800	10200

数据来源：InfoLink Consulting，集邦咨询，SMM，HTI

图：2022年光伏玻璃行业竞争格局（按产能，日/吨）



数据来源：隆众资讯，卓创资讯，各公司公告，HTI

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玻璃：双玻趋势明确，随地面电站起量加速渗透，玻璃需求高增

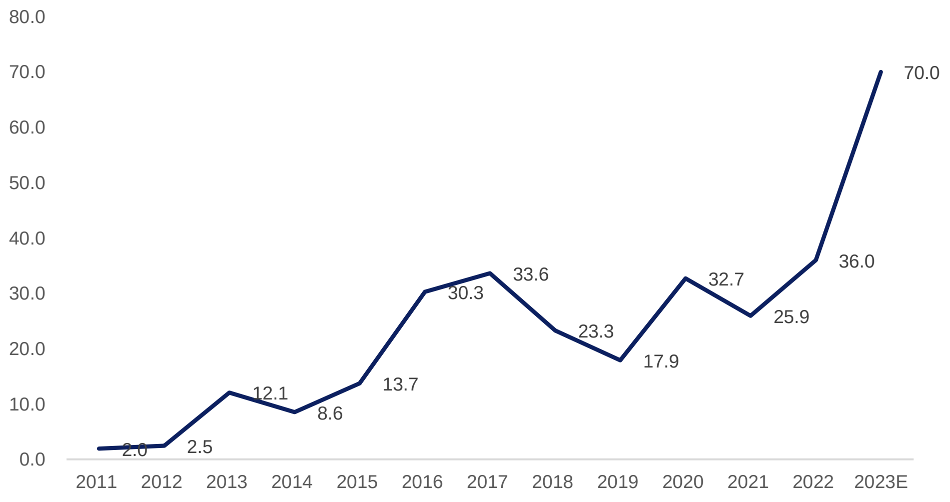
- 双面双玻组件趋势明确，随地面电站需求起量渗透率稳步提升：2021年龙头福莱特双玻渗透率达50%左右，较2020年提升约20pct。2023年随着硅料降价，组件价格下行，地面需求快速释放叠加2023年风光大基地一、二期项目并网，地面电站需求快速起量，2023年我们预计地面装机达70GW+，地面电站中双玻渗透率将进一步提升，长期看我们认为渗透率到2030年将达到70%，双玻渗透率的提升将加大对玻璃的需求。

图表：风光大基地一、二期并网节点

项目类型	2022年投产（GW）	2023年投产（GW）	2024年投产（GW）
光伏第一批	27	32	
风电第一批	18	20	
光伏第二批		84	36
风电第二批		56	24
光伏合计	27	116	36
风电合计	18	76	24
总合计	45	192	60

数据来源：国家能源局、智汇光伏，HTI

图：国内集中式光伏装机数据及预测（GW）



数据来源：国家能源局、智汇光伏，HTI

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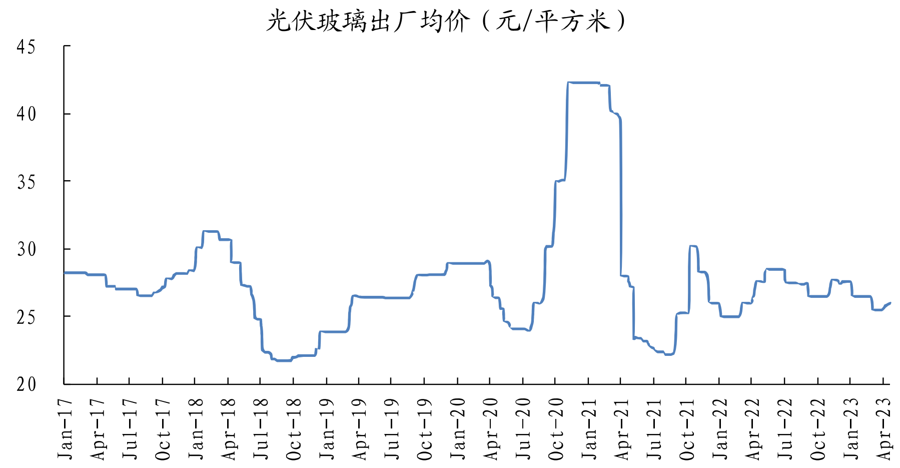
玻璃：二季度光伏玻璃价格有望触底反弹

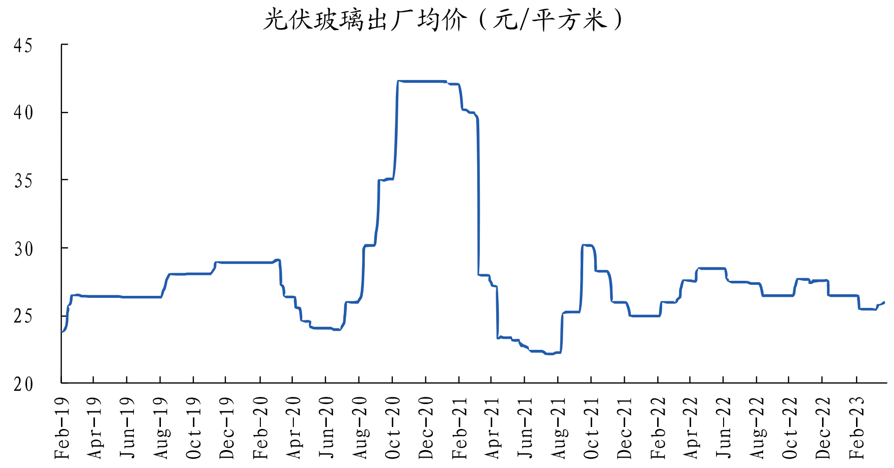
- 2022Q4，受抢装影响，光伏远月到期合约跌破1500元每吨，价格下行利好有望传导至公司成本端，下半年带来更大成本压缩，提玻璃需求量迅速增长，玻璃企业去库较多，成交量迅速爬升，价格从而走高。
- 2023Q1，光伏玻璃表现较弱，供应稍有过剩，而自3月开始，组件排产情况得到较大提升，光伏玻璃需求量迅速提升。
- 展望2023Q2，预计受组件排产持续走高的影响，对玻璃的需求将进一步提高，而2023Q2光伏玻璃产量增速预计不及需求端增速，光伏玻璃供需平衡表现稍紧缺。我们认为在成本及需求的支撑下，预计2023Q2光伏玻璃的价格将有望触底反弹。
- 目前纯碱价格大幅下行，升毛利空间。

