

Presentation: 光伏行业研究方法 Research Methods in the PV Industry

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01

新能源行业的供需矛盾与周期性

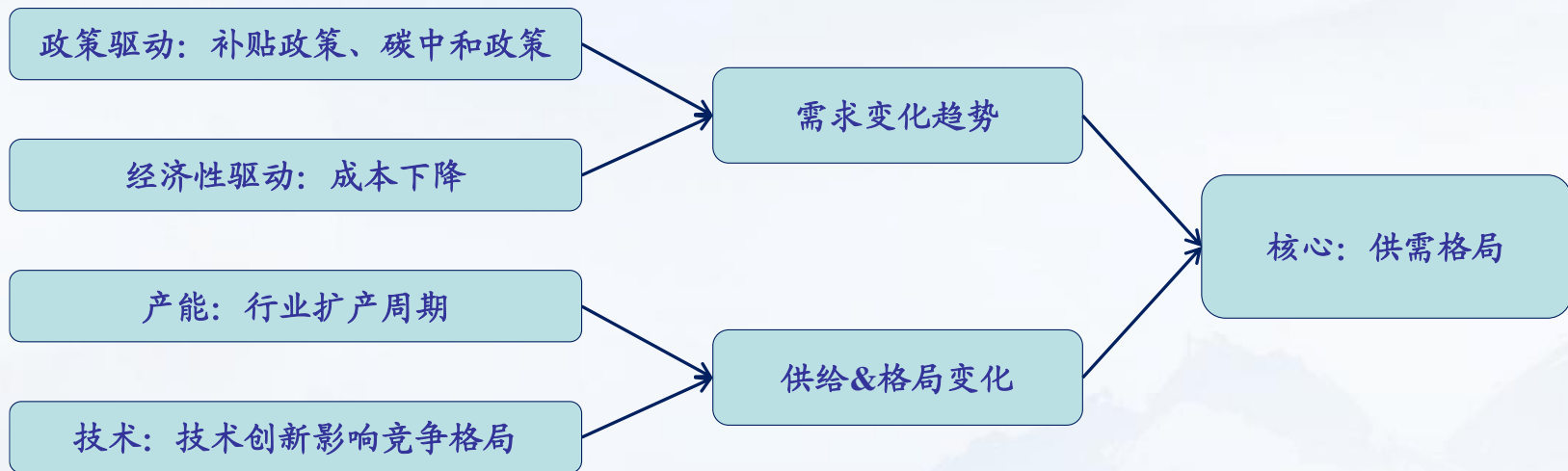
新能源行业的核心驱动要素

新能源行业的研究重点在于供需关系。

需求端：1是政策驱动，2是产业降本经济性驱动；

供给端：1是行业产能周期变化，2是技术进步、新技术研发对于行业格局的影响。

图1：影响新能源行业发展的核心要素



资料来源：HTI

01 新能源行业：周期性减弱、成长性加强

蛰伏期：成本偏高，技术储备；

快速成长期：政策点燃，井喷增长，获取暴利；

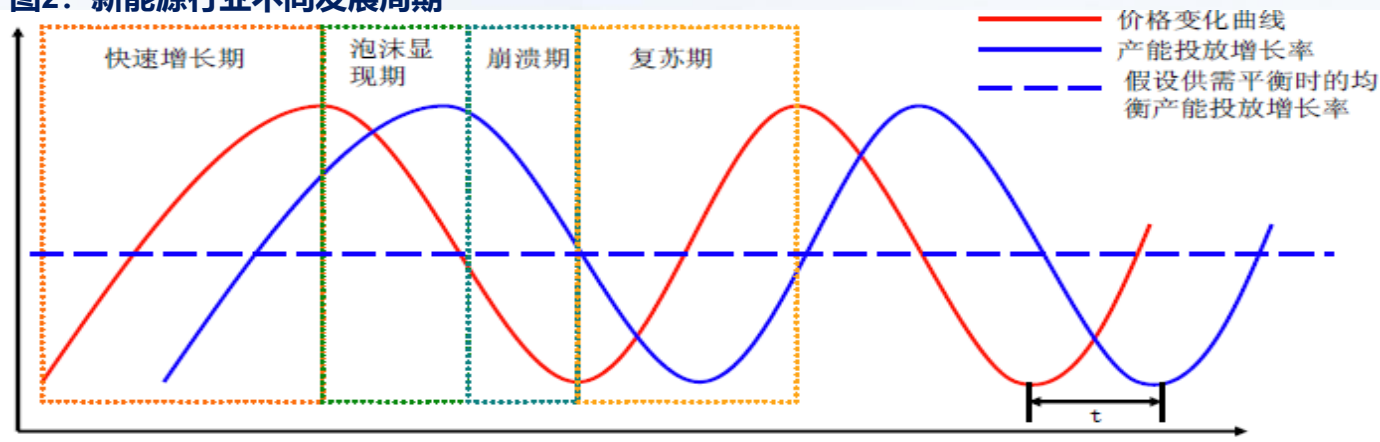
疯狂扩产期：暴利吸引行业快速扩张，社会资本蜂拥而入；

整合期（崩溃期）：政策退坡，产能过剩，行业整合，优胜劣汰；

复苏期：落后产能淘汰，优质企业挺过寒冬；

平稳期：经历几轮周期洗礼后，行业摆脱政策影响，进入自发成长期。

图2：新能源行业不同发展周期



02

光伏行业复盘与回顾

从光伏装机变化看需求驱动因素

根据BP数据，我们认为光伏行业的需求增长驱动力可以大致分为三个阶段。阶段1，2006-2012年行业需求增长动力主要来自欧洲；阶段2，2013-2017年中国成为全球最大的光伏市场，连同美国/日本/印度等国共同成为全球需求增长的主要来源，这一阶段行业需求来自少数新能源排头兵国家；2018年之后，光伏需求开始逐渐呈现多点开花的局面，越来越多的国家或地区都形成一定的装机规模，百花齐放格局形成后，行业需求增长区域稳定，且持续性增强。

表1：全球主要国家光伏新增装机容量（MW）

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Brazil	0	0	0	0	0	5	1	6	8	22	82	1076	1246	2246	3753	6048	11021	11929
Mexico	0	3	0	6	5	13	30	36	65	121	311	466	1681	3475	910	1763	429	1554
