Environmental Defense Fund

ENERGY FOUNDATION 能源基金会

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2022
中国碳价调查

2023.07

摘要

本报告总结了《2022 年中国碳价调查报告》的成果。此次调查于 2022 年 10-11 月展开。在此期间，项目团队与行业协会合作，对来自已经受到或即将受到碳价影响的中国碳密集型行业的行业代表，尤其是来自中国全国碳排放权交易体系首个覆盖行业——发电行业的代表，进行了广泛的调查。除发电行业外，水泥行业和钢铁行业被认为是对加入全国碳排放权交易体系准备最为充分的重点排放行业。从调查的结果来看，水泥行业和钢铁行业被认为最有可能在 2024 年前纳入全国碳排放权交易体系。超过 40%的发电行业受访者预计，其所在企业将需要从市场上购买配额来完成第二个履约周期（注：2022-2023 年）的履约。本次调查结果显示，受访者坚信，随着时间的推移，中国的碳价水平将逐步上涨，且碳价对投资决策的影响也会日益增加。受访者还对中国在 2030 年实现碳排放达峰目标表现出极大的信心。

关键词

碳价，碳排放交易，碳市场，公共政策，利益相关方调查，中国

推荐引用

Slater, H.，王庶，黎瑞鑫，《2022年中国碳价调查报告》， 2023年2月， ICF， 北京

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致谢：

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我们也非常感谢以下行业协会、企业及其代表协助发放调查问卷：中国电力企业联合会、中国有色金属行业协会、中国建筑材料集团有限公司、中国建筑材料联合会、冶金工业规划研究院以及中国石油和化学工业协会。

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中国碳论坛与澳大利亚国立大学的 Frank Jotzo 教授一起发起了 2013 年的首次调查，并随后负责管理后续调查项目的执行，直至 2020 年。多年来，中国碳论坛总经理卫诚然（Peter Edwards）为调查提供了宝贵的支持，报告执笔人对此表示由衷的感谢。

目录

缩略词：

CCER	国家核证自愿减排量（抵销机制）
CDM	清洁发展机制
CNY	人民币
CO_2	二氧化碳
ETS	碳排放权交易体系
GDP	国内生产总值
GHG	温室气体
MEE	生态环境部
MRV	监测、报告和核查
NDRC	国家发展和改革委员会
TCE	吨煤当量
tCO_2	吨二氧化碳

执行摘要

2022 年中国碳价调查于 2022 年 10 月和 11 月展开，共收集了 465 名利益相关方对中国碳价现状和未来的预期。虽然不能因此宣称本调查具有充分代表性，但其在一定程度上代表了市场利益相关方对于中国未来碳价的预期。自 2013 年以来开展的类似调查为本次调查奠定了基础。

中国碳市场的发展

2013 年至 2016 年期间，中国相继启动了八个地方碳市场。这些地方市场对配额分配机制、覆盖行业、抵消机制的使用以及各类衍生品等方面进行了不同的尝试。中国于 2015 年《巴黎协定》达成前夕宣布将建立全国碳排放权交易体系。

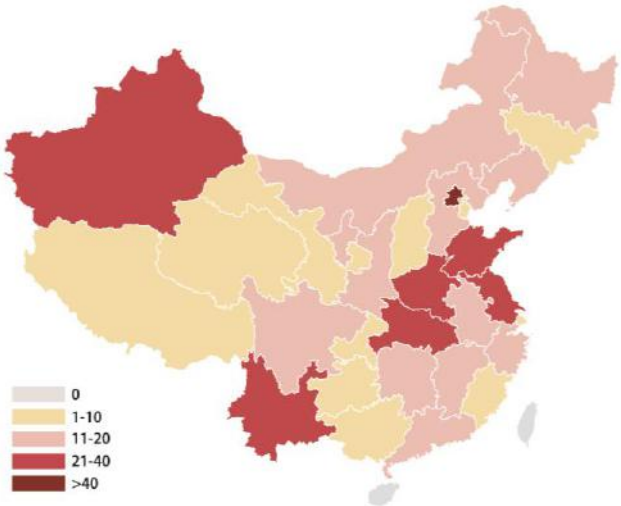
生态环境部发布的《碳排放权交易管理办法（试行）》使得全国碳市场自 2021 年 2 月起正式具有合法地位。该文件规定了各级政府、控排企业以及第三方核查责任的相关细节。中国的全国碳市场最初仅纳入了发电行业，随后将逐步扩大覆盖范围，按照“成熟一个纳入一个”的原则覆盖其他重点排放行业。2021 年 7 月，位于上海的全国碳排放权交易平台进行了首批交易，开盘价为 48 元/吨。全国碳排放权交易体系的首个履约周期于 2021 年 12 月 31 日结束。截至首个履约周期结束，全国碳排放权交易体系覆盖了电力行业的 2162 家控排企业，这些企业的年温室气体排放总量为 45 亿吨。

自 2021 年调查以来，全国碳排放权交易体系的发展呈现出几个方面的关键进展。2022 年 11 月，生态环境部发布了一项新的 2022 年排放配额分配计划草案，广泛征求意见。该草案指出，第二个履约周期仍为两年，电力行业企业必须于 2023 年 12 月 31 日之前缴纳配额完成履约。2022 年 12 月，生态环境部发布了最新的电力行业排放监测、报告与核查（MRV）指南，以期进一步提高碳排放数据质量。

2021 年 11 月，生态环境部发布通知，允许发电行业企业使用先前签发的 CCER 抵消部分出于履约目的而缴纳的配额，然而全面修订的 CCER 法规仍有待正式发布（预计会在 2023 年内发布）。

受访者

调查收集了来自不同行业的利益相关方的答复共 465 份。其中 84%来自控排企业，包括至少 49%的受访者来自已经被纳入地方或全国碳市场的企业。在控排企业中，发电行业占比最高（受访者比例为 38%），其次是建筑材料（21%）、钢铁（13%）、化工（5%）、有色金属（3%）和石化（3%）行业。10%的受访者来自碳市场相关服务供应商，另有 3%的受访者来自研究机构和行业协会。32%的受访者来自于地方碳市场所在省份（直辖市）。

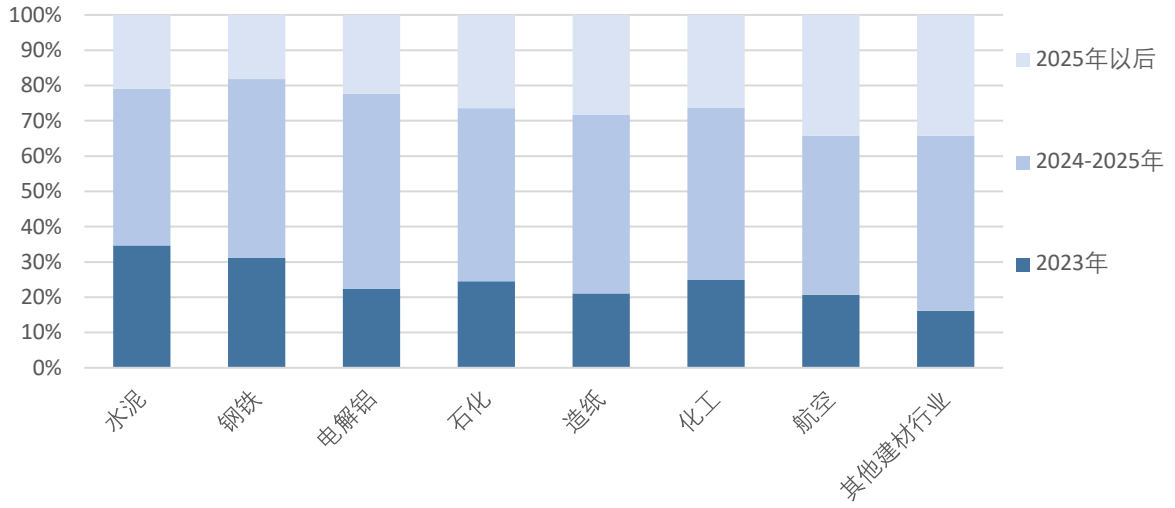


图表 1：受访者所在单位的地理分布情况

中国全国碳市场动态

来自发电行业的受访者被问及其所在企业在全国碳市场首个履约周期内的配额分配情况。与去年调查结果相比，在今年的调查中，更高比例的受访者预计其所在的公司需要在市场上购买配额，以满足履约需求（41%相对于 26%）。

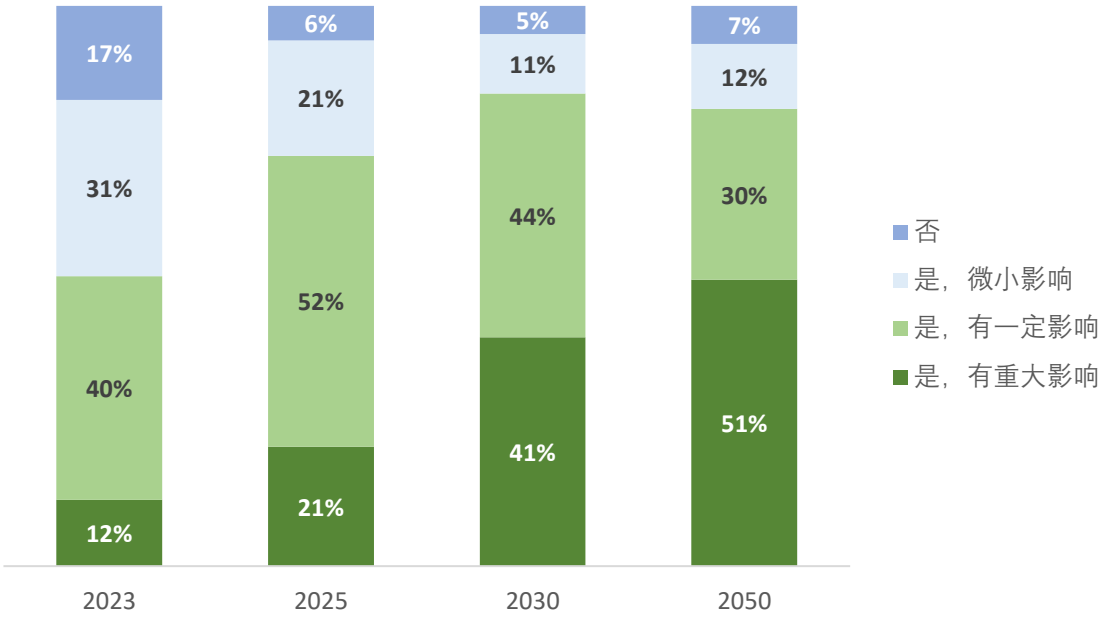
继发电行业之后，水泥行业和钢铁行业对参与全国碳市场的准备明显较其他行业更为充分。超过三分之一的受访者乐观地认为上述两个行业最早将在 2023 年准备好加入全国碳市场，而对这两个行业被纳入全国碳市场时间的加权平均预期为 2024 年。对其他重点排放行业纳入时间的平均预期则是在 2025 年前。



图表 2：您认为还有哪些行业将准备好加入国家碳市场？（n=392,385,371,368,367,356,342,371）

受访者预计，从目前直至 2030 年，碳价对投资决策产生的影响将会显著增加。约五分之四的回答该问题受访者预计，到 2025 年其所在企业的投资决策至少会受到中等程度的影响。仅有 6%的回答该问题的受访者预计即使到 2025 年其所在企业的投资决策也不会受到影响。

预计碳排放交易将对投资决策产生越来越大的影响

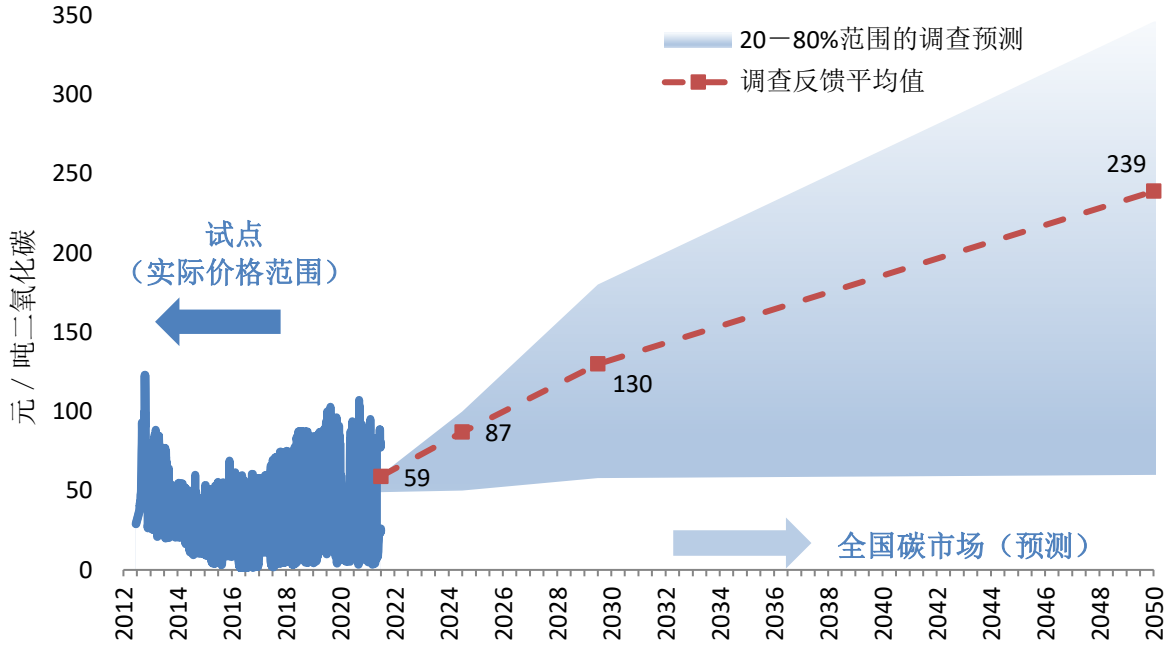


图表 3：到 2023 年/2025 年/2030 年/2050 年，您预期中国碳排放权交易体系是否会影响投资决策？（n=423，422，416，397）

碳价预期

调查结果显示，受访者预计全国碳市场的碳价将会稳步上涨。2022 年的全国碳市场平均碳价预期为 59 元/吨，到 2025 年将升至 87 元/吨，在 2030 年之前将达到 130 元/吨。虽然实际价格水平依然存在很大的不确定性，但自去年调查以来，针对同一年份的预期范围有所缩小。20-80 百分位区间价格从 2022 年的 49-60 元/吨增长至 2030 年的 58-180 元/吨。虽然对到 2030 年的价格预期要略低于去年调查的结果，但其依然大大高于此前调查中对到 2020 年的预期。对未来碳价的预期可能会受到全国碳市场第一个履约周期中高于预期的起始价格的影响。到本世纪中期的预期价格远低于欧盟 2023 年 1 月的平均价格水平（约 83 欧元或约 600 元人民币）。

预计中国碳价将稳步上涨

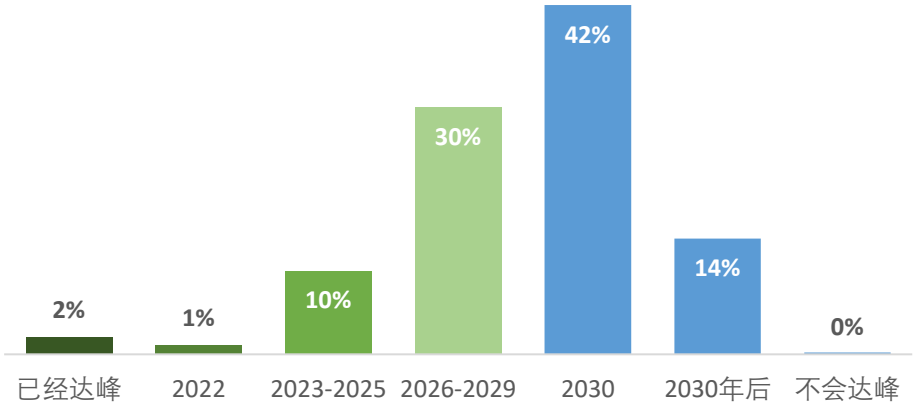


图表 4：地方碳市场目前的价格区间以及对全国体系的价格预估。

中国的排放目标和排放峰值

2020 年 9 月，中国国家主席习近平承诺，中国二氧化碳排放将在“2030 年前”（早于之前“2030 年左右”的承诺）达峰，提振了中国应对气候变化的雄心。今年，85%的受访者预计，中国将在 2030 年前或不晚于 2030 年实现二氧化碳排放达峰。只有 13%的受访者预计中国的排放量将在 2025 年或更早达峰，较两年前（2020 年）调查中的 36%有所下降。

中国有望在 2030 年前或不晚于 2030 年实现碳排放达峰



图表 5：您预期中国碳排放将于何时达到峰值？（n=434）

概述

本报告是对《2022 中国碳价调查报告》成果的总结。2013 年、2015 年以及自 2017 年以来每年开展的类似调查，为本调查项目奠定了基础。每次调查的许多问题都保持相似或类似，以便对历年的结果进行比较。此外，鉴于本年度调查在中国全国碳排放权交易体系的首个履约周期结束后开展，因此也纳入了新设计的一些问题，以体现对首个履约周期的反馈。

当 2013 年调查启动时，中国中央政府对使用碳价作为促进减排的政策工具表现出浓厚的兴趣，因为其已经开始在全国相继推出了七个地方试点碳市场。彼时，中国也在积极考虑实施碳税的可行性。

习近平主席在 2020 年作出的“碳达峰、碳中和”承诺成为全球关注的焦点，即中国将努力在 2030 年前实现碳排放达峰，并在 2060 年前实现碳中和。这些目标建立在到 2030 年将国家经济的碳强度至少降低 65%的目标之上。[1]全国碳市场有望在帮助中国实现这些目标方面发挥关键作用。

2021 年 7 月，全国碳市场正式启动线上交易。作为中国首个明确的直接限制碳排放的全国性政策，这标志着中国在实现碳达峰和碳中和目标的过程中迈出了重要一步。截至目前，全国碳市场已经覆盖了中国 40%以上的碳排放，进而增加了所覆盖排放企业的实际碳排放成本。随着碳价机制的不断完善，预计到 2030 年，中国的碳市场将发展为一个累计交易额高达 1000 亿元人民币的庞大市场[2]，进而为整个经济体的碳减排提供价格信号与资金支持。

《2022 年中国碳价调查》于 2022 年 10 月 17 日至 11 月 22 日期间通过在线调查平台“调查派” 匿名开展。通过与相关行业协会进行合作，本次调查重点放在中国碳密集型产业的从业代表上，并特别关注已经在全国范围内实施碳价的发电行业。我们向上述行业协会的会员发放了调查问卷，并向参与过 2021 年调查并留下联系方式的受访者发放问卷。此外，我们还利用社交媒体，尤其是微信平台，有针对性地向潜在受访者发放了问卷。