图：光伏玻璃3.2mm价格（元/平）更新



数据来源：卓创资讯，HTI

图：光伏玻璃原片出厂价格（元/平）更新



数据来源：卓创资讯，HTI

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组件：头部厂商今年TOPCon出货均已超1/3

- 据统计，TOPCon龙头目前TOPCon产能达到35GW;晶澳科技邢台、扬州、曲靖、石家庄等基地已规划70GW产能；隆基绿能预计后续西咸合计投产34GW。头部电池、组件厂商2023年TOPCon出货量占比均不低于1/3。
- 目前头部TOPCon电池、组件厂商扩产较快，且产能落地确定性较强。我们以钧达股份为例，对TOPCon超额利润提升之后的业绩弹性进行测算。预计2023年钧达TOPCon出货20GW,单瓦盈利每提升0.01元/W,公司业绩有望增厚2亿元，对应业绩弹性9.7%。

表：头部组件厂商2023年TOPCon出货情况

公司	电池技术	新技术电池出货	预计出货占比
TOPCon龙头	TOPCon	40GW+	60%-70%
晶澳科技	TOPCon	20GW+	30%
天合光能	TOPCon	20GW+	30%
隆基绿能	HPBC+TOPCon	20GW+	25%-30%
钧达股份	TOPCon	20GW	60%-70%
通威股份	TOPCon	9GW	13%

资料来源：各公司公告，HTI

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组件：TOPCon渗透提升，下游采购欲望强烈

- 2022年央国企组件招标中N型占比仍然较低，N型招标比例在15%以下。2023年以来，N型占比显著提升。国家电投启动5.65GW组件+逆变器招标，其中N型组件招标占比达到1/3；中核汇能启动6GW组件招标，其中N型组件2.5GW，占比40%+，表明下游客户对TOPCon组件接受度显著提高。
- 我们认为，TOPCon组件经过一年的市场培育期，目前下游客户已充分认知到其在降低度电成本上的优势。我们认为未来几年TOPCon组件将逐步对取代PERC的市场份额。预计2023年TOPCon组件需求有望达到120GW，市占率有望达到30%及以上。

表：2022年部分央国企招标中N型占比（单位：GW）

公司	招标日期	总规模	N型规模	N型占比
国家电投	2022年1月	4.5	0.2	4%
中核汇能	2022年2月	6.5-7	1	10%-15%
大唐集团	2022年8月	5.6	0.78	14%
中电建	2022年12月	26	1	4%

资料来源：索比光伏网，HTI

表：2023年至今部分央国企招标中N型占比（单位：GW）

公司	招标日期	总规模	N型规模	N型占比
国家电投	2023年2月	5.65	1.8	32%
中核汇能	2023年2月	6	2.5	42%

资料来源：索比光伏网，HTI

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Part2 推荐标的

福莱特玻璃： 成长迅速的光伏玻璃龙二玩家，关注市占率提升与毛利修复

Maxeon： 美国本土光伏组件厂，小而美的特色玩家

爱旭股份： 全球电池片龙头，ABC产能建设按步推进

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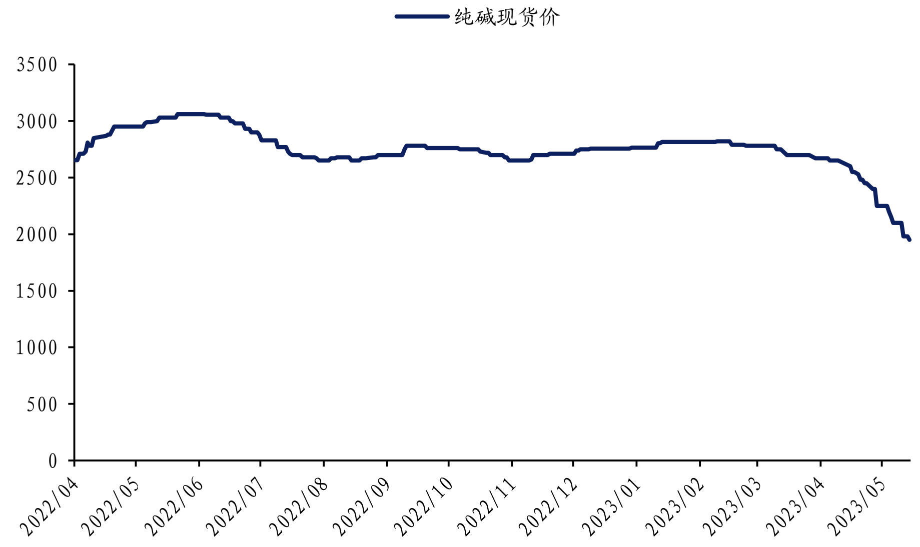
福莱特玻璃：成长迅速的光伏玻璃龙二，关注市占率提升与毛利修复