USA	205	276	179	461	1295	2263	2965	3822	4486	6034	11197	8336	8217	9600	14864	19218	18970	24844
China	10	21	39	144	580	2066	3570	10950	10600	15130	34240	53004	44206	29550	48830	52980	86050	216880
Japan	286	211	225	483	991	1296	1718	6967	9740	10811	7890	7460	6662	7030	8676	6545	6653	4011
India	0	-1	0	7	23	449	347	347	1886	1816	4134	8040	8974	7705	4122	10122	13107	9489
Ukraine	0	0	0	0	3	186	183	377	71	22	114	245	803	3933	1395	731	0	0
Italy	11	65	373	781	2328	9539	3654	1400	409	307	382	399	425	758	785	944	1961	5234
Spain	76	363	2889	38	448	409	285	120	7	5	10	9	35	4041	1328	3578	9596	5401
Germany	843	1271	1950	4444	7440	7910	8161	2633	1190	1324	1455	1614	2865	3756	4757	6367	7441	14260
Australia	9	9	12	247	759	330	1090	801	825	898	845	1362	3886	4325	4319	4624	4491	3725

02 国内需求：政策方向对于行业发展至关重要

我们认为2020年之前，光伏项目以电价政策为主要发展动力，如下表所示，2011年以来光伏的标杆上网电价/指导电价由国家统一规定，电价政策的变化对于行业发展至关重要；

2021年之后，集中式光伏开始执行当地燃煤发电基准电价，也就是我们所称的“平价”，相关政策的扶持也从电价引导为主，转为“碳达峰碳中和”相关政策，我们认为这对于光伏等可再生能源意义重大，“碳达峰碳中和”相关政策框架体系为行业发展保驾护航，政策的意义依然重大。

表2：集中式光伏上网电价汇总 (元/kWh)