本次调查共收到来自行业、市场相关服务提供商和研究机构等各界专业人士的答复 465 份。约有一半的受访者（49%）来自全国或地方碳排放权交易体系已覆盖或预计可能覆盖的企业。此外，还有 34%的调查反馈来自于未来将被纳入、不确定是否会被全国碳市场纳入或预计不会被全国碳市场纳入的行业的代表，3%来自于行业协会。行业意见的总体代表性达到 86%（400 份反馈）。

这项调查评估了专家和市场参与者对未来中国碳价的预期，以及碳价如何融入中国更广泛的减缓气候变化的行动。调查量化了对市场设计、相关政策、碳价以及对投资决策的影响的预期。因此，调查可以增进市场和政策制定者对行业和专家如何看待碳价前景的理解。

由于不存在业内代表专家名单， 且受访者都是自愿参与调查，因此本调查不能绝对代表所有专家和各行各业在这些问题上的观点。本报告中所得出的预期可被理解为对未来影响中国碳价行情的各类因素有一定认识和见解的部分群体所作出的“最佳猜测”。

就行业受访者而言，尚未做好准备的企业仍对碳市场持不确定的态度，因而不太愿意完成调查，因此调查样本可能会偏向准备较为充分的市场参与者。我们与各行业协会合作，争取获得更

[1] 碳强度是指单位 GDP 的二氧化碳排放量（CO_2/CNY GDP）

[2] 《生态环境部：逐步扩大全国碳市场行业覆盖范围》：http://www.zqrb.cn/finance/hongguanjingji/2022-07-22/A1658421363931.html

有代表性的行业反馈，以减轻由此带来的影响。此类调查得出的未来碳价格预期在概念上不同于市场期货价格，后者反映了市场预期，但是市场预期会根据市场风险进行调整，并受制于市场需求和资本供应。本调查中的未来碳价预期也与基于对潜在市场因素和政策假设进行量化分析得出的预期价格存在概念上的区别。

本报告首先回顾了中国碳排放权交易体系建设的最新进展，然后概述了调查的主要结果，包括地方碳排放权交易体系的经验、全国碳排放权交易体系预期、自愿减排市场和抵消机制、企业准备情况以及碳价对投资决策的影响等方面。本报告旨在客观呈现受访者的观点，为政策制定者和市场参与者提供参考。

中国碳排放交易动态

碳排放权交易体系是中国政府为了促进温室气体减排和加快清洁能源转型所采取的政策工具。从 2013 年年中开始，8 个地方排放交易体系在中国部分省市（北京、重庆、湖北、广东、上海、深圳、天津和福建）相继启动，为中央政府制定全国性的碳价机制提供了宝贵经验。

自 2013 年和 2014 年启动地方碳市场试点以来，大部分市场日趋成熟，推出了改善市场流动性的措施，并就是否应该扩大碳排放权交易体系试点的行业覆盖范围以及如何扩大覆盖范围进行了评估。自这些试点市场启动以来，部分试点市场价格持续震荡，每日价格如下文图 1 所示。

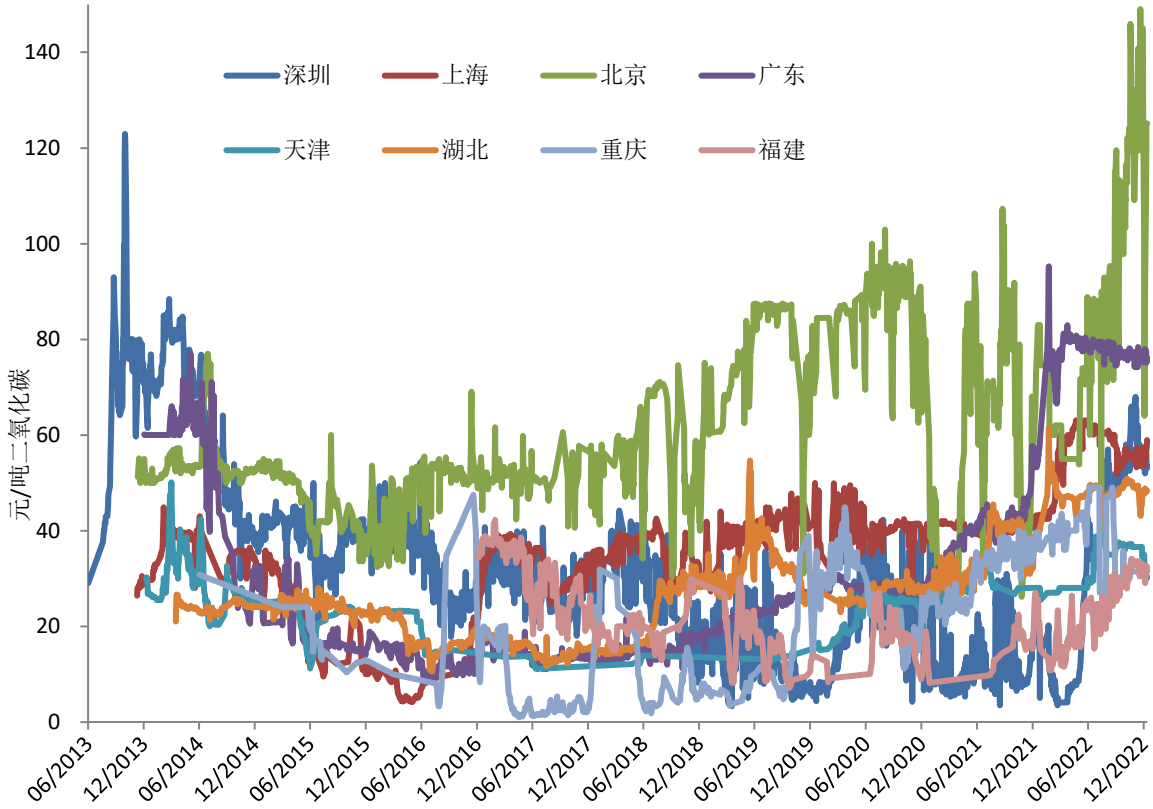


图 1: 网上交易日平均价格（人民币元/吨），2013 年 6 月-2022 年 12 月。

资料来源：SinoCarbon、VCarbon

2017 年，国家发改委印发《全国碳排放权交易市场建设方案（发电行业）》（下文简称《全国碳市场建设方案》）。迄今为止，全国碳市场涉及发电行业所涵盖实体之间的交易，并计划逐步扩大将其覆盖范围，以纳入其他主要排放行业。根据《全国碳市场建设方案》，中国全国碳市场的发展将遵循“三步走”的路线图：基础建设期、模拟运行期和深化完善期。

2018 年，中国政府对国务院组成部门进行了系统性重构。 之后，中国全国碳市场的建设责任转移到生态环境部。

2019 年 10 月至 12 月，生态环境部在各地组织了 17 次大型培训活动与配额分配试算，以期进一步提高发电行业企业在日常碳市场运作中的实操能力，并模拟配额分配方案，检验分配方案中分配给各控排企业的配额是否合理，规避市场风险。

2020 年 12 月 31 日，生态环境部颁布《碳排放权交易管理暂行办法》[3]（以下简称为“《管理办法》”），后续分别针对湖北和上海发电行业的控排单位发布了一系列规定细则，要求这些单位在全国碳排放权注册登记系统登记并进行联接。[4]

2021 年 7 月 16 日，全国碳市场正式开盘交易，标志着中国碳排放权交易体系建设的一个新里程碑，即全国碳市场进入了“三步走”路线图的“深化完善期”。 全国碳市场首日碳配额开盘价为 48 元/吨，与《2020 年中国碳价调查报告》中数百位受访者对开市价格预期的平均值（49 元/吨）十分接近。

2021 年 12 月 31 日，中国全国碳排放权交易体系的首个履约周期顺利结束，履约完成率为 99.5%。截止当日，全国碳市场累计运行 114 个交易日，碳排放配额累计成交量 1.79 亿吨，累计成交额约 77 亿元。

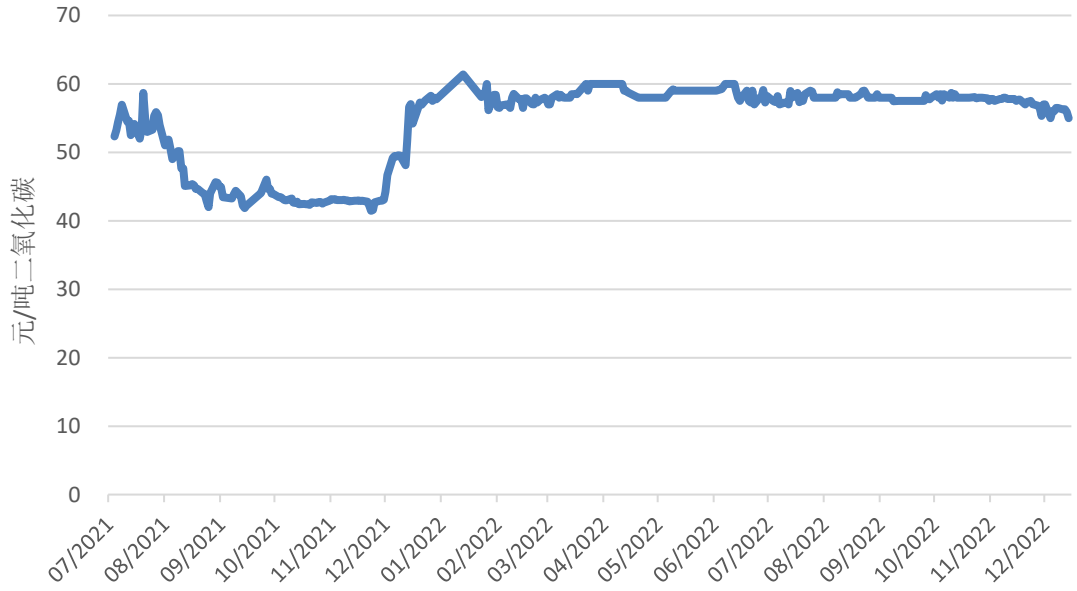


图 2: 全国碳市场每日在线交易价格。资料来源：SinoCarbon、VCarbon

从 2022 年 1 月 4 日至 12 月 30 日（2022 年最后一个交易日），中国全国碳市场的年度累计配额交易量接近 5100 万吨，年度累计成交额超过 28 亿元人民币。

自去年调查以来，全国碳市场的发展呈现出几个关键性进展。例如，2022 年 3 月，生态环境部强调准确可靠的数据是全国碳市场有效规范运行的“生命线”，并要求强化对碳排放数据质量的监督管理，以确保全国市场的平稳健康运行。

生态环境部要求各省级政府组织发电行业以及其他 7 个重点排放行业的控排企业对其 2021 年温室气体排放进行核算并提交核算报告。这些报告将构成未来这些行业纳入全国碳市场时的配额分配数据基础。发电行业企业必须于 2022 年 3 月底前通过官方环境信息平台披露其在全国碳市场第一个履约周期内的经核实的温室气体排放信息。此外，控排企业还必须更新其排放数据质量管

[3] 《碳排放权交易管理试行办法》：https://www.mee.gov.cn/xxgk2018/xxgk/xxgk02/202101/t20210105_816131.html

[4] 2021 年 5 月，《碳排放权登记管理规则（试行）》《碳排放权交易管理规则（试行）》《碳排放权结算管理规则（试行）》相继出台： http://www.mee.gov.cn/xxgk2018/xxgk/xxgk01/202105/t20210519_833574.html

理计划，并按月上报与碳排放核算有关的经核实的关键参数，例如燃料消耗量、元素碳含量、燃料的低水平热含量等，以期强化对企业排放数据的管理，并提高对未来数据质量的监督。

2022 年 11 月，生态环境部发布了 2021 年与 2022 年排放配额分配的草案。根据《2021-2022 年全国碳排放权交易配额总量设定与分配实施方案》，全国碳市场的第二个履约周期仍为两年，在此期间将继续免费分配配额。发电行业企业需要按年度分别缴纳 2021 年和 2022 年的配额，履约期限均为 2023 年 12 月 31 日。

虽然部分碳交易体系以拍卖作为配额分配的主要方式，然而对中国的全国碳市场而言，免费分配是目前唯一的分配方式。根据规范中国全国碳市场交易及相关活动的《管理办法》，全国碳市场配额的分配将以免费分配为主，并且可以应主管部门的相关要求适时引入拍卖（有偿分配）。

2022 年 12 月，生态环境部发布了最新的电力行业排放监测、报告和核查（MRV）指南[5]，以期提升碳排放数据质量。更新后的 MRV 指南优化了碳排放报告核查所涉及的公式，改进了数据质量控制体系，并调整了一些排放量计算参数，例如为每单位热值的碳含量设置了更为科学合理的缺省值。

依照 2020 年 12 月《管理办法》的规定，控排企业可以使用国家核证自愿减排量（CCER）作为合格的碳抵消信用，以抵消不超过应清缴碳排放配额的 5%。市场利益相关方期待着 CCER 市场的回归。第一个履约期的经验表明，全国碳市场对 CCER 有着非常强烈的需求。第一个履约期使用了约 3273 万吨 CCER，超过了 2012 年至 2017 年期间所使用的 CCER 总量。据生态环境部介绍，其将争取尽快重新启动新的 CCER 的审批和注册，并支持北京建立国家自愿减排量交易中心。

根据生态环境部的指示，将全国碳市场扩展至更多行业仍在考虑之中，例如钢铁、电解铝和水泥行业的 MRV 指南编制工作正在开展之中，生态环境部也与相关行业协会进行了接触并听取意见。然而，新冠疫情的影响以及疫情后经济复苏的需求，为判定扩大国家市场覆盖范围的恰当时机带来了一些不确定性。

[5] 《企业温室气体排放核算与报告指南 发电设施》《企业温室气体排放核查技术指南 发电设施》：https://www.mee.gov.cn/xxgk2018/xxgk/xxgk06/202212/t20221221_1008430.html

调查受访者

问卷共收集到了 465 份符合条件的反馈。与往年调查相比，今年的受访者人数位列第二，仅次于 2020 年的调查（567 人）。

本调查收集到了具有代表性的行业从业员的意见，广泛征集了来自中国碳市场专家群体、咨询机构和学术专家顾问的大量反馈。其合理地体现了中国碳市场界的观点与预期。

除非另有说明，本报告中的百分比是指对某一具体问题提供了答案的受访者，选择“不知道”的受访者不包括在内。

按群体划分受访者

在 465 名受访者中，84%来自控排企业，其中 49%来自已被地方碳市场或全国碳市场纳入的企业。[6] 在控排企业中，发电行业占比最高（受访者比例为 38%），其次为建筑材料（包括水泥）（20%）、钢铁（13%）、化学品（5%）以及有色金属（3%）和化工行业（3%）。

4%的受访者来自碳市场相关服务提供商，包括咨询服务、核查服务、碳抵消项目开发和碳交易服务等，3%的受访者来自研究机构和行业协会。其他受访者则来自学术界、金融业和政府官员。

按群体划分受访者

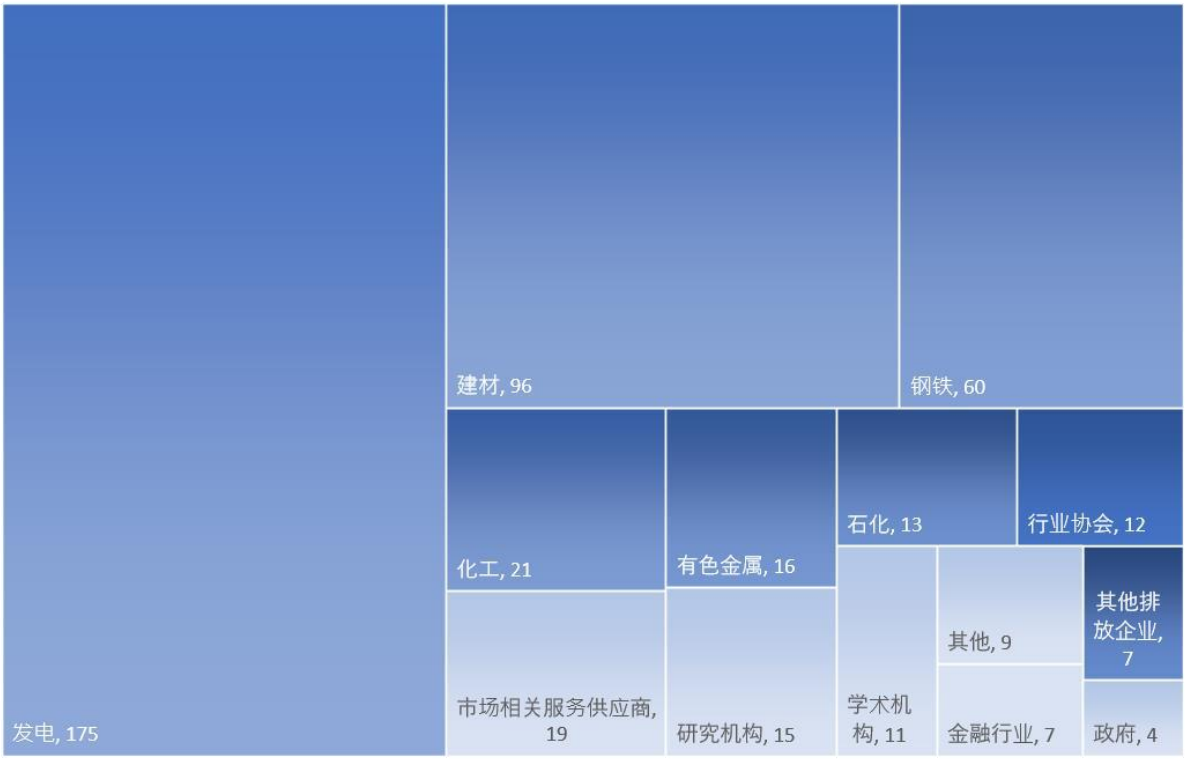


图 3：贵单位属于何种类型？
注：反馈总数 n=465

[6] 另有 10%的受访者表示自己并不了解其所在公司是否已经纳入碳市场。

按地区划分受访者

15%的受访者所在机构来自北京。32%的受访者来自碳市场试点地区。只有一名受访者来自中国大陆地区以外的机构。

来自北京的反馈率相对较高，一方面反映了决策者、咨询企业和专家群体多集中在首都，另一方面也反映了项目合作伙伴在北京拥有更强的人脉网络。除北京之外，受访者还多集中在江苏、湖北、山东和新疆（各占 6%）。