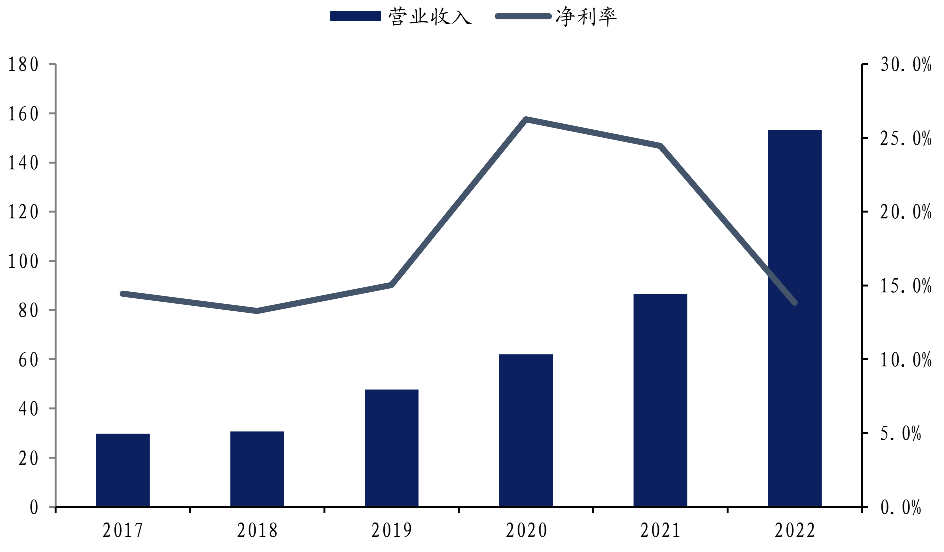
- 今年以来光伏玻璃价格长期维持稳定，较主材环节变化相对较小。**3.2毫米玻璃维持26元/平，2.0毫米维持18.5元/平。2022**年天然气与纯碱双双价格高企，玻璃企业普遍盈利承压，今年以来天然气价格已从高位大幅回落，同时纯碱由于上游化工企业产能规划大幅扩张，远月期货合约已经大幅反应市场预期，随着新增产能逐渐投产，将在成本端极大利好玻璃企业。
- 政策端产能扩张控制普遍受限，行业总产能扩张节奏趋缓将在产业大幅放量背景下提升环节议价能力。上月下旬，工信部、国家发改委联合发布通知限制行业大幅扩产，产能错配将使玻璃价格维持相对高位。公司目前市占率不到**30%**，略低于龙一水平，后续展望将向**35%**提升。二季度公司盈利水平与现金流将迎来明显改善。

图：国内纯碱现货价格（元/吨）



资料来源：Wind, HTI

图：2017-2022福莱特玻璃营收净利率



资料来源：公司公告，HTI

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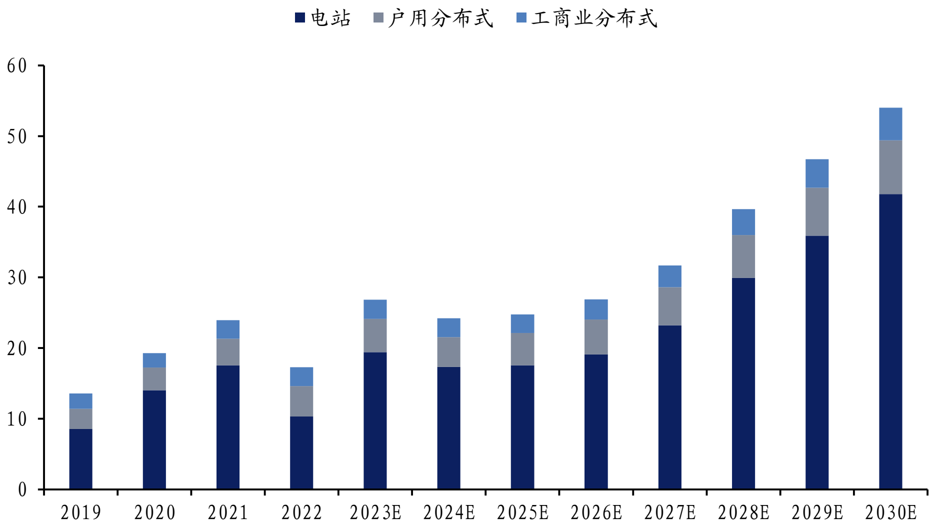
MAXN：IBC技术的发明者和行业龙头，有望受益于IRA法案