		I 类资源区	II 类资源区	III 类资源区
2011年7月1日之前	标杆电价	1.15		
2011年7月1日起	标杆电价	1.00		
2013年9月1日起	标杆上网电价	0.90	0.95	1.00
2016年1月1日起	标杆上网电价	0.80	0.88	0.98
2017年1月1日起	标杆上网电价	0.65	0.75	0.85
2018年1月1日起	普通光伏上网电价	0.55	0.65	0.75
	村级扶贫	0.65	0.75	0.85
2018年5月31日起	普通光伏上网电价	0.50	0.60	0.70
	村级扶贫	0.65	0.75	0.85
2019年7月1日起	集中式指导电价	0.40	0.45	0.55
	村级扶贫	0.65	0.75	0.85
2020年7月1日起	集中式指导电价	0.35	0.40	0.49
	村级扶贫	0.65	0.75	0.85
2021年1月1日起	集中式光伏	按当地燃煤发电基准价执行		
2022年1月1日起	集中式光伏	按当地燃煤发电基准价执行		

图3：“十四五”可再生能源扶持政策升级

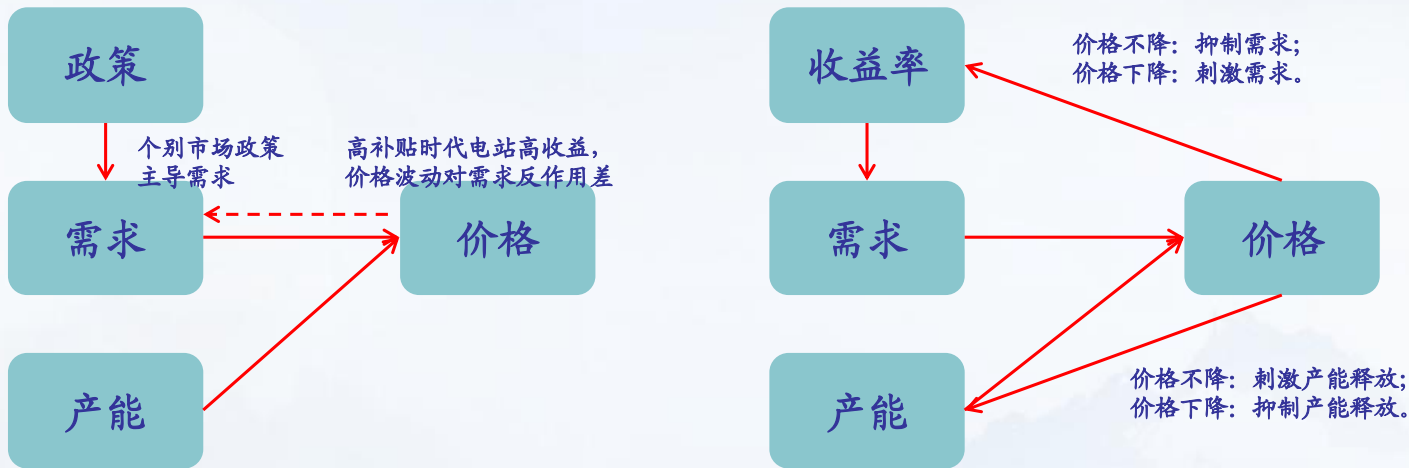


02 国内需求：平价时代，需求增长逻辑发生变化

我们认为：光伏进入平价时代后，特别是进入碳中和时代，行业需求与价格的传导逻辑发生改变。

- 1) 补贴时代行业需求由少数补贴国家驱动，补贴强度决定需求，结合供给能力来决定价格；
- 2) 平价时代、碳中和时代，如前文所述光伏发电成本与化石燃料成本范围相比已经具备较大成本优势，价格与需求之间相互作用，最终价格由可以满足收益率的边际需求决定；这种相互作用最终将导致产业链价格的波动幅度相比补贴时代更加平稳。