随着调查的逐年开展，受访者的地理分布面也越来越广，这也反映出全国各地参与碳市场的程度越来越高。

受访者按地区划分：分布越来越广

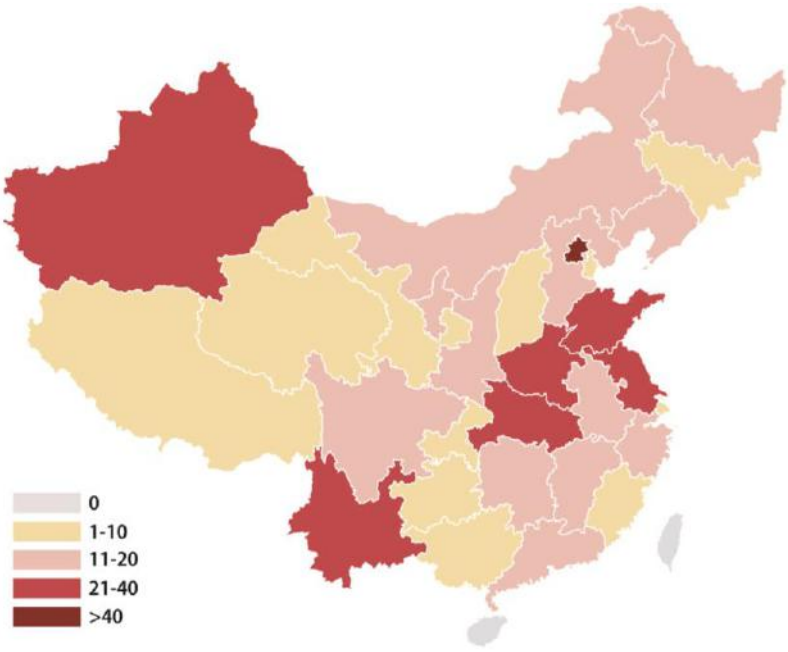


图 4：受访者所在单位的地理分布（n=465）

控排行业反馈

来自控排行业（包括行业协会）的受访者总体比例逐年增加：今年控排行业受访者的比例为 81%，高于 2021 年的 81%、2020 年的 76%、2018 和 2019 年的 68%、2017 年的 29%、2015 年的 23%和 2013 年的 7%。

本年度调查包括 229 名来自已被纳入碳市场企业（包括地方试点和全国碳市场）的受访者。自 2021 年调查以来，随着全国碳市场的启动，来自具有排放交易实操经验的受访者的反馈大大增加。全国市场的逐步成熟意味着受访者的预期可能会更加有据可依。

29%的控排企业受访者参加了地方碳排放权交易体系，包括各地方碳市场试点的参与企业，其中来自上海（36 名） 和湖北（35 名）碳排放权交易体系的受访者最多。

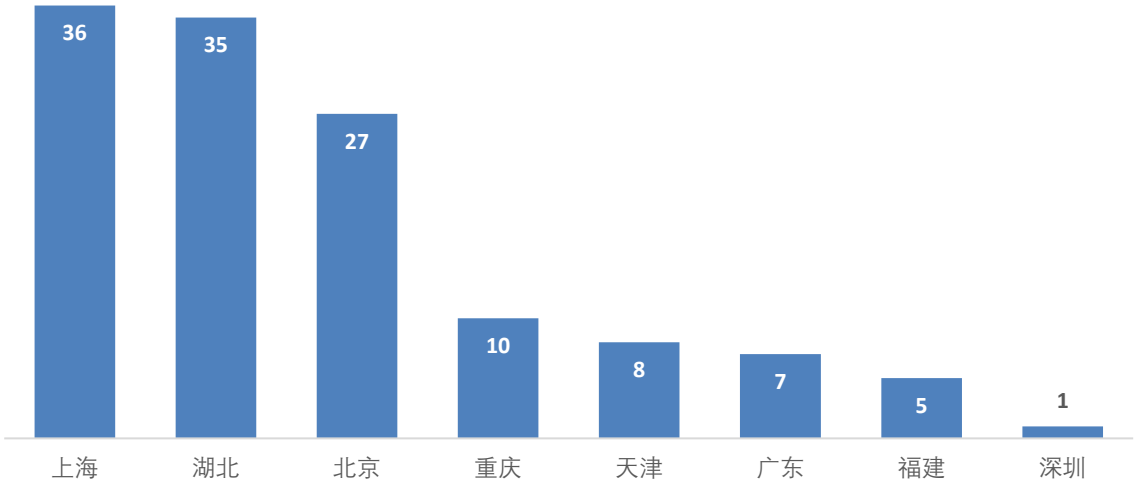


图 5：贵单位目前是否被纳入中国的碳排放权交易体系？如果是，是以下哪个碳排放交易体系？（n=90）

其中 11 名行业受访者来自参与国外碳排放权交易体系的企业，有 3 名受访者所在的企业参与了欧盟碳排放权交易体系，3 名受访者所在的企业参与了加州总量控制与交易体系，1 名受访者所在的企业参与了哈萨克斯坦碳排放权交易体系。对于这些企业而言，同时在多个碳排放权交易体系下运营将有助于经验共享，促进同行互相学习，并最终实现多个体系的整合。

在所有来自控排企业的受访者中，三分之二为普通员工，26%为中层管理者。今年的调查收到了 17 份来自高层管理者的反馈。

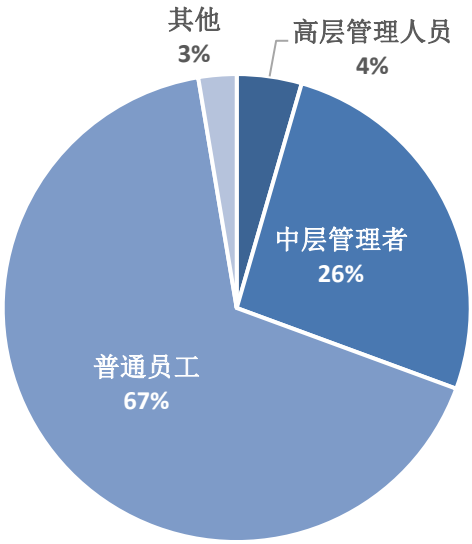


图 6：在贵单位的管理结构中，您担任什么职位？（n=379）

在来自控排单位的受访者中，52%来自央企，19%来自地方国企。另有 15%来自私企，10%来自合资企业。44%的控排单位属于能耗大户，每年能耗超过 100 万吨煤当量。11%的反馈来自年能耗低于 1 万吨煤当量的小型企业，而年能耗 1 万吨煤当量是全国碳市场的纳入门槛。碳排放大户多是央企（125 家），央企位于中国碳排放最高的企业之列。

行业受访者的规模和所有制类型

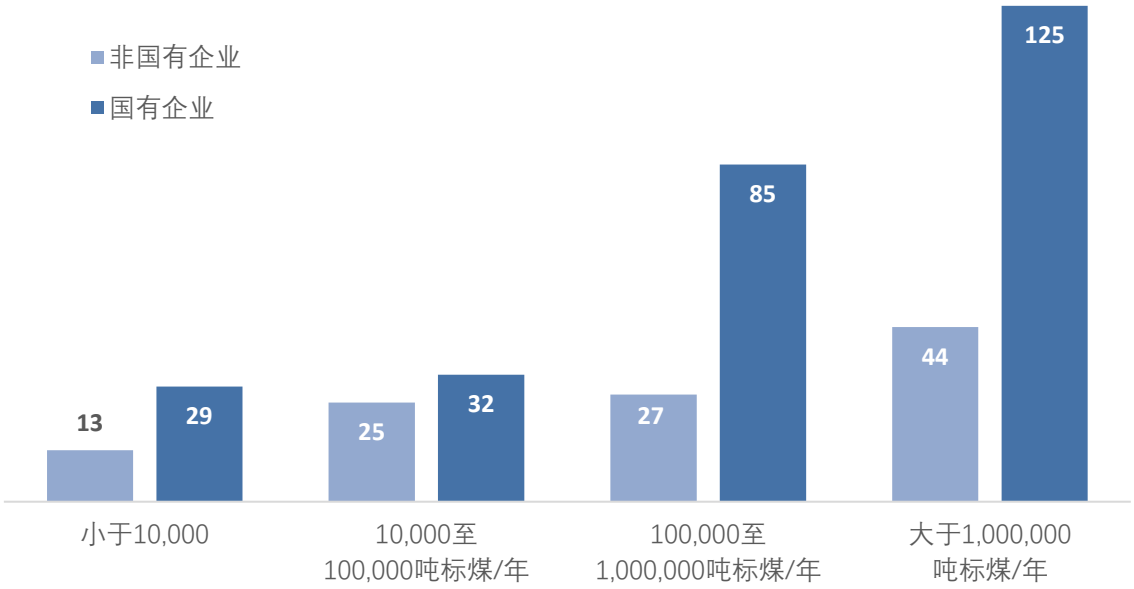


图 7：贵单位在中国的年能耗是多少？- 按企业类型分类（吨煤当量/年）（n=380）。

全国碳排放权交易体系

本次调查向受访者提出了与全国碳排放权交易体系有关的多个问题，包括覆盖行业、市场管理和价格预期等。

覆盖行业

继发电行业之后，水泥行业以及钢铁行业对碳市场的准备明显较其他行业更为充分。超过三分之一的受访者乐观地认为上述两个行业最早将在 2023 年做好加入全国碳市场的准备，这两个行业被纳入全国碳排放权交易体系的平均预期是 2024 年。对其他重点排放行业被纳入全国碳排放权交易体系的的平均预计则是在 2025 年前。

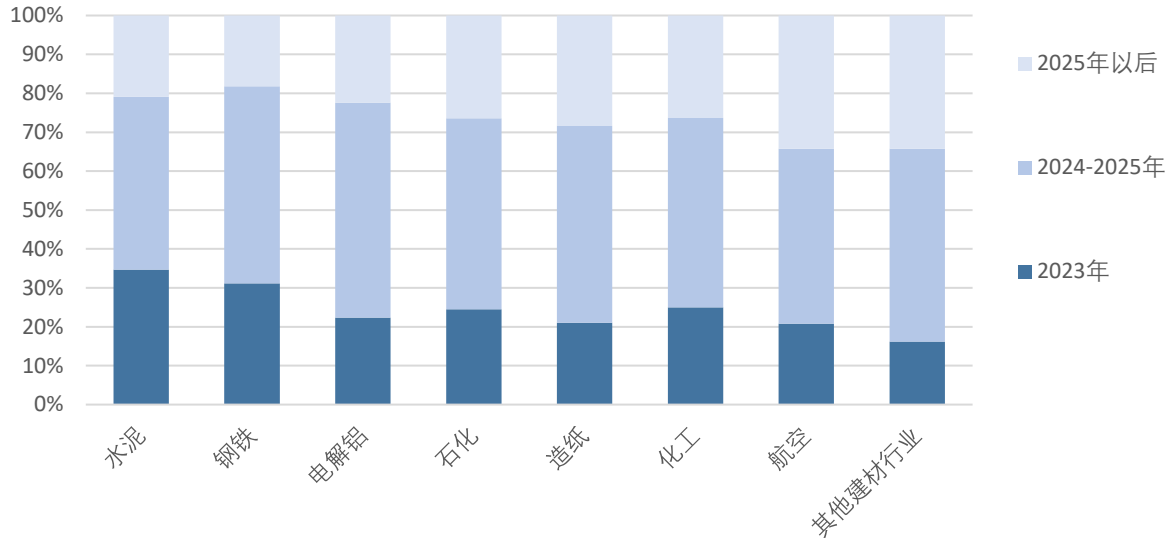


图 8：您认为还有哪些行业将准备好加入全国碳排放权交易体系？（n=392，385，371，368，367，356，342，371）

配额分配

基于基准线的免费分配（基准线法）和基于历史强度的免费分配（历史强度下降法/祖父法）是免费配额分配常使用的两种方式。基准线法以某一行业的基准值为基础，继而计算分配给设施或机构的配额。该基准值通常代表业内良好表现的情况，并且是基于所报告的温室气体排放数据得出的。历史强度下降法则是根据一个设施或机构过去几年间的历史温室气体排放水平来计算其配额分配量。但对那些过去几年间表现良好，且（或）当前正处在快速发展期的企业而言，历史分配可能不够公平。采用基准线法来分配配额更为公平， 但在监管和计算方面更复杂。

发电行业在全国碳市场第一个履约周期的配额分配采用了基准线法。在本年度调查中，来自建材（包括水泥）和钢铁行业的明显多数受访者认为基准法是最合适的配额分配方法。与 2021 年的调查结果相比，今年的调查结果呈现出两个重大转变。首先，有色金属（包括电解铝）行业的大多数受访者现在认为历史强度下降法是更佳的分配方法，这与去年的结果相反。其次，化工和石化行业的受访者在这个问题上的意见相当平均，而在去年的结果中，有四分之三的受访者倾向于采用基准线法。与此前几年调查结果一致的是，极少数行业代表认为拍卖是目前最好的配额分配方式。

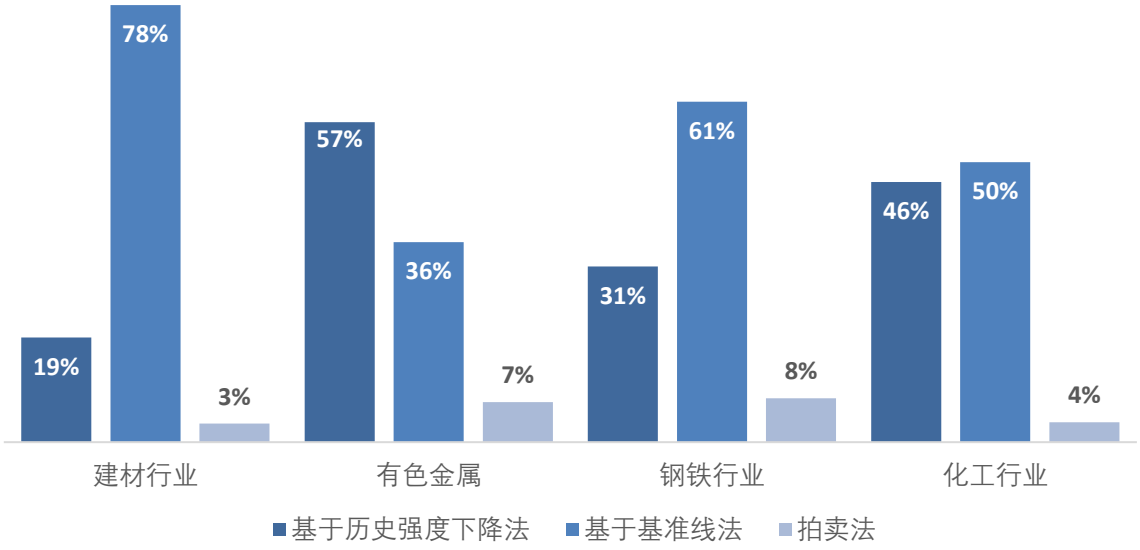


图 9：您认为哪一种是最好的配额分配方法？（n=91,14,51,28）

2020 年 11 月，全国碳市场发电行业配额分配计划公布，为容量超过 300 兆瓦（MW）的煤电机组以及 300 兆瓦及以下的煤电机组分别确定了基准。发电行业的受访者被问及全国碳排放权交易体系所设定的基准线是否足以鼓励减少温室气体排放。极少数受访者认为目前基准线的设定“过于宽松”。与那些未被地方碳排放权交易体系试点覆盖的企业相比，已被地方碳排放权交易体系试点覆盖企业的受访者更可能倾向认为基准线较为宽松。2022 年 10 月 31 日，也就是在本次调查进行之后，生态环境部公布了全国碳市场第二个履约周期所采用的基准线制定方法[7]，与大型设施相比，小型设施所适用的基准线更为严格。

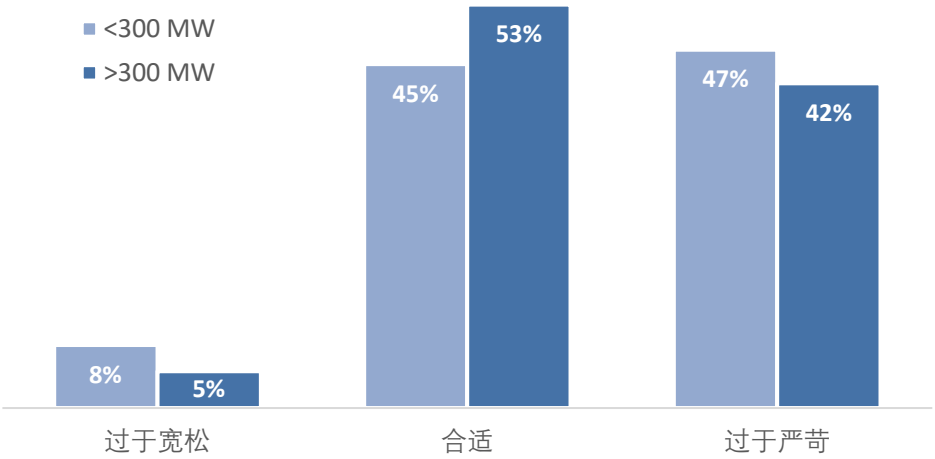


图 10：全国碳排放权交易体系设定的基准线是否足以鼓励减少温室气体排放？（n=127,119）

[7] 2021 年和 2022 年碳排放交易配额总量设定和分配实施计划：
https://www.mee.gov.cn/xxgk2018/xxgk/xxgk06/202211/W020221103336161991455.pdf

反馈摘录：发电企业对于配额分配基准线的适当程度

- “随着电力市场改革持续深化，火电企业更多的是发挥兜底保障作用，频繁参与电网深度调峰等工作，导致煤耗及运营成本大幅升高。若进一步收紧配额分配方式，将进一步增加企业的成本。”——大型发电企业代表（湖北）
- “300MW 及以下机组配额盈余比例大；600MW 很多机组出现亏损，1000MW 机组配额盈余较多，感觉对 600MW 机组略不公平。”——大型发电企业代表（北京）
- “看近两年执行情况，基本合适。”——大型发电企业代表（河南）
- “目前国内在役 600 兆瓦等级，和 1000 兆瓦等级基准一致。但煤耗差别较大，多年节能改造，机组改造空间有限。”——大型发电企业代表（山西）
- “600MW 机组配额有较大缺口，300MW 机组盈余较大。”——中等规模发电企业代表（四川）
- “600MW 机组的基准线过于严苛。”——大型发电企业代表（山东）

来自发电行业的受访者还被问及其认为基准线应多久更新一次。超过半数受访者选择了每五年更新一次，而 38%受访者认为每年更新一次是合适的。选择“其他”的八名受访者建议更新基准线的周期在一年至五年之间（即两年或三年）。多名受访者建议，应该为各个履约期调整基准线，目前的基准线每次涵盖两年的排放量。