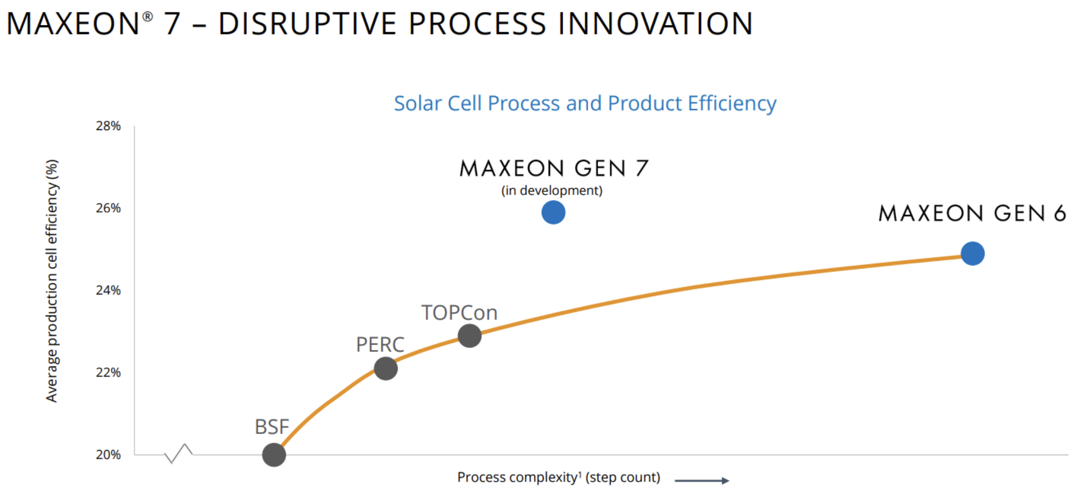
- MAXN是IBC电池技术的发明者和行业龙头，同时也是叠瓦组件的行业龙头。
- 美国公布了IRA法案的细则，MAXN有望收益。IRA税收抵免需要满足：美国本土价值量占比超40%（2023-2025年占比逐年提升至45%/50%/55%）。据目前的指导，我们认为 FSLR和MAXN在美国制造组件更可能满足IRA的要求。对于仅在美国组装组件的供应商（例如阿特斯），我们认为很难满足IRA的要求。
- MAXN宣布了749万股普通股的增发，每股价格为28.00美元。Maxeon预计将从发行中获得约1.574亿美元的总收益。这些收益将用于资助Maxeon 7 IBC 500兆瓦的扩产。我们相信增加的IBC产能将在未来为公司带来可观的利润。

图：美国按用途光伏装机量预测



资料来源：Wood Mackenzie，HTI

图：MAXN IBC产品的演进



资料来源：公司公告，HTI

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MAXN组件出货将受惠于美国ITC政策更新+PTC政策重启

- **ITC政策：ITC是为太阳能、小型风电设备、地热。汽轮发电机提供税收抵免的政策，就是将新能源、储能等能源投资额抵免一定比例的增值税。2022年8月IRA法案正式通过，对ITC的补贴退坡时间点延后了10年，基础抵免比例提升到了30%，并首次纳入了独立储能，大幅利好新能源+储能投资。**
- **PTC政策：PTC是生产税收抵免，对于发电运营商而言直接提供电价补贴，对于光伏上游设备制造商而言，PTC新增加了先进制造业生产税收抵免（45X）和先进能源抵免（45C），企业只能选择其一。**

表：美国ITC政策对储能抵税情况

政策	类型	2022	2023	2024	2025-2032	2033	2034
IRA更新前	工商业/电站级别	26%	22%	10%	10%	10%	10%
IRA更新后	户用	26%	22%	-	-	-	-
IRA更新前	工商业/电站级别	30%	30%	30%	30%	26%	22%
IRA更新后	户用	30%	30%	30%	30%	26%	22%

表：美国PTC政策对光伏电站的基础抵免情况（美分/kWh）

光伏电站类别	政策	2021	2022-2032
1MW以上	原政策	0.9	0
	IRA新政策	0.3	0.3
1MW以内+符合条件的1MW以上	原政策	0.9	0
	IRA新政策	1.5	1.5

资料来源：SEIA，HTI

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爱旭股份：全球电池片龙头，ABC产能建设按步推进

- 公司具有成本+品牌+渠道优势，是全球一体化组件龙头。
- 1)产能：加码ABC产能建设，ABC系统有望迅速放量。目前ABC组件规划产能达25GW，在手订单充沛，产品供不应求
- 2)产品：ABC组件凭借高转换效率、外观优势等优点，有望抢占高端分布式光伏场景高地。转换效率方面，目前ABC电池转换效率高达26.5%，明年的目标是27%以上。成本方面，公司的目标是24年中前单瓦成本和PERC打平
- 3)渠道：依靠赛能数字能源和与华为的合作，公司将扩展业务边界，以ABC技术为核心，商业模式向营销与渠道端延伸。

图：爱旭“黑洞”系列ABC组件

资料来源：各公司公告，HTI

图：公司组件量产效率位于TaiyangNews Top Modules List的榜首位置

TAIYANGNEWS ALL ABOUT SOLAR POWER

TaiyangNews Solar Facts: Highest Efficient Commercial Solar Modules 03-2023

Rank	Company	Series	Model	Wafer type	Cell Size	Cells No.	Cell Tech	Module Technology	Power (W)	Efficiency (%)
1	Aikosolar	ABC White hole	AIKO-A610-MAH72Mw	n-type	182	144	ABC	Halfcell, Back Contact	610	23.6
2	LONGi	Hi-MO 6	LR5-72HTH-590M	-	182	144	HPBC	Halfcell, Backcontact	590	22.8
2	Maxeon	Maxeon 6	SPR-MAX6-440-E3-AC	n-type	-	66	IBC	Halfcell, Back Contact	440	22.8
4	JinKO	Tiger Neo	JKM585N-72HL4-V	n-type	-	144	TOPCon	Halfcell, MBB	585	22.65
5	HUASUN	Himalaya	HS-210-B132	n-type	210	132	HJT	Bifacial, Halfcell, MBB	700	22.53
5	中来股份	Niwa Light	JW-HT108N	n-type	182	108	TOPCon	Halfcell, MBB	440	22.53
7	Canadian Solar	HiHero	CS6R-440H-AG	n-type	182	108	HJT	Halfcell, MBB	440	22.5
8	ASTRONERGY	Astro N5	CHSM78N(DG)/F-BH	n-type	182	156	TOPCon	Bifacial, halfcell, MBB	625	22.4
8	JA SOLAR	DeepBlue 4.0	JAM78D40 600-625/GB	n-type	182	156	TOPCon	Bifacial, Halfcell, MBB	625	22.4
8	TW Solar	-	TH405-430TMBG 54ZDDF	n-type	-	108 (2x54)	TOPCon	Bifacial, Shingle	430	22.4
11	Canadian Solar	TOPBiHiKu6	CS6W-575TB-AG	n-type	182	144	TOPCon	Bifacial, Halfcell, MBB	575	22.3
11	SPIC	ANDROMEDA 2.0	SPICN6(LAR)-66/IH	n-type	166	132	IBC	Halfcell, MBB	440	22.3
11	REC	Alpha Pure-R	RECxxxAA Pure-R	n-type	210	80	HJT	Halfcell, SWCT	430	22.3
14	Akcome	Ak iPower	SKA611HDGDC	n-type	210	132	HJT	Bifacial, halfcell, MBB	690	22.22
15	DASOLAR	DAON	DAS-DH144NA	n-type	182	144	TOPCon	Bifacial, halfcell, MBB	570	22.1
16	某光电公司	Aurora Pro	EG-685NT66-HU/BF-DG	n-type	210	132	TOPCon	Bifacial, halfcell, MBB	685	22.05
17	Qcells	Q.TRON	Q.TRON BLK-G1+	n-type	-	120	TOPCon	Halfcell, MBB, Zero Gap	395	22