图4：补贴时代与平价时代，光伏需求与价格传导逻辑发生变化

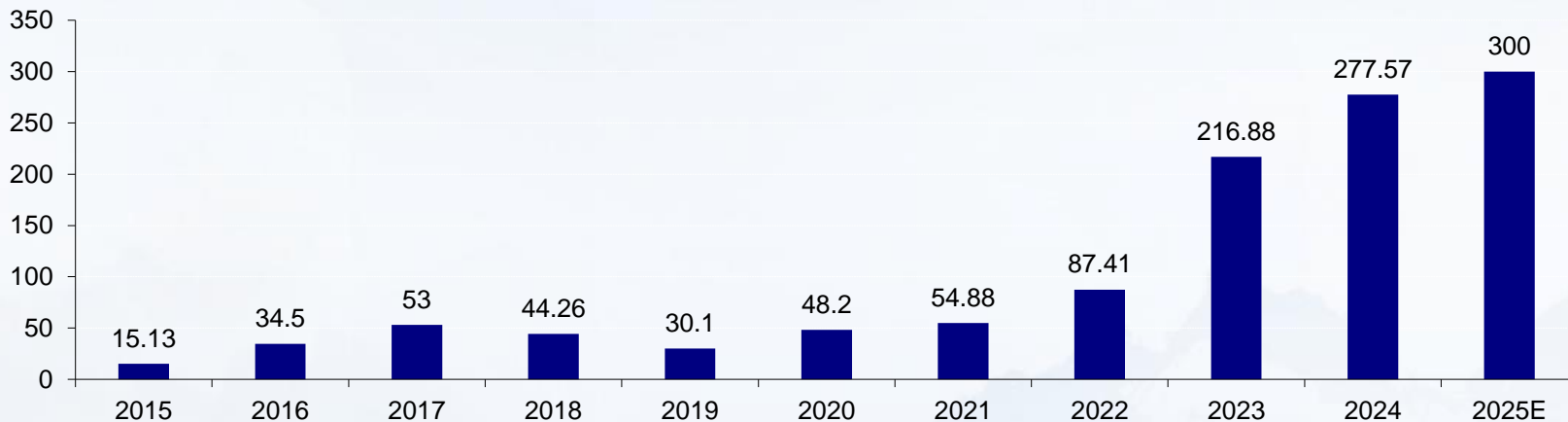


02 国内需求：“碳中和”引领装机量高增长

根据国家能源局官网，2024年国内光伏新增装机容量高达277.57GW，其中集中式光伏159.39GW，分布式光伏118.18GW，分布式中户用光伏29.55GW；我们预计2025年国内光伏新增装机量有望达到300GW。

2021-2023年国内光伏进入快速增长期，当行业需求达到甚至超过200GW后，光伏需求仍保持较强韧性，当前行业已经从快速增长期进入稳定增长期。

图5：中国光伏新增装机容量（GW）



02 国内需求：“碳中和”引领装机量高增长

根据CPIA，世界主要经济体光伏渗透率不断提升，特别是近五年增速较快，虽然部分国家已经达到甚至超过20%，但2024年世界平均光伏发电渗透率约为6.57%，我们认为全球渗透率仍较低，未来光伏仍有较大发展空间。