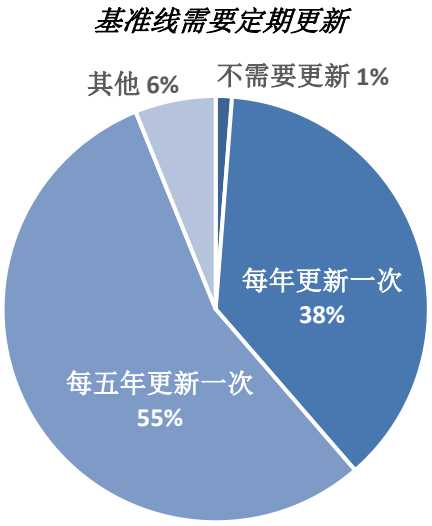


图 11：您认为基准线应多久更新一次？（n=163）

反馈摘录：基准线更新

- “目前电力行业装机结构处于一个快速变化的阶段，建议每年调整以适应市场需求。”——大型发电企业代表（湖北）
- “基准线更新太频繁，导致市场主体无法准确预期，不敢交易。基准线不更新或者很久更新一次，则基准线不见得适合各年度的形势和政府要求，要与时俱进。所以建议 5 年更新一次。”——大型发电企业代表（北京）
- “结合履约周期调整较为合理。”——大型发电企业代表（四川）
- “设置基准线，费时间，费人力，核查核算环节成本过高。”—小规模发电企业代表（新疆）
- “每年更新的话由于技术更新迭代没这么快，没必要，五年可考虑是否更新。”——大型发电企业代表（宁夏）
- “根据当年的经济形势合理调整基准线，减轻火电压力。如去年煤价高企，环保管控，生存已成困难，碳履约压力陡增。”——大型发电企业代表（山西）

半数发表观点的受访者预计全国碳市场将在 2025 年至 2030 年间引入配额拍卖。

配额拍卖预计在 2030 年前启动

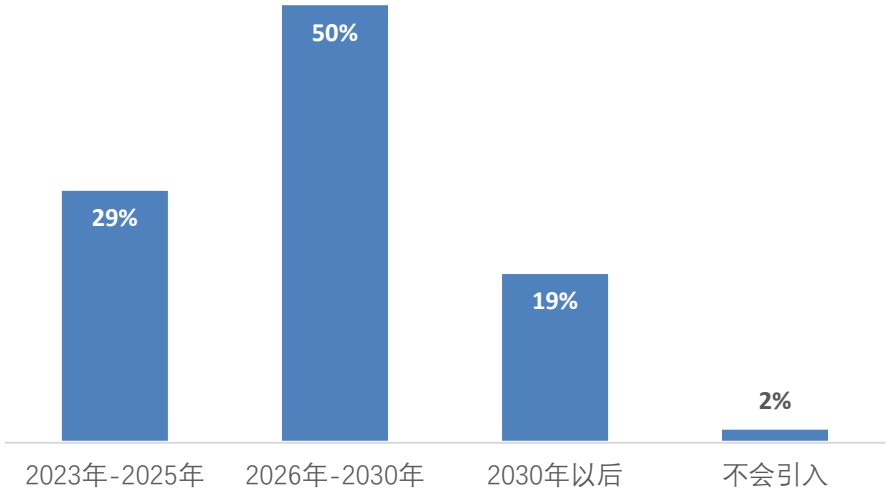


图 12：您预计全国碳排放权交易体系将在什么时间启动排放配额拍卖？（n=412）

测量排放

绝大多数电发电行业的受访者倾向于使用实测值作为关键排放因子，进而计算设施的总温室气体排放量。

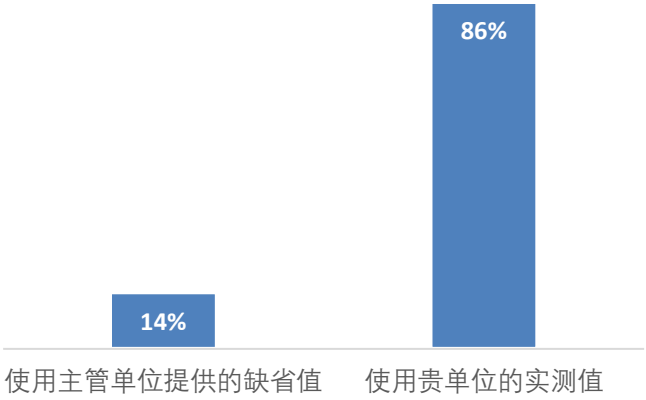


图 13：在计算设施的温室气体排放总量中，您更倾向于采用哪种方法获取关键排放因子？（n=122）

反馈摘录：排放因子

- “实测操作难度大，技术要求高，难以进行监督。”——的发电企业代表（北京）
- “分地区煤种差异大，实测值有利于推动碳检测工作开展，提高企业重视程度，激励企业加大检测设备人员培训的投入。”——中等规模发电企业代表（新疆）
- “对于小耗量的化石燃料可采用主管单位缺省值。大宗燃料应采用实测值，缺省值比实测偏大很多。”——大型发电企业代表（宁夏）

38%的受访者认为，安装连续排放监测系统（CEMS）是确保温室气体排放数据可靠性最为关键的措施。还有四分之一的受访者认为，明确排放企业与核查机构的法律权责是最关键的措施。

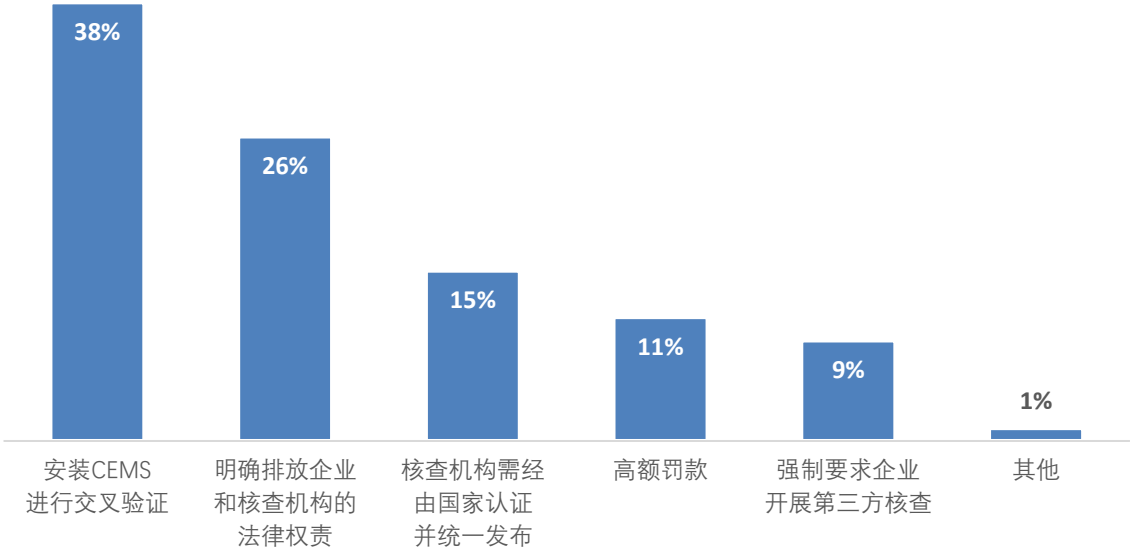


图 14：您认为哪项措施对确保实体的温室气体排放数据的可靠性而言最为关键？（n=446）

全国碳市场的管理

受访者被问及何种强度的处罚或激励措施才能确保高履约率。最受欢迎的选项是让无法履约的公司留下负面的信用记录，由此影响其从银行获得融资的能力。这与之前的调查结果一致。

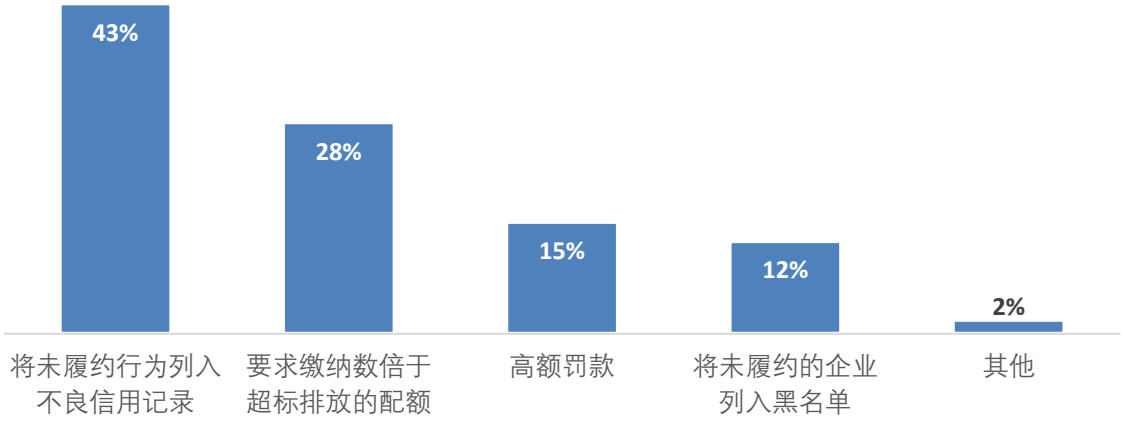


图 15：您认为何种惩罚/激励机制能够确保高比率的履约？（n=435）

受访者被问及何种类型的数据应该被公开以支持市场透明度。约三分之二的受访者认为企业年度排放数据应当优先被公开。

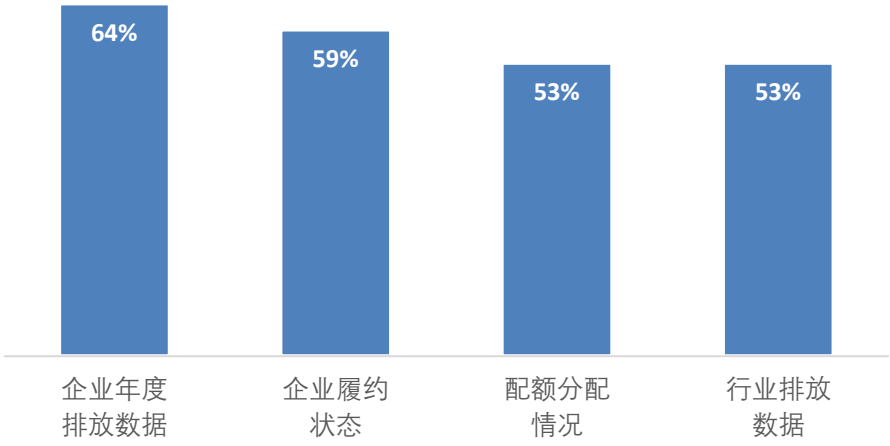


图 16：出于支持市场透明度的目的，应该公开哪些数据？（n=450）

半数受访者认为，非排放行业（例如碳排放交易商、机构投资者等）到 2025 年将被允许参与全国碳市场。

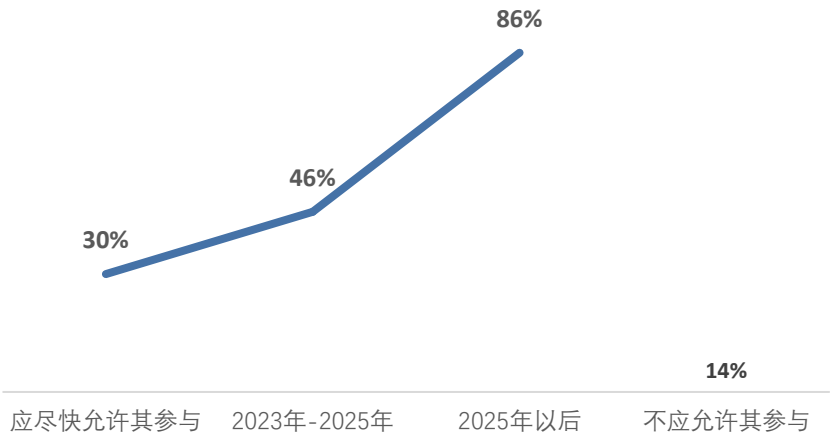


图 17：您认为非排放行业何时能够参与全国碳市场？（n=412）

反馈摘录：纳入非履约企业

- “碳排放权来自于企业，非排放企业进行具有金融属性参与，容易引导碳价走高，扰乱市场，增加企业负担。”—— 钢铁企业代表（广西）
- “金融机构的快速介入一来有助于碳市场的快速构建，另一方面可以尽快让金融体系在碳市场中成熟。”—— 建材企业代表（安徽）

受访者被问及他们认为何种碳金融产品最适合在全国碳市场启动初期被引入市场。最受欢迎的选项是“期货”。

碳期货是一种衍生金融合约，合约双方按照预先确定的未来日期和价格交易配额。在合约到期日，买方必须按预定价格购买配额，卖方必须按预定价格出售配额，不受到期日实际价格的制约。回购协议相当于一种短期抵押贷款。配额的持有者向买方出售配额变现。作为交易的一部分，卖方同意在未来某个日期回购配额。回购配额所支付的价格高于最初的出售价格。

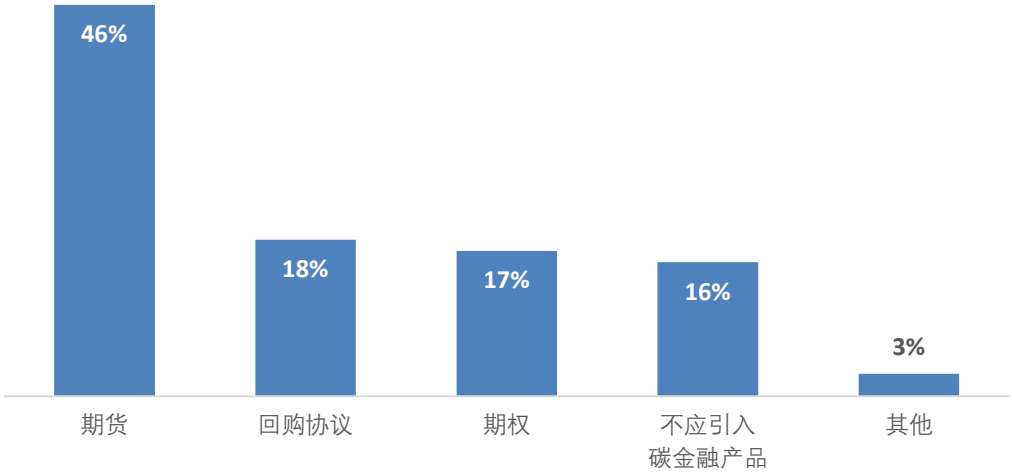


图 18：在全国碳市场启动初期，您认为何种碳金融产品最适合被引入市场？（n=76）

根据生态环境部 2021 年发布的《碳排放权交易管理办法（试行）》，通过全国碳排放权交易系统进行交易的方式包括协议转让、单向竞价或其他合规方式。协议转让是指交易双方达成协议并确认交易的交易方式，包括挂牌协议交易和大宗协议交易。其中，挂牌协议交易指交易主体通过交易系统提交卖出或买入挂牌申报，而有意向的受让方或转让方对挂牌申报进行协商并确认交易的交易方式。大宗协议交易指交易双方已初步达成交易意向，但需要通过交易系统查询价格并确认交易的交易方式。单一大宗交易的交易量应在 10 万吨以上。

略高于半数发表意见的受访者认为，大宗协议交易价格无法体现真实的碳价（边际减排成本）。

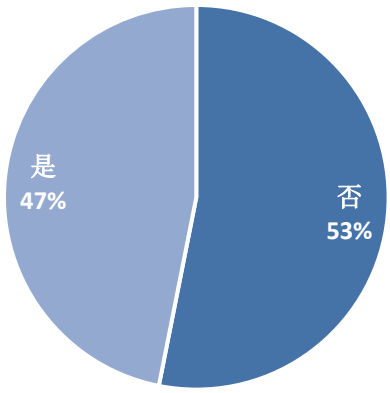


图 19：您认为大宗交易是否体现了真实的碳价/边际减排成本？（n=352）

来自被纳入全国碳市场的企业的受访者被问及其迄今为止在第一和第二履约周期中的经验。结果表明，截至 2022 年 11 月，许多被纳入全国碳市场的企业在参与碳市场能力方面仍有待提升。

公司需要进一步的能力建设

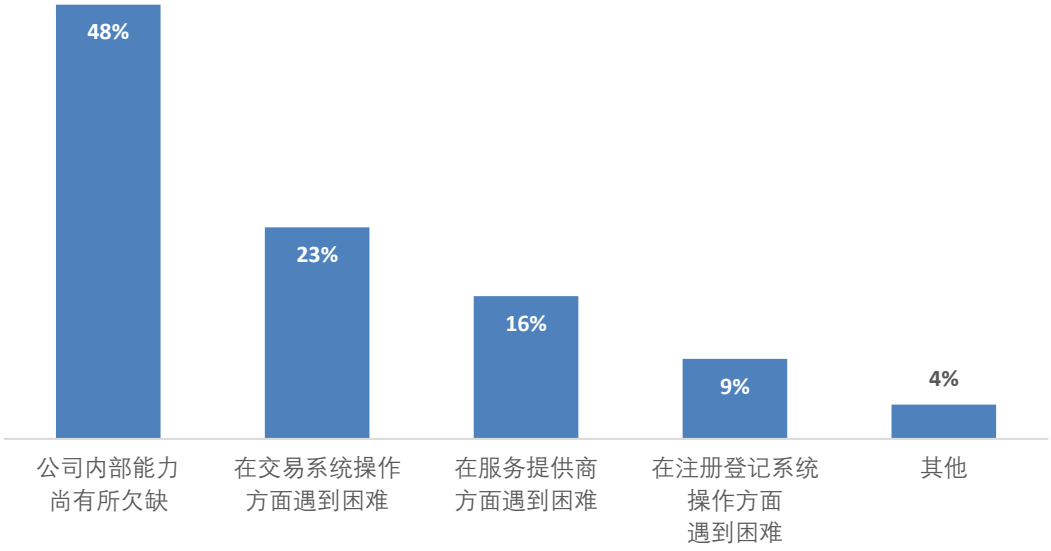


图 20：截至目前，您在履约期内是否遇到过任何困难？（n=158）

反馈摘录：履约面临的困难

- “人员素质低，更换频繁。”——某发电企业代表（内蒙古）
- “国家对企业核算环节已梳理清晰，但是交易环节仍缺乏培训。企业领导单纯重视，落实下去后工作人员操作困难。集团内部掌握在特定机构，企业在交易上自主性较差。”——发电企业代表（新疆）

受访者被问及其是否预期中国会设定绝对减排目标。专家和政策制定者对于这个问题已经讨论过一段时间，这一目标的设定与否也可能会对全国碳市场的设计产生影响。只有 37%的受访者表示预计中国将设定到 2030 年的绝对排放目标（低于去年的 48%），而约半数的受访者则预计中国将设定迟于 2030 年的绝对排放目标。