资料来源： TaiyangNews，HTI

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估值对比

表:覆盖公司估值

代码	公司	收盘价 (港股HKD，A股RMB)	市值 (港股HKD，A股RMB)	EPS （元/股）			PE （倍）		
代码	公司			2022	2023E	2024E	2022	2023E	2024E
0836.HK	华润电力	18.26	878.39	1.46	2.22	2.54	11	7	7
0916.HK	龙源电力	8.60	1385.15	0.61	0.90	1.13	15	10	8
2380.HK	中国电力	3.22	398.32	0.21	0.33	0.50	14	10	7
1133.HK	哈尔滨电气	3.35	57.17	0.06	0.31	0.62	48	11	6
1072.HK	东方电气	11.20	628.62	0.92	1.24	1.52	13	8	7
1193.HK	华润燃气	28.35	656.02	2.09	2.47	2.82	12	11	8
2688.HK	新奥能源	109.30	1236.30	5.20	7.54	8.70	16	13	12
2208.HK	金风科技	6.17	260.7	0.56	0.80	0.99	20	14	11
603606.CH	东方电缆	53.50	367.9	2.6	3.04	3.73	17	14	12
002074.CH	国轩高科	28.77	511.78	0.18	0.88	1.22	157	31	22
300750.CH	宁德时代	240.00	10551.10	12.58	18.16	25.62	31	20	15
300438.CH	鹏辉能源	52.18	240.70	1.36	2.87	4.02	38	18	13
300014.CH	亿纬锂能	69.06	1412.78	1.72	3.44	5.21	38	19	13
0175.HK	吉利汽车	9.47	952.40	0.51	0.55	1.00	20	16	9
600732.CH	爱旭股份	30.74	400	1.79	2.72	3.41	17	11	9
FSLR.US	First Solar	212.8	227	-0.41	5.95	10.03	n.a.	36	21
MAXN.US	Maxeon	28.56	14.58	-6.54	-0.39	-0.36	n.m.	n.m.	n.m.

资料来源：wind，HTI

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APPENDIX 1

上游价格下行利润加速传导，关注N型新技术。国内：1-4月我国光伏新增装机量48.31GW，同比增长186%，海外:1-4月组件累积出口69GW，同比+41%。美国:组件扣留趋势不断下降，被扣留组件逐步获释。欧洲:净零工业法案对我国光伏制造业影响有限。全球:预计2023年全球新增光伏装机355GW。中国:预计2023年全球新增光伏装机140GW，同比+60%。

光伏产业链:产业链短期承压，关注N型新技术。硅料: N型硅料相对紧缺，NP价差有望拉大;硅片:5月高纯石英砂价格企稳，硅片双龙 头共同降价;光伏玻璃:价格处于底部，二季度价格有望触底反弹; 推荐福莱特玻璃; 电池片/组件:N型技术百花齐放，TOPCon迅速 落地; 以及Maxeon、爱旭股份。

电池:HPBC/ABC凭高效率、高美观度有望抢占高端分布式市场。玻璃:双龙头引领扩产，光伏玻璃产能预警，龙头恒强。玻璃:双玻趋势明确，随地面电站起量加速渗透，玻璃需求高增。组件:头部厂商今年TOPCon出货均已超1/3，TOPCon渗透提升，下游采购欲望强烈。

APPENDIX 1

Upstream prices are down and profit transmission is accelerating, and attention should be paid to N-type new technologies. Domestic: From January to April, my country's newly installed photovoltaic capacity was 48.31GW, a year-on-year increase of 186%.

Overseas: from January to April, the cumulative export of modules was 69GW, a year-on-year increase of +41%. United States: The trend of component detention is declining, and detained components are gradually released. Europe: The net zero industry bill has limited impact on my country's photovoltaic manufacturing industry. Global: It is estimated that 355GW of new photovoltaic installed capacity will be added globally in 2023. China: It is estimated that in 2023, the world will add 140GW of new photovoltaic installed capacity, +60% year-on-year.

Photovoltaic industry chain: The industry chain is under short-term pressure, and attention should be paid to N-type new technologies. Silicon material: N-type silicon material is relatively scarce, and the NP price gap is expected to widen; Silicon wafer: The price of high-purity quartz sand stabilized in May, and the price of silicon wafer double-leaders jointly cut; Photovoltaic glass: The price is at the bottom, and the price is expected to bottom out in the second quarter; to focus on Flat Glass; cells/modules: N-type technologies are in full bloom, and TOPCon quickly landed; to focus on Maxeon and Aixu.