我们预计2025年全球光伏新增装机规模可达610GW。

图6：世界部分经济体光伏发电渗透率

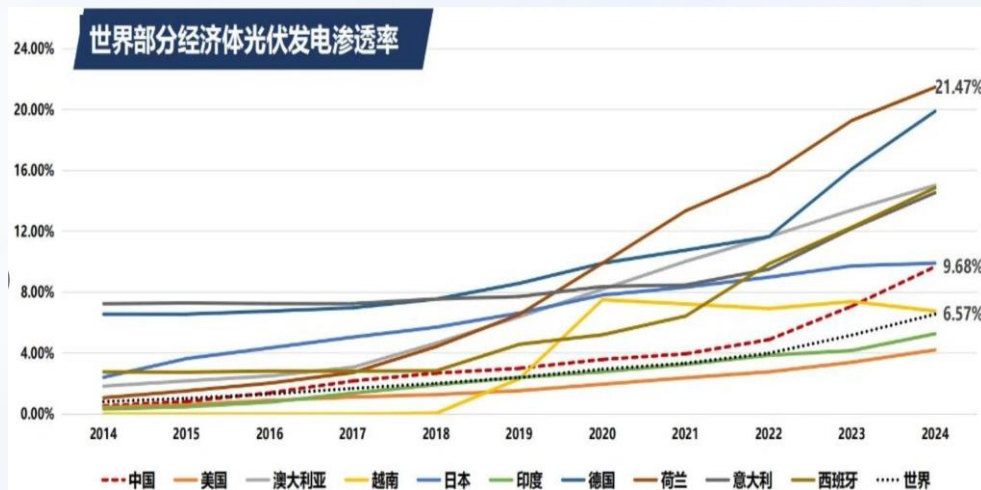
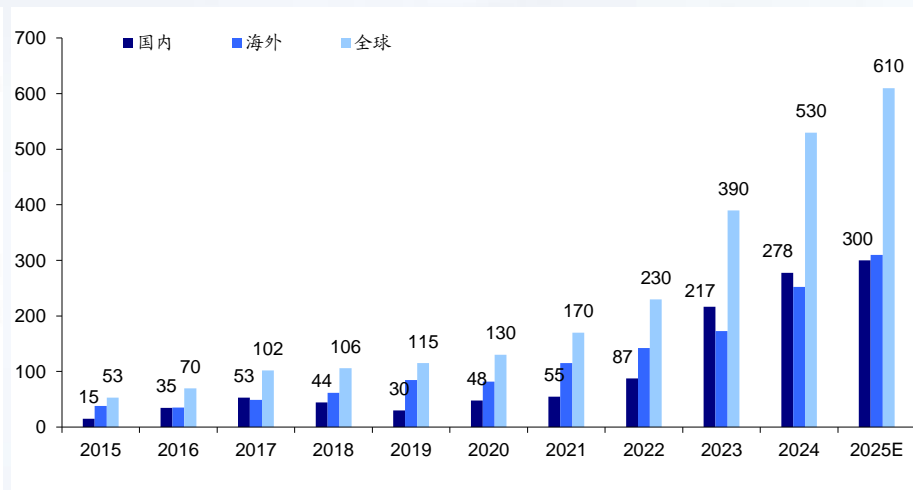


图7：全球光伏新增装机容量预测 (GW)



03

光伏供给侧产能周期与新技术

供给侧：光伏产业链概况

上游：多晶硅料，属于高纯化工制造业；

中游：硅片-电池-组件，属于加工制造业；

辅材：逆变器、光伏胶膜、光伏玻璃、线缆接线盒；

终端：电站，属于电力、公共事业行业。

上游原材料

中游制造

下游应用

多晶硅料



单晶硅棒



单晶硅片



单晶硅电池片



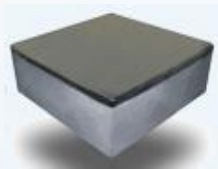
单晶组件



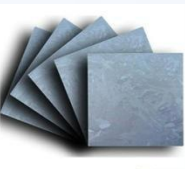
电站系统应用



多晶硅棒



多晶硅片



多晶硅电池片



多晶组件



屋顶系统应用



供给侧：光伏产业链概况

行业已在周期底部。我们选取52家光伏企业为样本，2024年以来行业面临严重亏损，标志这光伏产业已进入低谷周期，根据Infolink Consulting价格统计，24年下半年以来光伏产业链价格也在底部徘徊；长期严重亏损产业链难以维系，将有望出现产能出清；我们认为在当前反内卷的大背景下，光伏供给侧的问题有望出现明显边际改善，反内卷将加快行业底部修复的节奏。