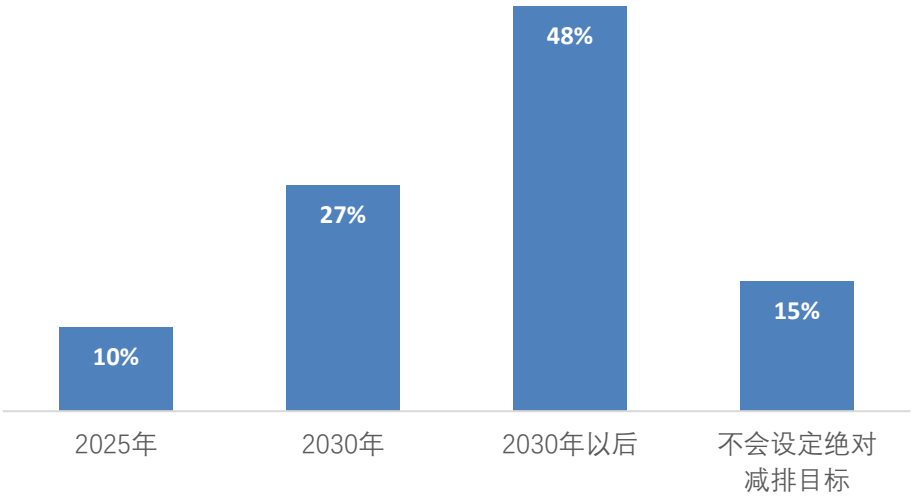


图 21：您预计中国是否将设定以下绝对排放目标：（n=423）

碳价预期

从地方碳市场试点建立之初到目前的成熟运作阶段，本调查对地方碳市场试点发展的预期和观点进行了持续的追踪。

来自试点地方的受访者被问及其对于地方碳市场试点未来最高碳价和最低碳价的预期，从而为未来几年的碳价预期提供了一个区间。在本次调查期间，碳价预期介于重庆的31元/吨和北京市的104元/吨之间。具体的地方碳价见第3页图表1。

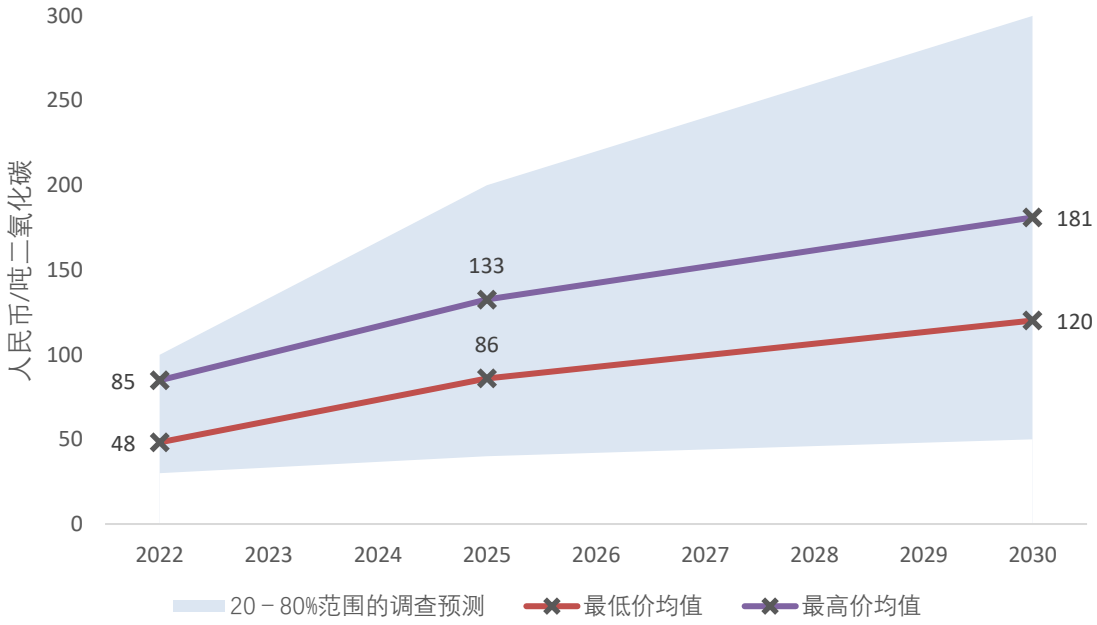


图22：您对未来几年试点地区的最高与最低碳交易价格的预期是什么？（n=161,159,160）

反馈摘录： 对区域碳市场的价格预期

- “当前国家碳排放权配额分配政策进一步收紧，在CCER未完全开放前碳排放配额价格估计会有一定的上浮。但随着新能源开发进一步深化及CCER政策的放开，碳价会有一定的回落，但整体价格基本稳定在一定区间。”——发电企业代表（湖北）
- “逐步同国际碳价接轨。”——研究机构代表（湖北）
- “目前中国全经济尺度的边际减排成本大概是7美元。碳市场若要发挥有效作用，碳价应该大于或等于每吨7美元。迈向2030年碳达峰、2060年碳中和目标，中国经济全尺度的碳减排成本也会有所增加，所以碳价还有上升空间。‘十四五’期间，中国碳市场的碳价可能在每吨8美元至10美元左右。‘十五五’期间，碳价可能进一步升至每吨15美元。”—— 研究机构代表（湖北）

近 40%发表意见的受访者表示，参与调查时，全国碳市场的配额价格与他们的预期相当。然而，纳入行业和其他受访者之间的观点略有分歧——来自纳入行业的受访者更倾向于实际价格高于预期。

纳入行业更倾向于认为价格高于预期

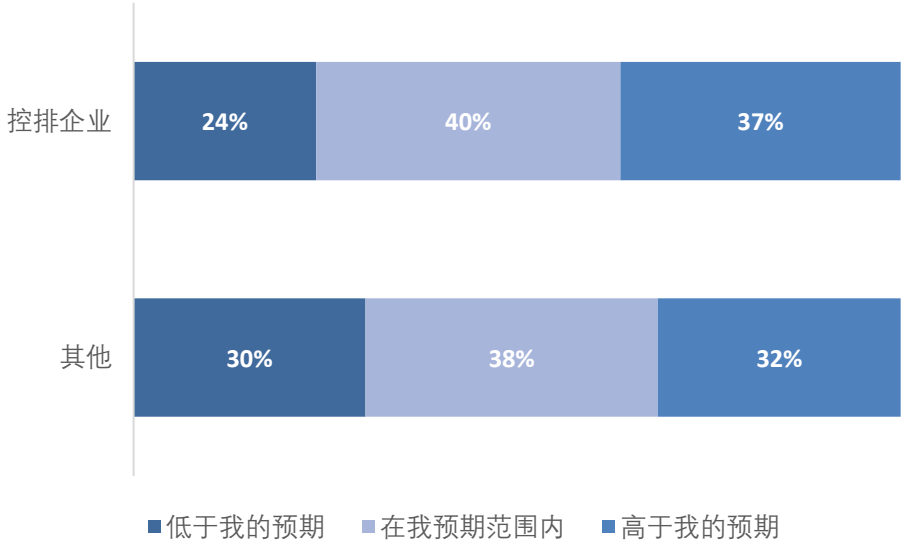


图 23：目前全国碳市场价格与您的预期相比如何？（n=366）

自 2013 年以来，本调查一直围绕利益相关方对地方市场碳价和全国碳市场碳价的预期进行调查。2021 年的调查中，受访者的平均碳价预期为 49 元/吨二氧化碳，当时，全国碳市场交易于 7 月刚刚启动。

今年，受访者再次被问及他们对于全国碳市场在不同时间点的平均碳价预期。结果显示，受访者预计碳价会稳步上涨，但对于上涨幅度的预期存在显著差异。

针对全国碳市场的平均碳价预期是：2022 年为 49 元/吨，2025 年上涨至 87 元/吨，到 2030 年之前则将涨至 139 元/吨，到本世纪中叶为 239 元/吨（见图表 34）。虽然实际价格水平依然存在很大的不确定性，但自去年调查以来，针对同一年份的预期范围有所缩小。20-80 百分位区间碳价预期从 2022 年的 49 元每吨至 60 元/吨上涨至 2030 年的 58 元/吨至 180 元/吨。

作者剔除了多个极端反馈。[8]下表显示了平均价格预期和中位数价格预期。34%的受访者没有给出碳价预估。

[8] 作者剔除了 3 名受访者的极端反馈，即 2030 年前为 1000 元/吨或以上，2050 年为 2000 元/吨以上。这些答复过于极端，因此不包括在分析中。

预计中国碳价将稳步上涨

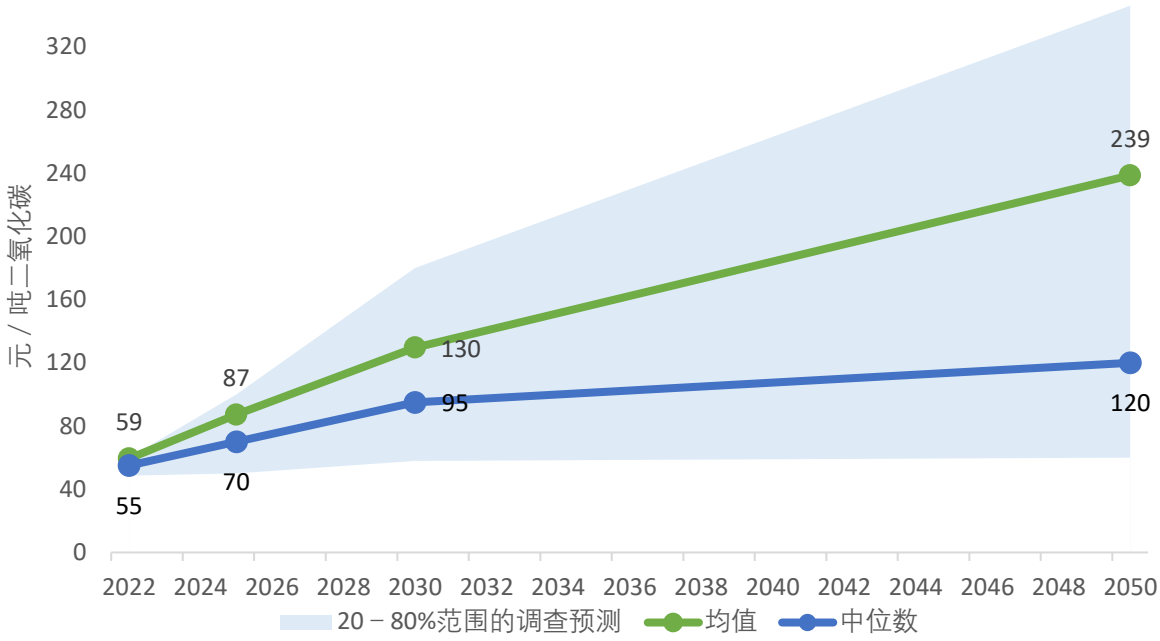


图 24：您对未来全国碳市场的碳价预期为何？（n=297，299，289，89）

控排行业和其他类型受访者对长期价格的预期各不相同，控排行业受访者对不同时间节点的预期价格均较其他类型受访者的预期价格低。

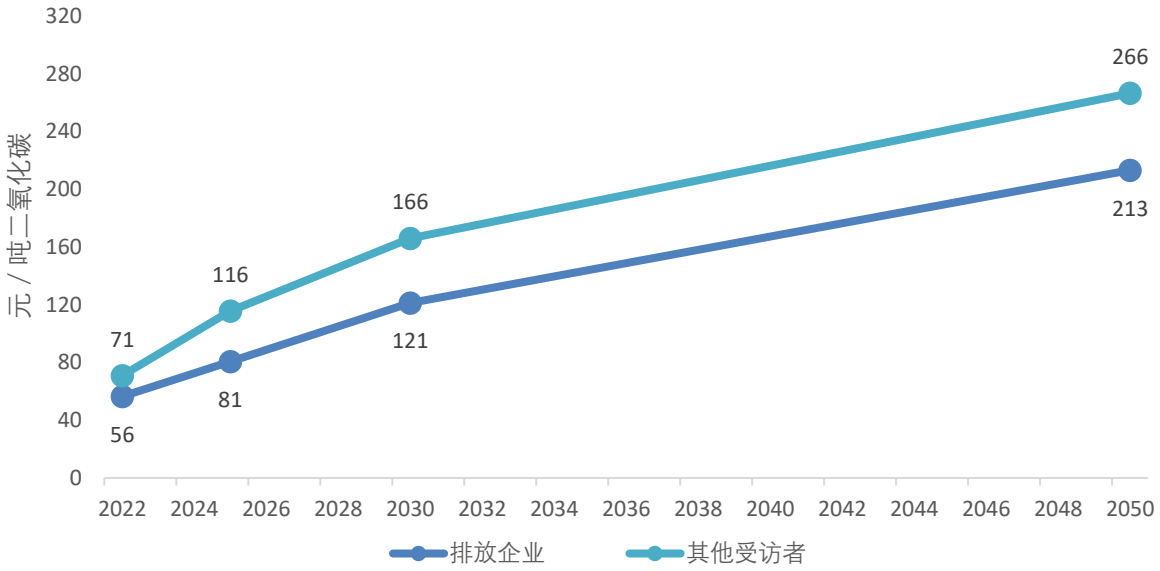


图 25：您对未来全国碳市场的碳价预期为何？
来自控排行业的受访者与其他类型受访者反馈对比。

对 2030 年的价格预期要略低于去年调查的结果，但其依然大大高于 2020 年及之前的调查结果。对未来价格的预期似乎普遍受到当前实际价格水平的影响。

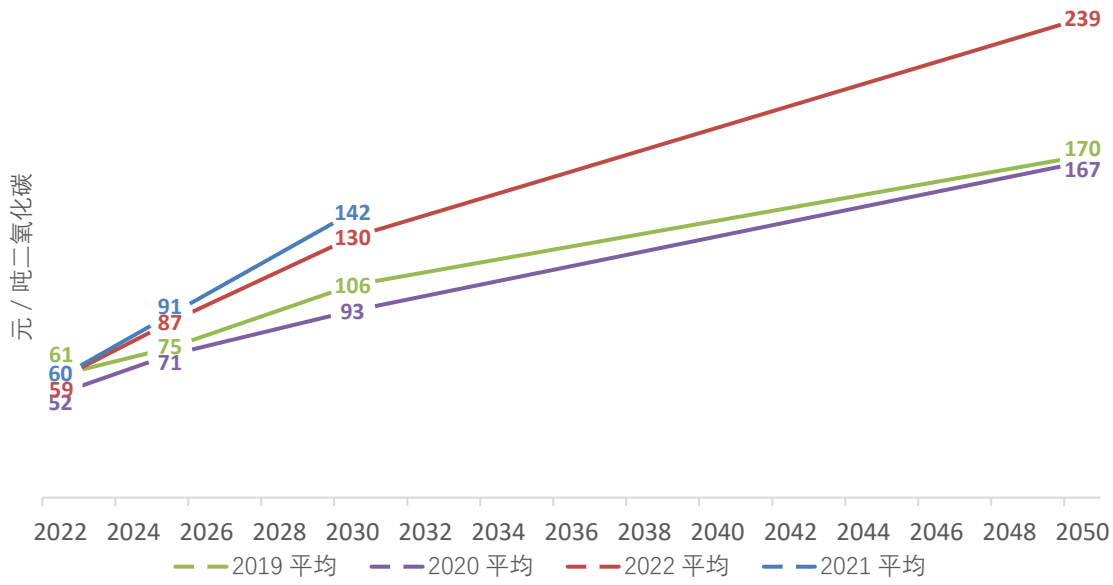


图 26：对全国碳市场价格的预期，2019-2022 年中国碳价调查。

需要注意的是，碳价预期仅为评价整体减排工作的部分指标，因为如强制关闭低效设施、鼓励节能、可再生能源上网电价等非定价政策也将成为碳市场的补充手段。

反馈摘录：对全国未来若干年碳价的预期：

- “基准逐年压减，价格会升高。”——发电企业代表（山东）
- “随着双碳政策的严格落实，企业节能减排工作也随之加快步伐，并且基准线的逐步缩紧，可交易配额量会逐步减少！”——发电企业代表（吉林）
- “随着国家重视，碳市场建立，碳价会涨价。”——化工企业代表（新疆）
- “随着双碳目标临近，碳减排压力巨大，企业碳配额缺口将逐步增加，价格自然会高。”——研究机构代表（湖北）
- “参照国外碳市场价格，接近我国 2060 年碳中和目标时，碳价理应高涨；2025 年之前履约单位单一，碳价处于稳定上行阶段；2030 年后，随着非排放单位的加入，活跃度增加，碳价大幅上涨，有利于企业加大减碳力度。”——钢铁企业代表（江苏）
- “碳达峰前，可能是观望期，稳中有降；待国家政策出来后推高碳交易价格，碳配额处于供不应求状态；碳达峰后国家目标转为碳中和，绿碳会逐渐供过于求，碳交易价格下降。”——建材企业代表（云南）
- “个人认为 2030 年是个重要节点，增速放缓，让碳峰值更高一些，把经济基础体量打起来，30 年后，到 2060 年之间是一个碳中和的过程，这个阶段碳排放基本也就处在可控区间，同时，国家放开了计划生育政策，这区间国内人口应该会有一个幅度的增长，因此产生的就业需求是必须要解决的问题，因此，这个时候，碳排放交易价格也应该回归到一个比较合理的区间，从而平衡好经济发展，民生需求以及可持续绿色发展之间的关系。”——化工企业代表（新疆）
- “碳交易价格太低，企业没有积极性。”——石化企业代表（新疆）

自愿碳市场/抵消机制

自中国宣布将到 2060 年实现碳中和目标以来，中国企业对碳抵消信用的需求一直处于激增状态。一方面，碳排放权交易体系（履约市场）所覆盖的企业可以使用国家核证自愿减排量（CCER）来满足其履约义务的一小部分。另一方面，对于许多目前未被碳排放权交易体系覆盖的大型企业而言，其正在自愿承诺实现碳中和，包括通过使用可由各种认证系统核证的碳抵消信用等。

在今年的调查中，控排企业受访者被问及其所在企业目前是否购买了碳抵消信用。仅 16%的知情者回答称其所在企业购买了碳抵消信用。在目前已经购买碳抵消信用的企业中，CCER 是迄今为止最受欢迎的碳抵消信用类型。

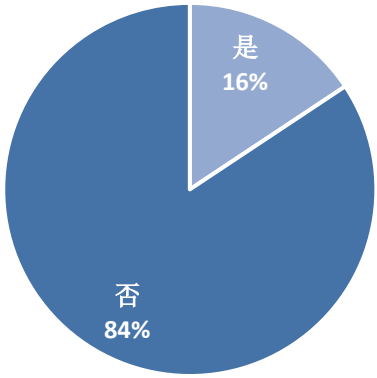


图 27：贵公司是否购买碳抵消信用？（n=287）

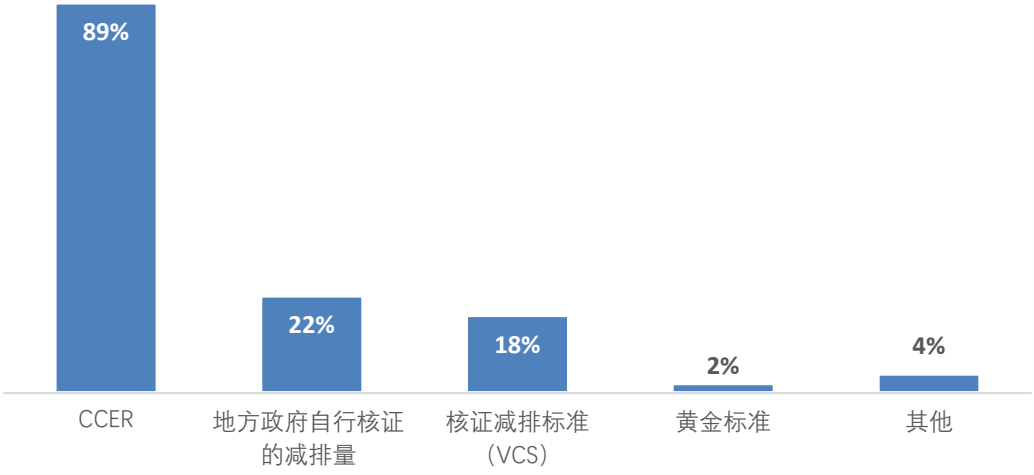


图 28：如果是，贵公司购买了何种碳抵消信用？（多选）（n=45）

来自控排企业的受访者被问及其所在企业是否更倾向于购买某些类型的抵消信用。仅 14%的受访者表示其所在企业有一定的偏好，其中最常见的偏好是涉及太阳能和风能发电等成熟技术的项目。