Battery: HPBC/ABC is expected to seize the high-end distributed market due to its high efficiency and high aesthetics. Glass: Shuangtao leads the expansion of production, photovoltaic glass production capacity warning, and the leader is Hengqiang. Glass: The trend of double glass is clear, and the penetration of ground power stations is accelerating, and the demand for glass is increasing. Components: Leading manufacturers have shipped more than 1/3 of TOPCon this year. The penetration of TOPCon has increased, and the desire for downstream purchases is strong.

APPENDIX 2

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分析师股票评级
优于大市，未来12-18个月内预期相对基准指数涨幅在10%以上，基准定义如下
中性，未来12-18个月内预期相对基准指数变化不大，基准定义如下。根据FINRA/NYSE的评级分布规则，我们会将中性评级划入持有这一类别。
弱于大市，未来12-18个月内预期相对基准指数跌幅在10%以上，基准定义如下
各地股票基准指数：日本 – TOPIX, 韩国 – KOSPI, 台湾 – TAIEX, 印度 – Nifty100, 美国 – SP500; 其他所有中国概念股 – MSCI China.

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Analyst Stock Ratings
Outperform: The stock’s total return over the next 12-18 months is expected to exceed the return of its relevant broad market benchmark, as indicated below.
Neutral: The stock’s total return over the next 12-18 months is expected to be in line with the return of its relevant broad market benchmark, as indicated below. For purposes only of FINRA/NYSE ratings distribution rules, our Neutral rating falls into a hold rating category.
Underperform: The stock’s total return over the next 12-18 months is expected to be below the return of its relevant broad market benchmark, as indicated below.
Benchmarks for each stock’s listed region are as follows: Japan – TOPIX, Korea – KOSPI, Taiwan – TAIEX, India – Nifty100, US – SP500; for all other China-concept stocks – MSCI China.

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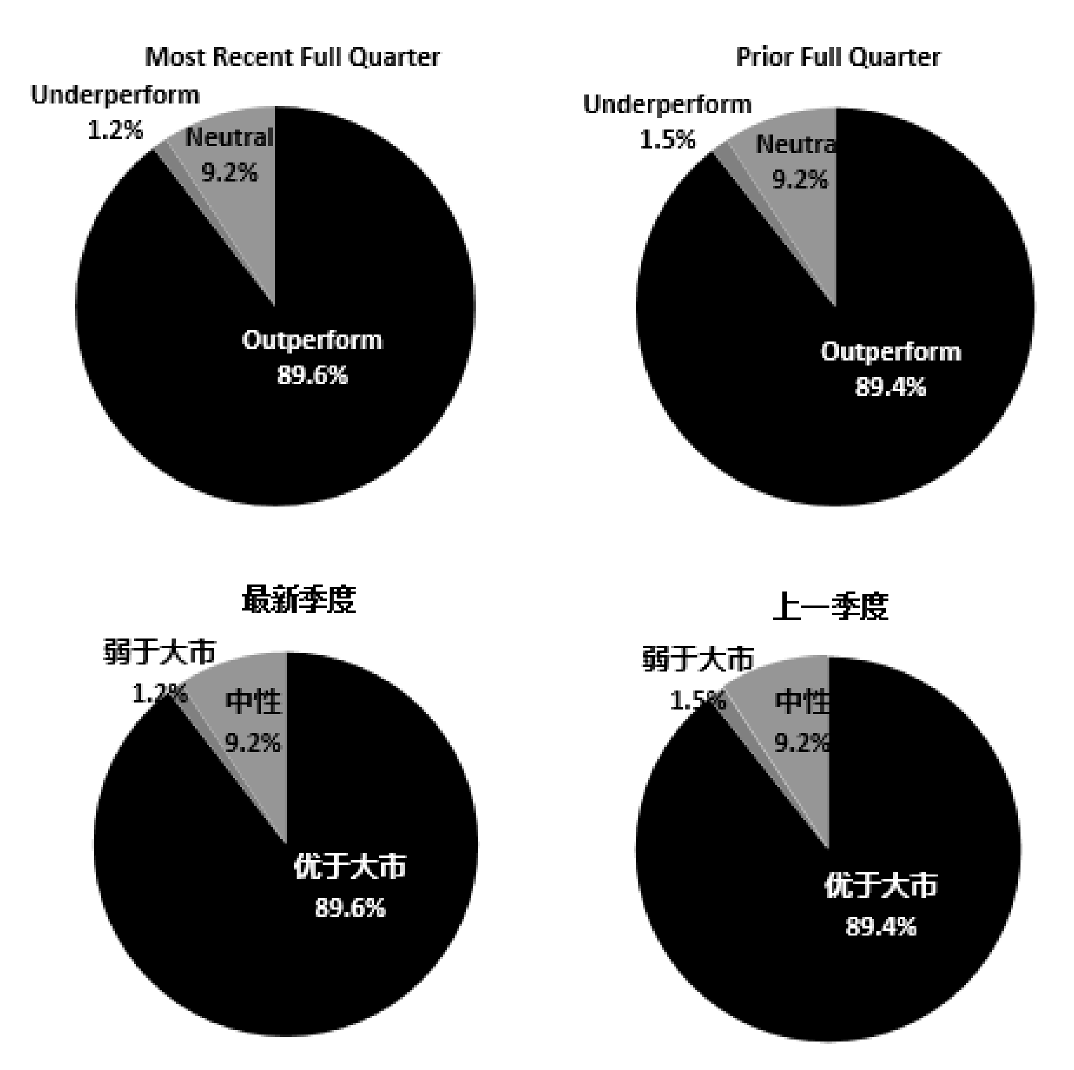
评级分布Rating Distribution