图8：52家光伏公司单季度归母净利润合计（亿元）

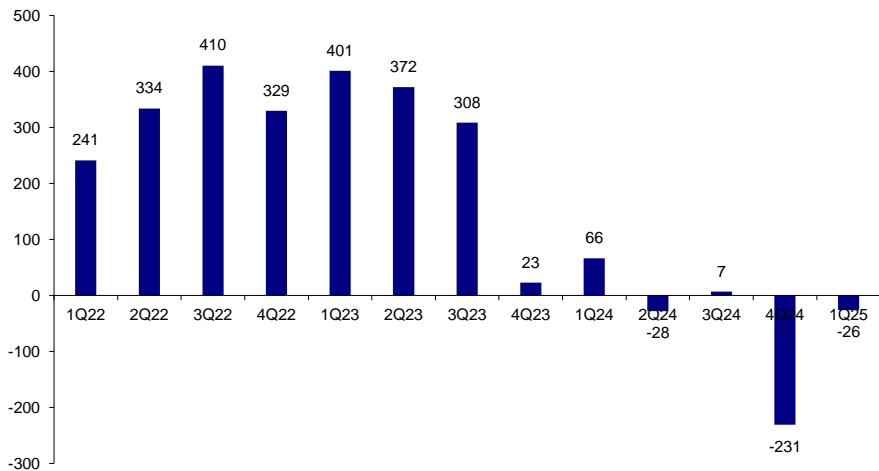
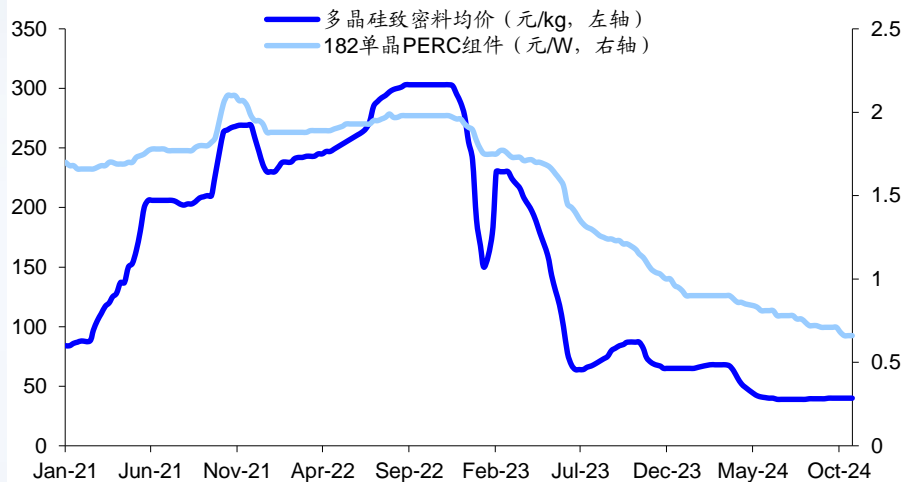


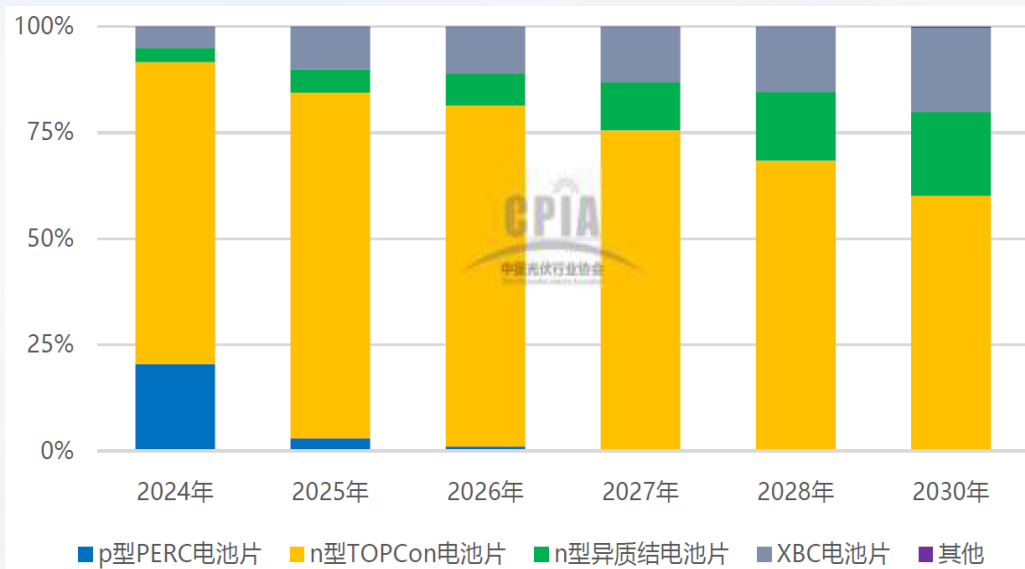
图9：光伏产业链多晶硅、组件价格走势



03 供给侧-技术变化：N型成为主要发展方向

我们认为光伏行业技术进步是推动行业降本提效的核心动力。根据CPIA数据，2024年，新投产的量产产线基本都是n型电池片产线。随着n型电池片产能快速释放，PERC电池片市场占比下降至20.5%；n型TOPCon电池片市场占比达到71.1%，成为占比最高的电池技术路线；异质结电池片市场占比约3.3%；XBC电池片市场占比约为5.0%。