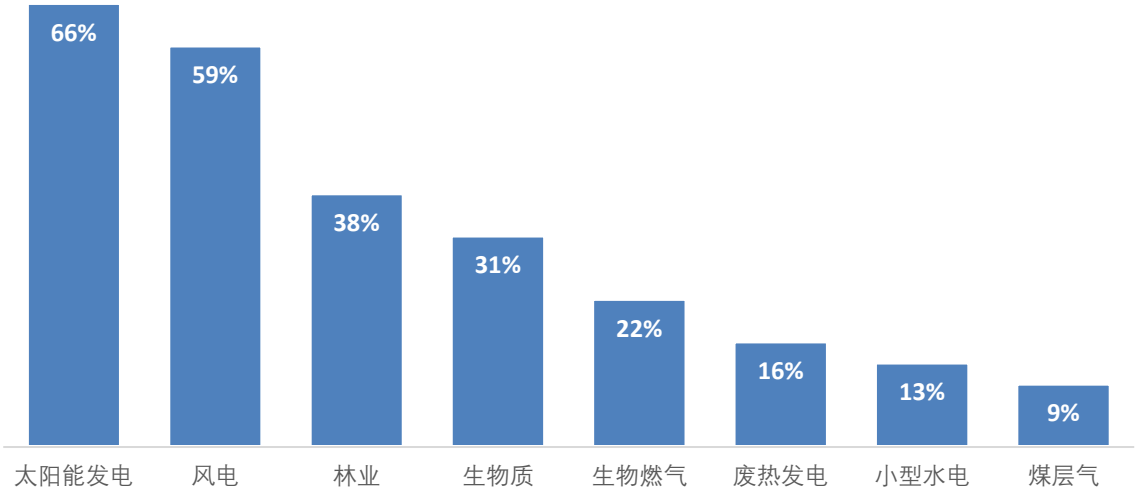


图 29：贵公司是否更倾向于某些类型的碳抵消信用？如果是，是什么类型？（可多选）（n=32）

除了 CCER 之外，至少半数受访者希望由地方政府核证的碳抵消信用能够用于全国碳市场的履约。由 Verra 核证的核证减排标准（VCS）也得到了很大的支持，尽管支持 VCS 可用于全国碳市场履约的受访者的比例要低于去年的调查结果（56%）。

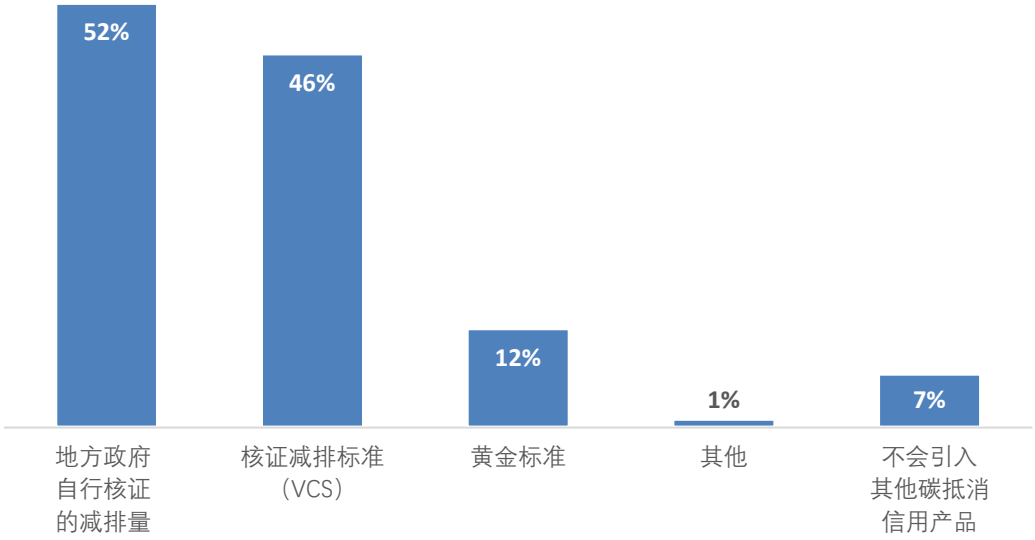


图 30：除了 CCER 以外，您预计还将会有哪些碳抵消信用产品可被用于全国碳市场？（可多选）--占总回复人数的百分比（n=364）

《管理办法》规定，企业每年可以使用 CCER 抵消碳排放配额清缴的抵消比例不得超过应清缴碳排放配额的 5%，且用于抵消的 CCER 不得来自纳入全国碳排放权交易体系配额管理的减排项目。受访者被问及其预计在全国碳市场中使用碳抵消信用是否会受到任何限制。最为普遍的预期是在碳抵消信用的发放年份方面可能会有一定限制。

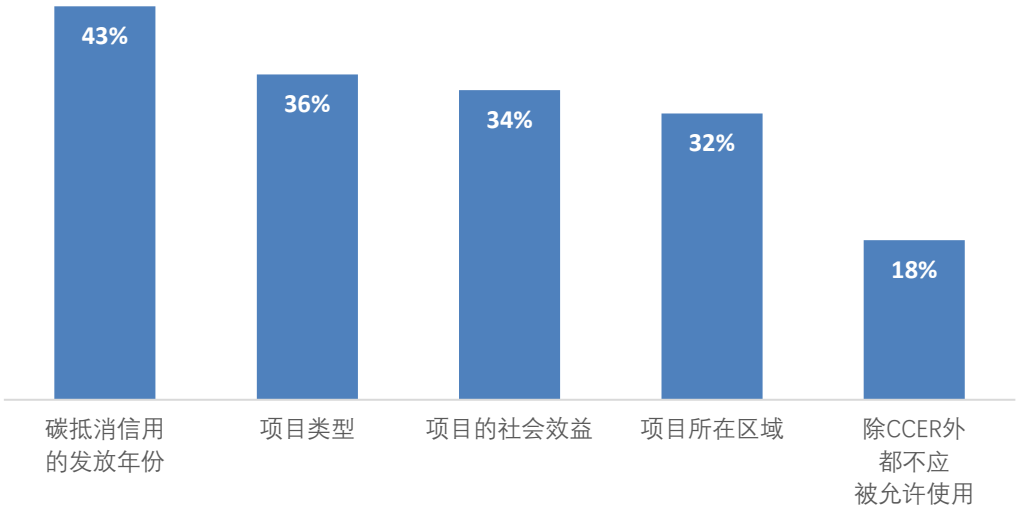


图 31：您预计在碳抵消信用的使用方面会有何种限制？（n=357）

排放交易的准备程度

受访者被问及是否需要进一步的培训以执行/管理全国碳市场的任务，89%的受访者表示其仍需要进一步的培训。在已经被全国碳市场覆盖的发电行业的受访者中也呈现出同样的比例。

在来自控排行业的受访者提供的 367 份反馈中，对能力建设的需求最高的方面为对碳排放权交易体系框架的基本了解，然而，受访者表示在其他方面仍需要进一步能力建设。

许多领域均需要能力建设

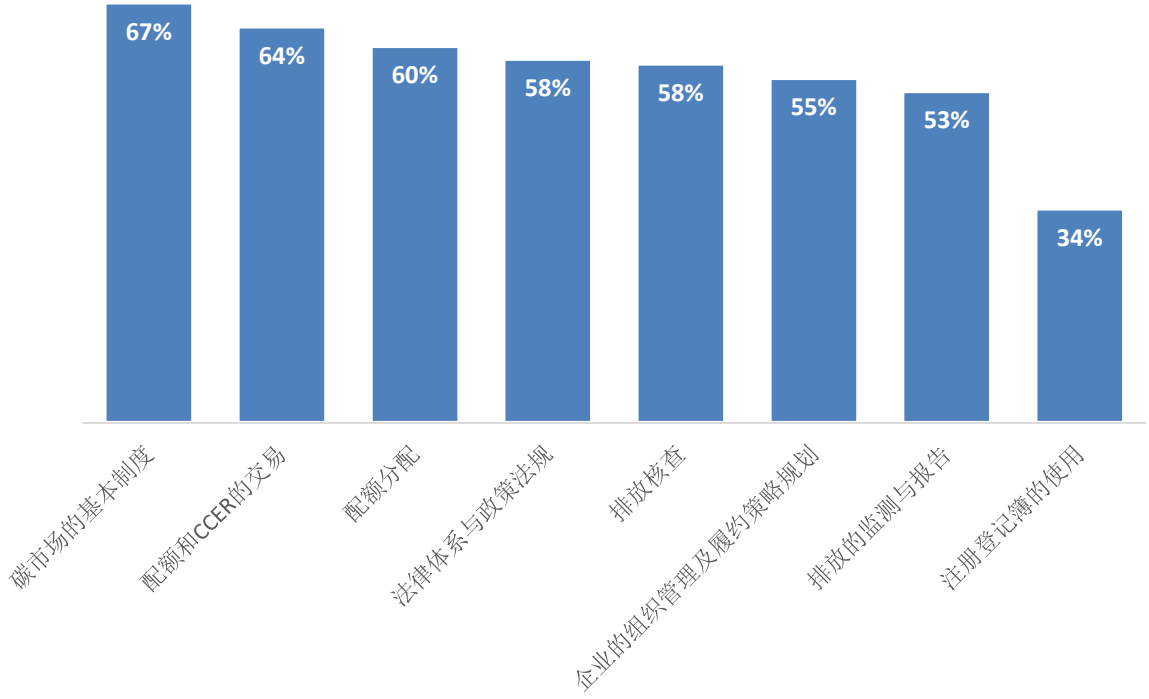


图 32：您是否需要进一步培训以执行/管理全国碳市场的任务？（占总排放量的百分比，而不仅仅是需要培训的企业）（n=367）

通过对参加过地方碳市场试点的企业与没有参加过的企业的回答进行比较，调查显示对进一步培训的需求平均略低（80%）。

来自控排企业的受访者还被问及其所在企业是否有指派专人岗位或成立专门团队来负责碳排放交易履约相关工作。63%的受访者表示其所在企业有专人岗位或专门团队负责（与去年相当）。

超过半数控排企业安排了专门团队负责碳排放交易履约相关工作

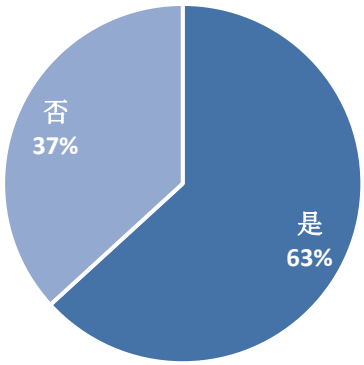


图 33：贵单位是否有指派专人岗位或成立专门团队来负责碳排放交易相关工作？（n=337）

在成立了专门团队负责碳排放交易履约相关工作的企业中，大多数团队人数不足 10 人，平均团队人数为 7.7 人，与去年调查中的 4.4 人相比，规模有所扩大。不同行业数据差异较大，这主要是由于企业规模不同，并且发电行业在碳市场（包括之前的清洁发展机制（CDM））方面积累了更多经验，这是可以理解的。上述结果并不意味着团队人数较少就会造成团队人手不足。即使是规模较大的履约企业，也可以仅指派五人或更精简的团队来专门负责监测、 报告与核查（MRV）以及配额管理等事宜。

大多数企业管理碳排放交易履约相关工作的团队规模较小

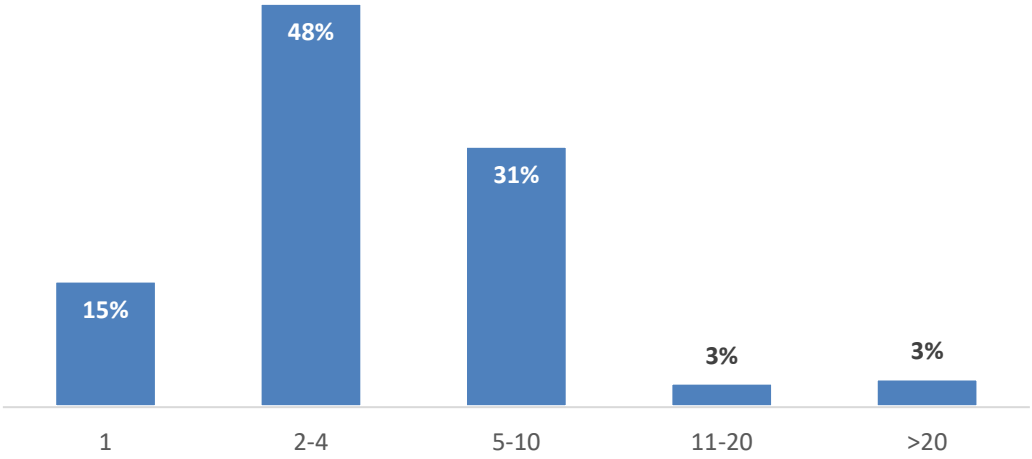


图 34：团队中有多少成员？— 控排行业受访者（n=213）

在碳排放交易履约团队人员构成方面，今年调查结果中， “管理层”首次成为参与比例最高的群体，表明管理层越来越多地参与到碳交易履约相关工作当中。其他最具代表性的专业领域涉及“安全环保”和“节能”。金融专家和工程师参与的比例则相对较低。

管理层越来越多地参与到碳交易履约相关工作中

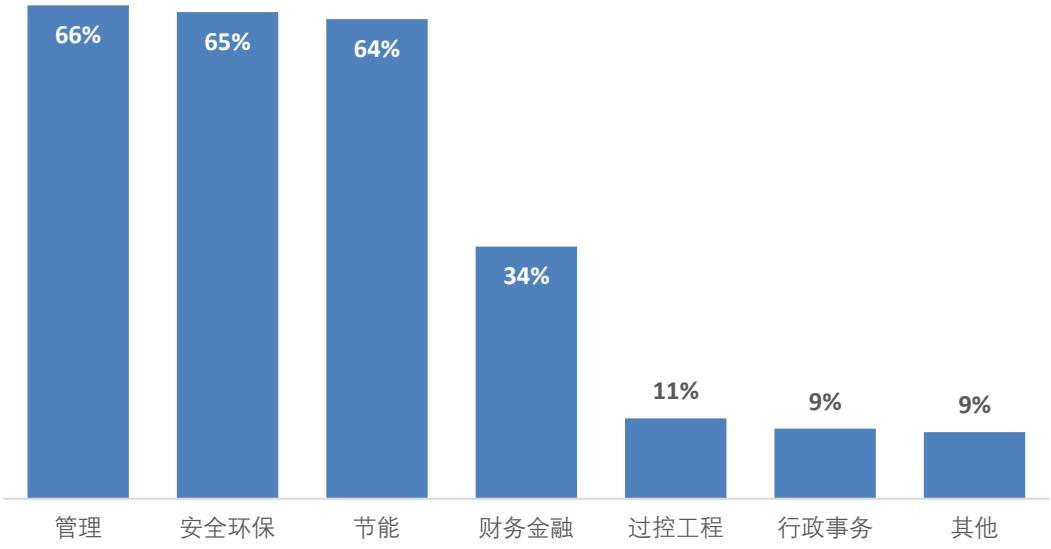


图 35：贵公司指派处理履约相关工作的人员有哪些能力？（n=213）

“采取减排措施”再次成为排放企业计划履行履约义务时最常选择的方法，且选择该方法的受访者人数要高于以往。在去年的调查中，有一半的受访者表示拟采取减排措施来完成履约，而至少有 40%的人计划购买配额或 CCER 以满足其要求。今年，三分之二的人正计划首先通过减少排放的方式来完成履约。

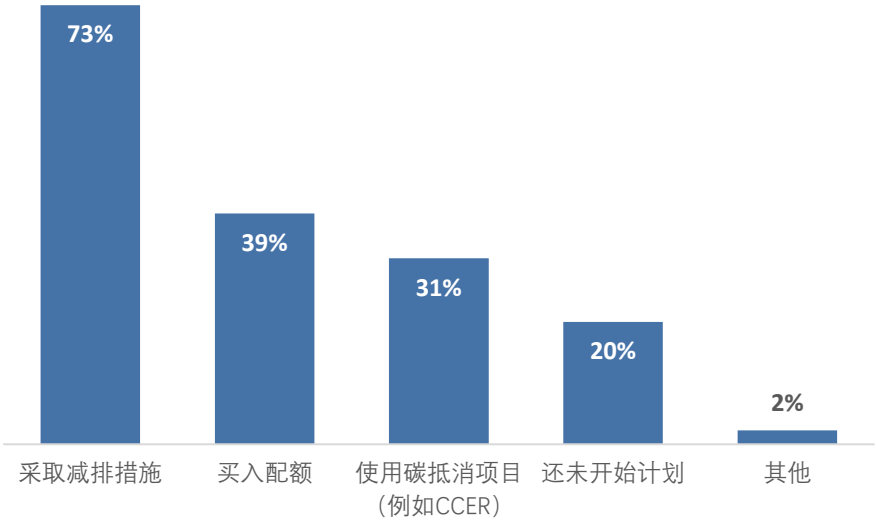


图 36：贵公司计划如何履行其履约义务？（n=361）

68%的来自控排企业的受访者表示企业内部已经设定了减排目标，较去年的调查结果（43%）大幅提高。结果显示，虽然发电企业已经被纳入了全国碳市场，但与其他重点排放行业相比，发电企业设定长期减排目标的比例仍然较少。