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截至2023年3月31日海通国际股票研究评级分布

	优于大市	中性 (持有)	弱于大市
海通国际股票研究覆盖率	89.6%	9.2%	1.2%
投资银行客户*	5.2%	6.4%	9.5%

*在每个评级类别里投资银行客户所占的百分比。
上述分布中的买入，中性和卖出分别对应我们当前优于大市，中性和落后大市评级。
只有根据FINRA/NYSE的评级分布规则，我们才将中性评级划入持有这一类别。请注意在上表中不包含非评级的股票。

此前的评级系统定义（直至2020年6月30日）：
买入，未来12-18个月内预期相对基准指数涨幅在10%以上，基准定义如下
中性，未来12-18个月内预期相对基准指数变化不大，基准定义如下。根据FINRA/NYSE的评级分布规则，我们会将中性评级划入持有这一类别。
卖出，未来12-18个月内预期相对基准指数跌幅在10%以上，基准定义如下
各地股票基准指数：日本 – TOPIX, 韩国 – KOSPI, 台湾 – TAIEX, 印度 – Nifty100; 其他所有中国概念股 – MSCI China.

Haitong International Equity Research Ratings Distribution, as of Mar 31, 2023

	Outperform	Neutral (hold)	Underperform
HTI Equity Research Coverage	89.6%	9.2%	1.2%
IB clients*	5.2%	6.4%	9.5%

*Percentage of investment banking clients in each rating category.
BUY, Neutral, and SELL in the above distribution correspond to our current ratings of Outperform, Neutral, and Underperform.
For purposes only of FINRA/NYSE ratings distribution rules, our Neutral rating falls into a hold rating category. Please note that stocks with an NR designation are not included in the table above.

Previous rating system definitions (until 30 Jun 2020):
BUY: The stock’s total return over the next 12-18 months is expected to exceed the return of its relevant broad market benchmark, as indicated below.
NEUTRAL: The stock’s total return over the next 12-18 months is expected to be in line with the return of its relevant broad market benchmark, as indicated below. For purposes only of FINRA/NYSE ratings distribution rules, our Neutral rating falls into a hold rating category.
SELL: The stock’s total return over the next 12-18 months is expected to be below the return of its relevant broad market benchmark, as indicated below.
Benchmarks for each stock’s listed region are as follows: Japan – TOPIX, Korea – KOSPI, Taiwan – TAIEX, India – Nifty100; for all other China-concept stocks – MSCI China.

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Recommendation Chart

1. 1 Mar 2023 OUTPERFORM at 36.59 target 52.0.
2. 20 Mar 2023 OUTPERFORM at 32.8 target 52.0.

我们的目标价52元，基于2023年22倍PE

风险：竞争加剧、原材料价格上涨或政策弱于预期。

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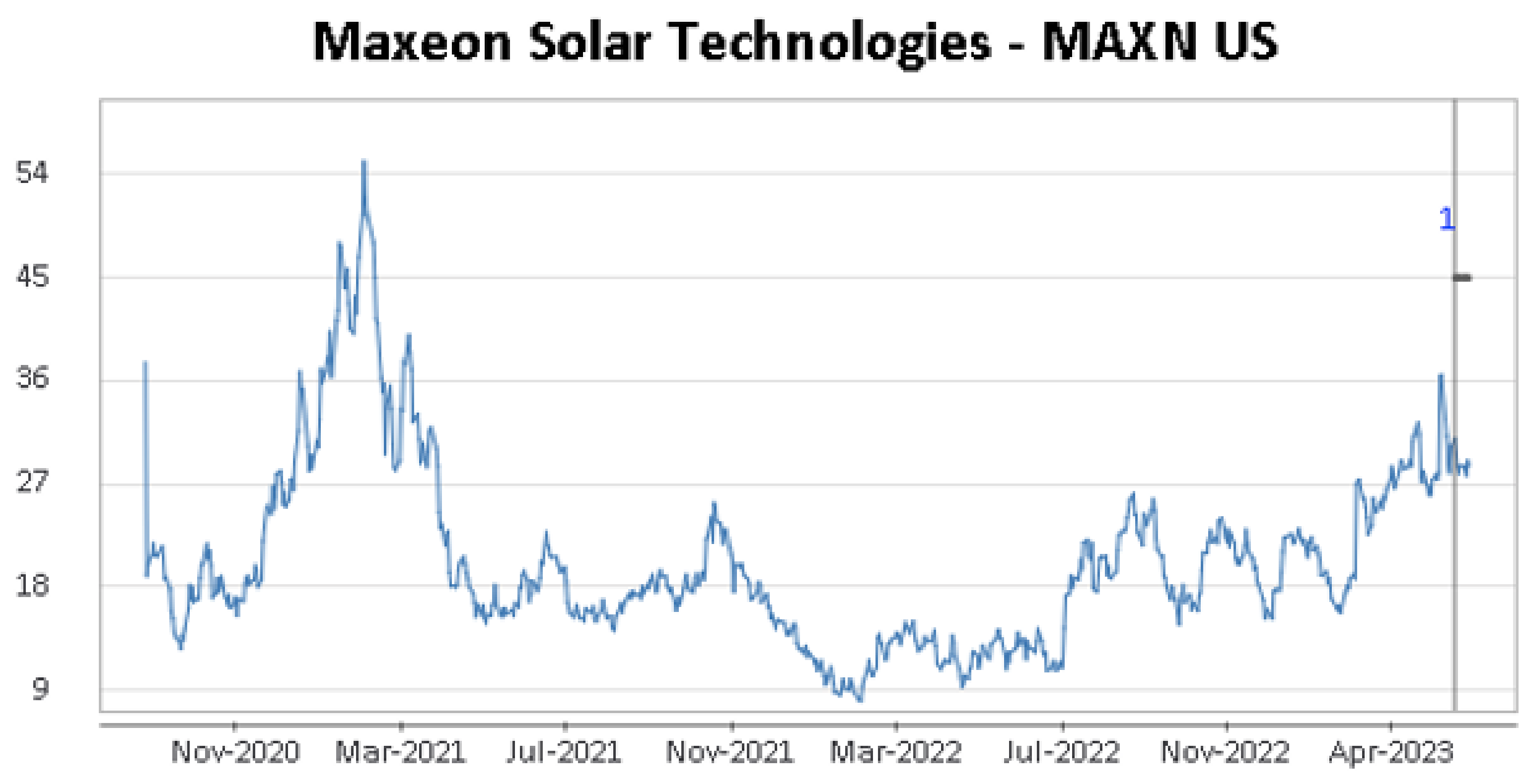
Recommendation Chart