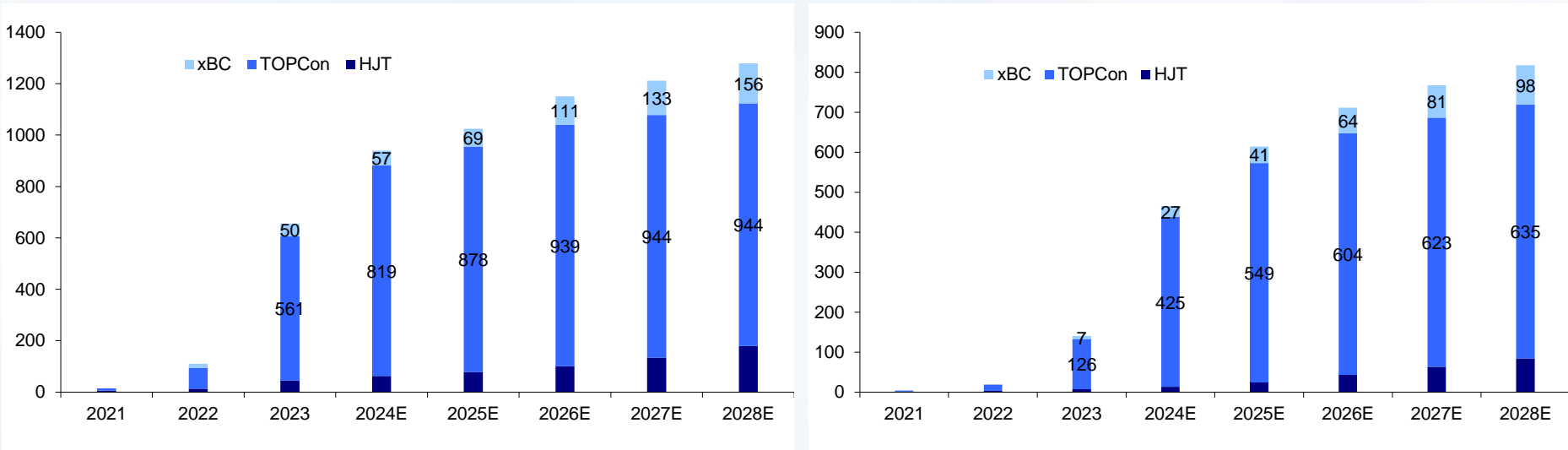
图10：不同电池技术路线市场占比变化趋势



03 供给侧-技术变化：N型成为主要发展方向

新技术迎来机遇。我们认为2024年光伏产业链价格竞争激烈，对于新技术的推广相对不利；根据Infolink Consulting，当前主流TOPCon技术在价格和量产难度上具有一定优势，而近期崭露头角的xBC技术，则在量产效率和美观性上优势明显，但量产难度较高，我们认为若明年工艺成熟度可突破，我们认为xBC技术或是接下来需要重点关注的新方向。

图11：不同电池技术路线市场占比变化趋势 (GW)



04

风险提示

政策变化风险；
原材料价格波动风险；
竞争加剧风险；
新技术替代风险。

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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。

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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.

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	优于大市	中性 (持有)	弱于大市	优于大市	中性 (持有)	弱于大市
海通国际股票研究覆盖率	92.6%	7.2%	0.2%	92.2%	7.5%	0.3%
投资银行客户*	2.9%	4.1%	0.0%	3.3%	3.5%	0.0%

*在每个评级类别里投资银行客户所占的百分比。

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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 June 30, 2025			Haitong International Equity Research Ratings Distribution, as of March 31, 2025		
	Outperform	Neutral (hold)	Underperform	Outperform	Neutral (hold)	Underperform
HTI Equity Research Coverage	92.6%	7.2%	0.2%	92.2%	7.5%	0.3%
IB clients*	2.9%	4.1%	0.0%	3.3%	3.5%	0.0%

*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.

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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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