越来越多企业设定了内部减排目标

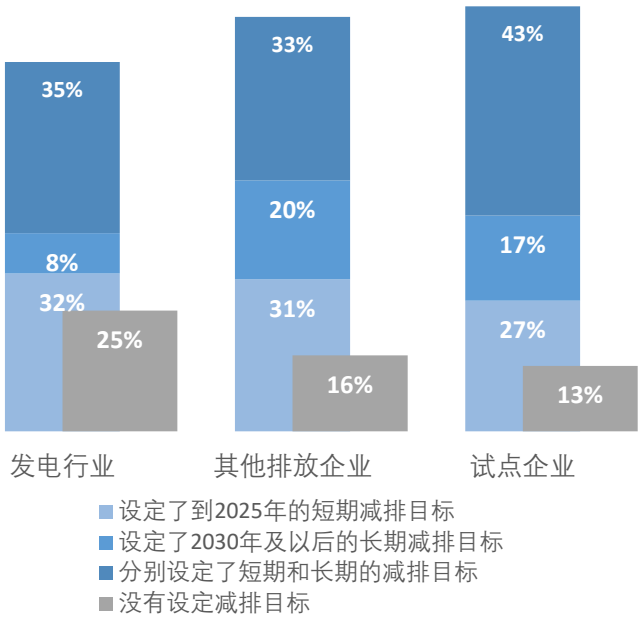


图 37：贵单位是否设定了减排目标？（n=278）

15%的控排行业受访者表示其所在企业已经设定了内部碳价，较去年的比例有所提高。在参与了地方碳市场试点的企业中，20%的企业设定了内部碳价。高达 38%的行业受访者表示不确定其所在企业是否已设定内部碳价，这一结果与之前的调查类似。上述设定了内部碳价的企业中，内部价格平均为 72 元/吨，高于 2021 年调查的 61 元/吨。[9]虽然仅有少数受访者就本问题作出回复（仅有 35 名受访者回复），该结果仍表明部分企业设定的内部碳价高于全国碳排放权交易体系和大多数地方碳市场当前的现货价格。

大企业集团层面的受访者被问及其所在企业是否曾在子公司之间进行内部配额分配。只有少数企业表示曾采取此类配额再分配措施，但与去年调查相比，这一比例有所上升（54%对 38%）。

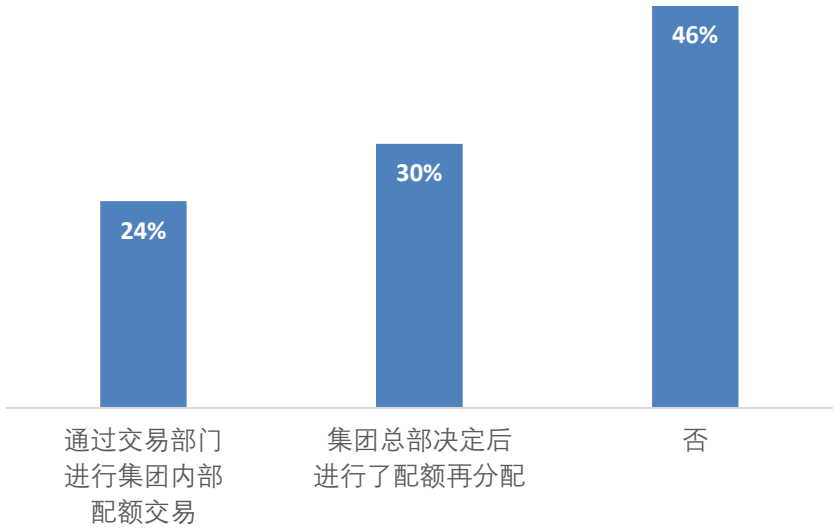


图 38：贵单位是否在子公司之间进行了内部配额分配？（集团层面的受访者）（n=68）

本次调查向发电行业的受访者询问了其所在企业在全国碳市场的第二个履约周期内的配额分配情况。与去年首个履约周期结果相比，更高比例的受访者预计其所在的公司需要在市场上购买配额，以满足第二期的履约需求（41%对 26%）。预期第二个履约周期内配额将会盈余的受访者比例较少（27%对 48%）。

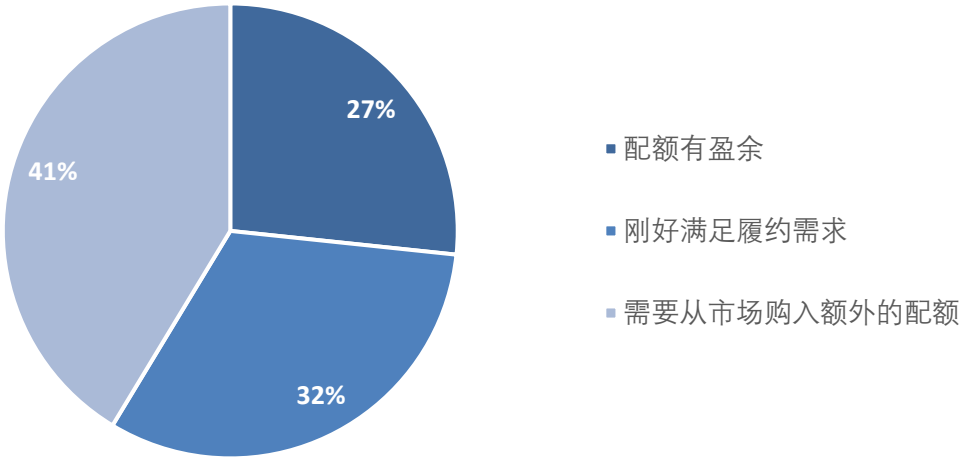


图 39：您对贵单位在全国碳市场第二个履约周期内所分配到的配额情况有何预计？（n=150）

[9] 该问题的结果不包括化工行业的答复，其所报告的内部碳价为 700 元人民币/吨。作者将其作为一个极端的异常值排除。

发电行业的受访者被问及其计划在何时进行配额交易。与传统观念相反，仅有极少数受访者表示会在接近履约截止日期才进行交易。在参与地方碳市场试点的企业中，更大比例的受访者表示会在整个履约期内任何时间开展交易。

不会等到最后一刻才进行交易

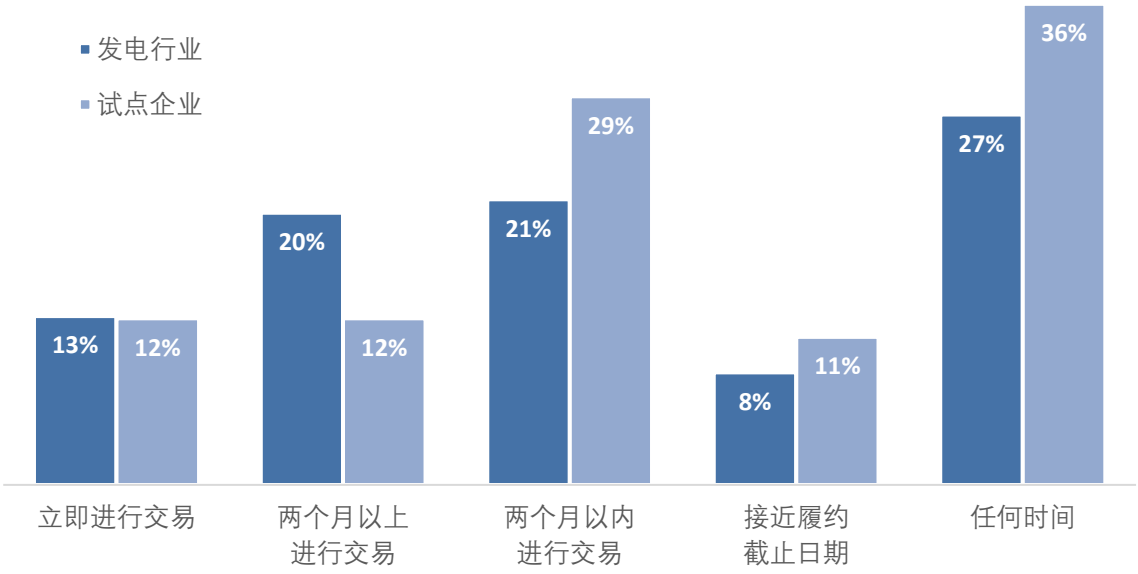


图 40：您偏向在何时交易（出售或购买）配额？（n=144）

发电行业的受访者还被问及其所在企业是否主要进行大宗交易或定期现货交易。大多数受访者表示，大宗交易是其所在企业的主要碳配额交易形式。然而，相当大一部分的受访者（37%）不知道如何回答这一问题。

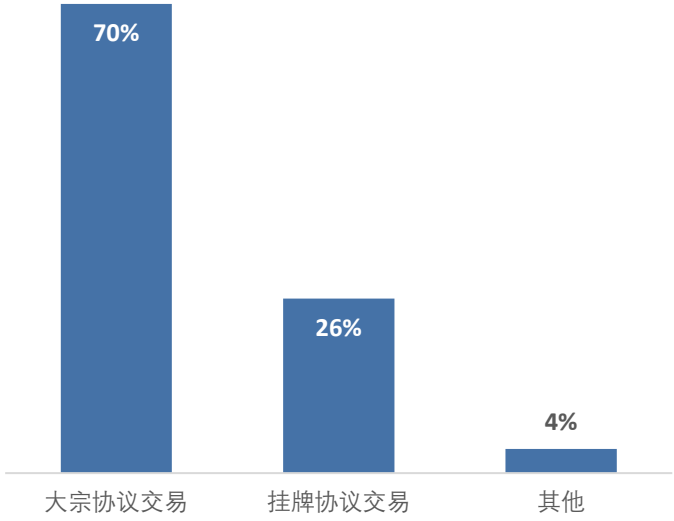


图 41：贵单位将主要进行大宗交易还是常规现货交易？（n=111）

碳价对投资的影响

受访者被问及及碳价是否会影响其所在企业到 2023 年、2025 年、2030 年和 2050 年的投资决策。受访者预计，从当前到 2030 年，碳价将对投资决策所产生的影响将日益增加，尽管认为所产生影响的程度略低于去年的调查结果。约四分之三回答该问题的受访者预计，到 2025 年其所在企业的投资决策至少会受到中等程度的影响。仅有 6%的受访者预计即使到 2025 年其所在企业的投资决策也不会受到影响。

受访者相信到 2025 年碳市场将影响投资决策

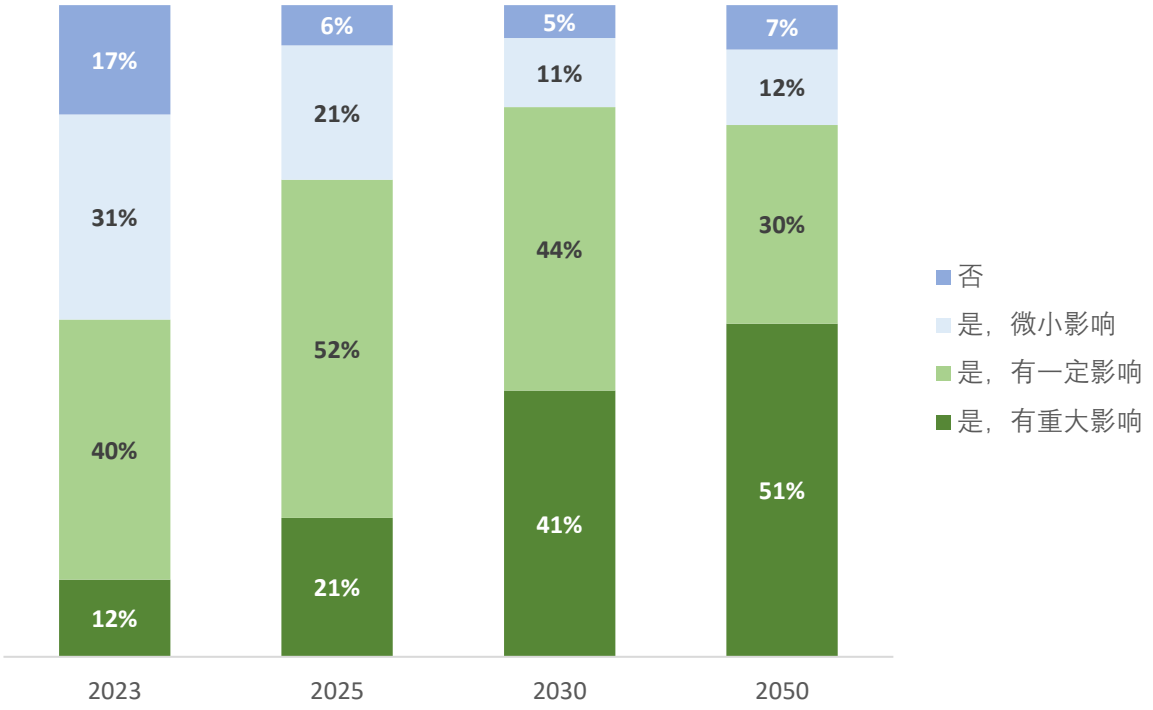


图 42：到 2023 年/2025 年/2030 年/2050 年，您预期中国碳排放权交易体系是否会影响投资决策？（n=423,422,416,397）

反馈摘录：碳市场如何影响投资决策：

- “基准值若收紧后，公司配额已不够履约，碳成本将成为公司重要成本之一，在电力交易决策中占重要组成部分。”——发电企业代表（浙江）
- “目前还未开放钢铁行业配额分配，行业未纳入市场交易。”——钢铁企业代表（广西）
- “我单位电石，电厂，水泥，煤化工，都属于高能耗企业，未来投资越来越难决策。”——化工企业代表（新疆）
- “现阶段政策呼吁性太强，实际引导性不强，做不做差别不大。相信今后双碳政策会对企业更有影响力，作用会更明显。”——食品饮料企业代表（四川）
- “实行碳交易后，企业碳排放高的生产装置就面临着停下来整改。在进行新一轮的投资项目会非常慎重考虑的。”——石化企业代表（北京）

发电行业的受访者被问及碳市场对其公司的财务状况有何影响。大多数受访者表示，截至目前，碳市场产生了积极而非消极的影响（49%对 34%）。

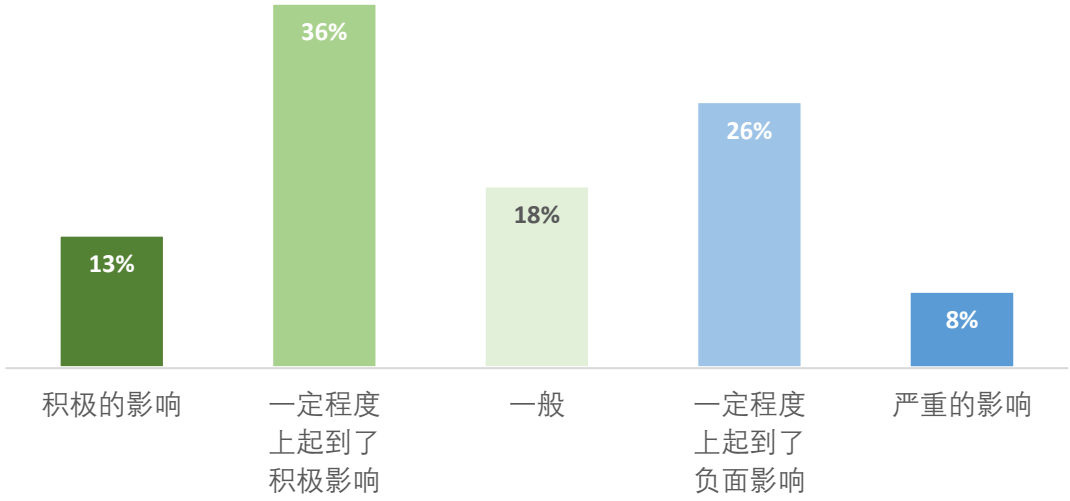


图 43：综合考虑，碳市场对贵公司的财务状况有什么影响？（n=146）

反馈摘录：全国碳市场如何影响公司财务状况：

- “增加企业生产成本。”——钢铁企业代表（浙江）
- “集团统一调配，企业无自主权。”——发电企业代表（新疆）
- “水泥减碳技术部路线多，效果不明显。减排难度大。”——建材企业代表（重庆）
- “关停了部分小规模产能，产业链整体生产能力有所降低，造成了一定的影响。”——化工企业代表（新疆）
- “引导企业开展谋划开展节能技改，争取更多的资金和管理资源倾向于降低碳排放的技术改造。对于之后的生产经营和财务状况是好事。”——有色金属企业代表（内蒙古）

与实行碳价机制的其他大部分国家和地区不同，目前中国的电价由中央政府逐年确定，且各地区电价之间存在差异。这意味着发电企业无法将碳价转嫁给消费者。受访者被问及其预期碳价将会于何时对消费者终端电价产生影响。仅 21%的受访者认为到 2025 年碳价将影响电价，而与去年相比，更多的受访者预计这一改革将在 2030 年后实现。

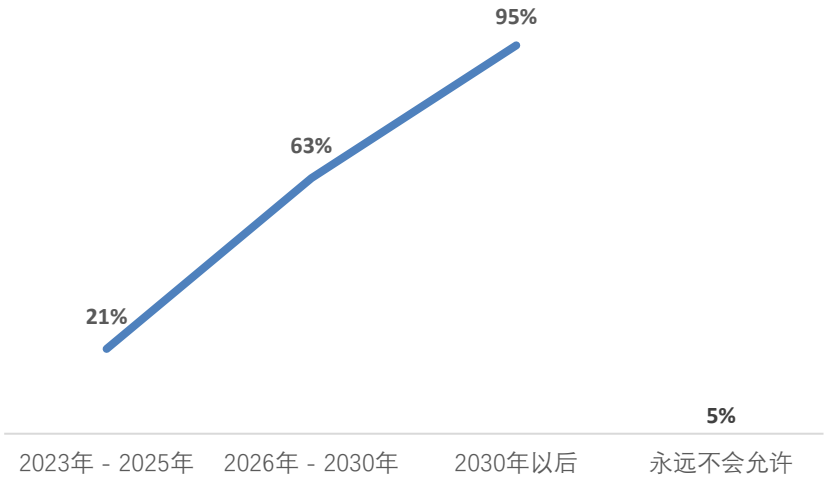


图 44：您预期电力市场改革将于何时允许碳价从发电企业传导到终端用户？（n=399）

排放达峰

2020 年 9 月，中国国家主席习近平承诺，中国能源消费的二氧化碳排放将力争在 “2030 年前”（而不是“2030 年左右”）达峰，增强了中国应对气候变化的雄心。今年，43%的受访者预计，中国将在 2030 年前实现二氧化碳排放达峰。只有 13%的受访者预计中国的排放量将在 2025 年或更早达峰，较 2020 年调查中的 36%有所下降。