1. 22 May 2023 OUTPERFORM at 28.02 target 45.0.

Source: Company data Bloomberg, HTI estimates

我们的目标价基于适用于 2023 财年的 25 倍 EV/EBITDA 倍数;

风险: 平均售价低于预期; 光伏需求不及预期; 原材料价格高于预期。

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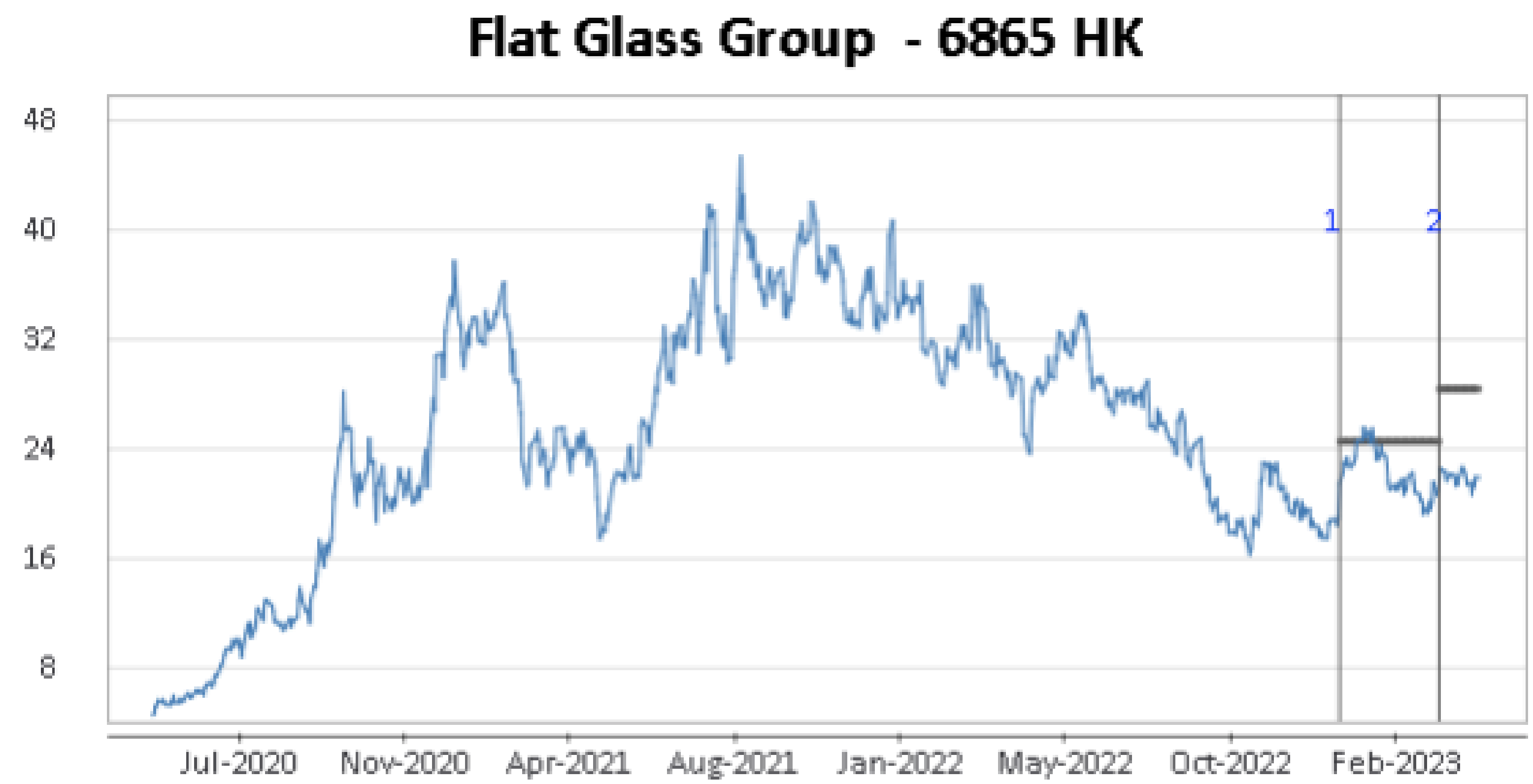

1. 8 Jan 2023 OUTPERFORM at 21.55 target 24.59.
2. 29 Mar 2023 OUTPERFORM at 21.1 target 28.43.

Source: Company data Bloomberg, HTI estimates

28.4 港元的目标价，基于 DCF模型（WACC 为 10.5%，没有永续增长）

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