中国有望在 2030 年前或不晚于 2030 年实现碳排放达峰

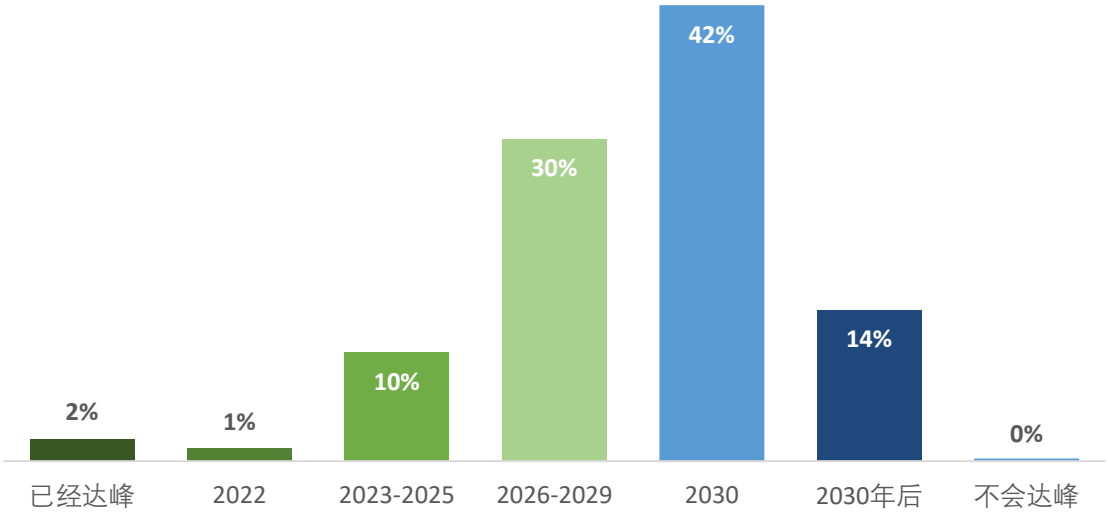


图 45：您预期中国碳排放将于何时达到峰值？（n=434）

碳边境调节机制

随着全球应对气候变化的力度加大，以及全世界，尤其是欧盟碳价的不断上涨，限制“碳泄漏”所面临的挑战日益引起关注。避免“碳泄漏”不仅关乎本地经济，也与全球去碳化进程密切相关，因为如果某些地区的减排量被其他地区的排放量所抵消，将延缓全球实现“净零排放”的进展。

来自水泥、钢铁、电解铝和化工行业的受访者被问及其所在企业是否向欧盟出口。如果对欧盟出口，他们是否充分了解欧盟计划推出的碳边境调节机制（CBAM）及其对行业的影响。上述行业中的 17 名受访者（12%）表示其所在企业从中国向欧盟出口商品。其中 41%的受访者表示其对于碳边境调节机制有中等程度或充分的了解，高于去年调查的 30%。但值得注意的是，这仍然是受影响的受访者中的少数。

对欧洲推出的碳边境调节机制（CBAM）的了解并不充分

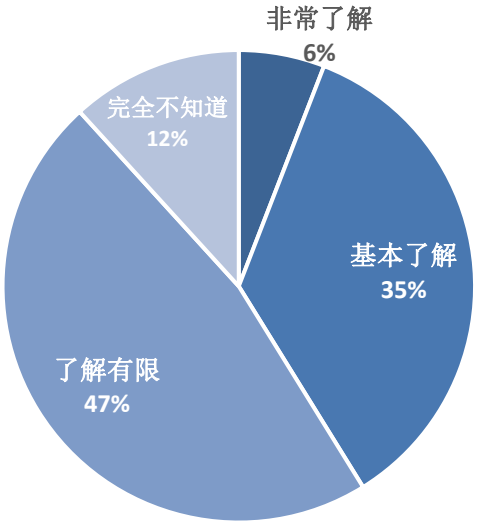


图 46：您对欧盟拟推出的碳边境调节机制（及其对您所在行业的影响）有哪种程度的了解？（n=20）

与去年的调查相比，预计碳边境调节机制将影响其出口的企业比例有所增加（78%对 60%）。

出口企业担心碳边境调节机制会影响业务

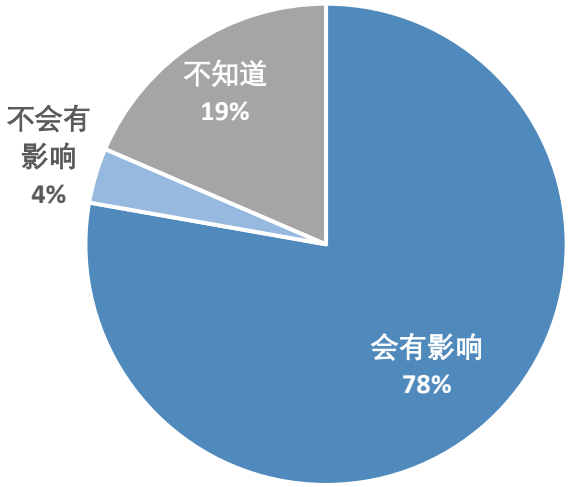


图 47：您预计碳边境调节机制是否将影响您所在企业对欧洲的出口？（n=20）

项目合作伙伴

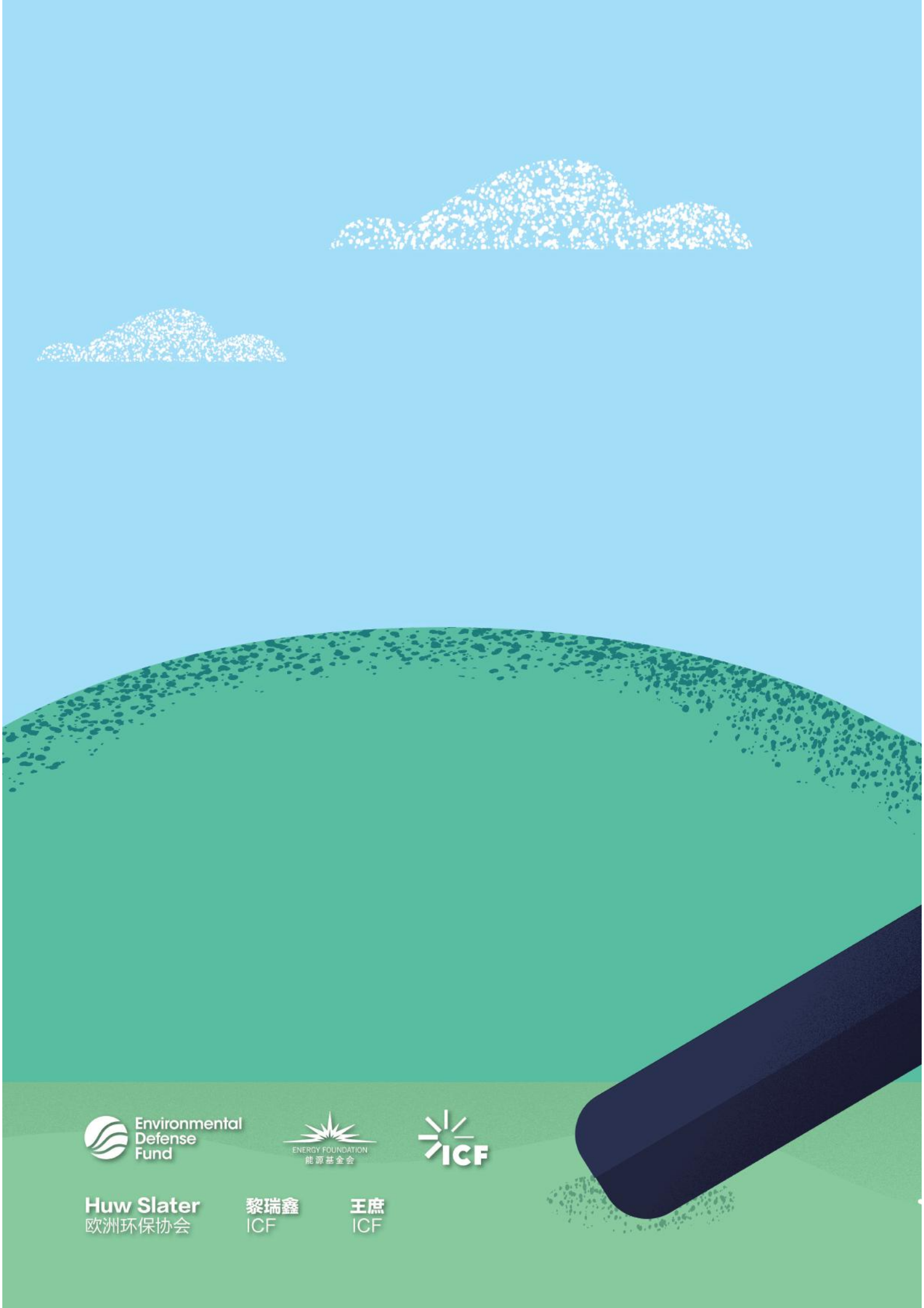
ICF 国际咨询公司是全球领先的气候变化和低碳相关服务提供商，在英国、中国、比利时、印度、尼泊尔、欧洲和北美均设有办事处以及能源/气候专家。ICF 拥有 1500 多名专业员工，致力于气候变化、能源和环境问题的研究。ICF 北京办公室对中国的能源、环境、经济和政策问题有深入的研究，在中国持续开展了 20 年的气候政策能力建设项目，并拥有广泛的合作伙伴和利益相关方网络。ICF 连续两年（2017 年和 2018 年）在《环境金融杂志》的“年度市场排名”评选中被评为中国碳市场最佳顾问/咨询公司。

项目资助方

美国环保协会（EDF）成立于 1967 年，总部设在纽约，是世界领先的环境组织之一。美国环保协会目前有 300 多万名成员，近 1000 名专业人员，在世界各地设有 12 个办事处，包括美国、中国、英国和墨西哥。协会工作领域包括：气候和能源、海洋、生态系统、健康等。自成立以来，协会一直以科学和经济原则为指导，聚焦最严峻的环境问题，寻找切实和持久的解决方案。美国环保协会自 1991 年以来一直在中国开展工作，2017 年 6 月，美国环保协会成为首家在中国环境保护部监督下注册的外国非政府组织。

能源基金会是在美国加利福尼亚州注册的专业性非营利公益慈善组织，自 1999 年起一直在中国开展工作，致力于中国可持续能源发展。基金会在北京依法登记设立代表机构，由北京市公安局颁发登记证书，业务主管单位为国家发展和改革委员会。能源基金会的愿景是通过推进可持续能源促进中国和世界的繁荣发展和气候安全。我们的使命是通过改造能源和优化经济结构，促进实现温室气体排放中和，世界一流的空气质量、能源获取和绿色增长。我们作为再捐资者、协调推进者和战略建议者，高效推进使命的达成。

挪威环境局致力于建设一个绿色清洁、多样化的环境。其主要任务是减少温室气体排放，管理挪威的自然环境以及防治污染。它是挪威气候与环境部下属的政府机构，拥有 700 名员工，分布在特隆赫姆和奥斯陆的两个办事处以及挪威自然监察署的 60 多个本地办事处。其工作是针对气候和环境政策的制定提供和实施建议。它以专业方式保持独立。这意味着它在决议的独立个案中以及传达知识和信息或提供建议时保持独立。



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ENERGY FOUNDATION 能源基金会

ICF

2022
CHINA CARBON PRICING SURVEY

2023.07

Abstract

This report summarises the results of the 2022 China Carbon Pricing Survey. The survey elicited expectations about the future of China's carbon pricing policies from stakeholders in carbon markets in China during October and November 2022. Through cooperation with industrial associations, the project team reached a wide range of representatives from China's carbon-intensive industries which are already subject to or are soon expected to be subject to carbon pricing, in particular the power sector which was the first to be covered by China's national carbon emissions trading market. The cement sector and the iron and steel sector stand out in terms of those perceived as the next most ready for coverage by the national carbon market, with the weighted average being that those two sectors will have joined by 2024. Over 40% of power sector respondents expect that their company will need to buy allowances in the market to meet their compliance needs for the second period. The survey results give strong confidence that carbon price levels in China will rise over time, and that carbon pricing will increasingly affect investment decisions. There is strong confidence that China will peak its carbon emissions before 2030, as pledged by President Xi Jinping in September 2020.

Keywords

Carbon pricing, emissions trading, carbon market, public policy, stakeholder survey, China

Suggested Citation

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We are grateful for the following sector associations and their representatives for assisting with dissemination of the survey questionnaire: China Electricity Council, China Non-ferrous Metals Industry Association, China Building Material Group, China Building Material Federation, China Metallurgical Industry Planning and Research Institute and China Petroleum and Chemical Industry Association.

The survey implementation and project management were supported substantially by Jessica Jia, ICF.

China Carbon Forum (CCF) initiated the survey in 2013, together with Professor Frank Jotzo at Australian National University, and managed the implementation of each subsequent survey up until 2020. The support of CCF's General Manager Peter Edwards has been invaluable over a number of years and the authors are grateful for it.

Table of Contents

Acronyms:

CCER	China Certified Emission Reduction
CDM	Clean Development Mechanism
CNY	Chinese Yuan
CO_2	Carbon Dioxide
ETS	Emissions Trading System
GDP	Gross Domestic Product
GHG	Greenhouse Gases
MEE	Ministry of Ecology and Environment
MRV	Monitoring, Reporting and Verification
NDRC	National Development and Reform Commission
TCE	Tons of Coal Equivalent
tCO_2	Tons of Carbon Dioxide

Executive Summary

The *2022 China Carbon Pricing Survey* was undertaken during October and November 2022, obtaining expectations about the experience to-date and the future of carbon pricing policies in China from 465 stakeholders. The survey does not claim to be representative, but it does provide an indication of stakeholder views about carbon pricing in China. The project builds on surveys conducted since 2013.

China's carbon market progress

Eight regional carbon markets were launched in the period of 2013 to 2016. The regional markets have experimented with different allocation mechanisms, sectoral coverage, the use of offsets, and various derivative products. In 2015, shortly before the Paris Agreement was signed, China announced that it would develop a national carbon market.

The Ministry of Ecology and Environment (MEE) released regulation bringing the national carbon market into legal effect in February 2021. This document sets out details in relation to the responsibilities of different levels of government, emitting companies, and third-party verification. China's national carbon market was planned to first include the power sector, then gradually expand its coverage to other key emitting sectors. July 2021 saw the first trades take place on the Shanghai-based national carbon emissions exchange platform, starting at 48 CNY/tonne. The first compliance cycle of China's national carbon market ended on 31 December 2021. By then, the national carbon market covered 2,162 emitting enterprises from the power sector, with total annual GHG emissions of 4.5 billion tonnes.

Since the 2021 survey, several key developments occurred in the development of the national carbon market. A new draft plan for allowance allocation for 2021 and 2022 emissions was issued by the MEE in November 2022 asking for comments. It indicated that the second compliance cycle remains a two-year cycle, and power sector enterprises are required to surrender their allowances by 31 December 2023. In December 2022, the MEE issued updated guidelines for monitoring, reporting and verification (MRV) of emissions within the power sector, in order to further improve the quality of carbon emission data.

While the MEE issued a notification in November 2021 allowing use of previously issued CCERs to offset a proportion of allowances to be surrendered for compliance, a fully amended CCER regulation is still to be officially released, though this is foreseen to occur within 2023.

Respondents

The survey received 465 responses from stakeholders in relevant sectors. 84% identified as being from emitting enterprises, including at least 49% from companies already covered by either a regional carbon market or the national one. Of the emitters, the highest representation is from the power sector (38% of all respondents), followed by building materials (21%), steel (13%), chemicals (5%), non-ferrous metals and petrochemical sectors (3% each). 4% of respondents are from companies providing carbon market-related services, while 3% each came from research institutes and sectoral associations. 32% were from organizations in provinces with regional carbon markets.

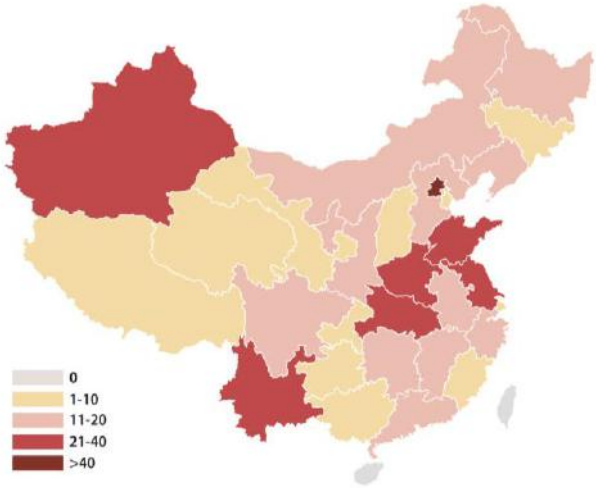

Figure i: Location of respondent organisations. n=465

China's national carbon market

Power sector respondents were asked about their company's situation during the first compliance phase of the national carbon market regarding allowance allocation. A far higher proportion of respondents now expect that their company will need to buy allowances in the market in order to meet their compliance needs, compared to last year's results for the first period (41% vs. 26%).

After power generation, the cement and the iron and steel sectors stand out in terms of perceived carbon market readiness, with over a third of respondents optimistic that they will be ready to join the national carbon market by as early as 2023, and the weighted average of expectations being that those two sectors will have joined by 2024. The other key emitting sectors are expected, on average, to join by 2025.

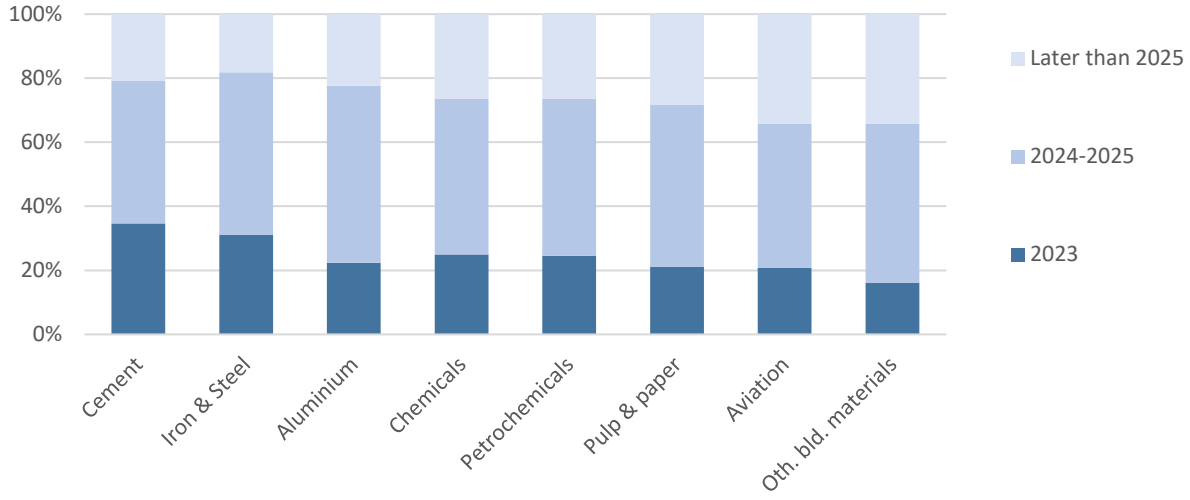

Figure ii: Which other sectors do you think will be ready to join the national carbon market? (n=392,385,371,368,367,356,342,371)

Respondents expect the effect of carbon pricing on investment decisions to greatly increase between the time of the survey and the end of this decade. By 2025, about three quarters of respondents expect investment decisions to be at least moderately affected. Only 6% of respondents who answered this question expect investment decisions to be unaffected by 2025.

Carbon emissions trading is expected to increasingly affect investment decisions

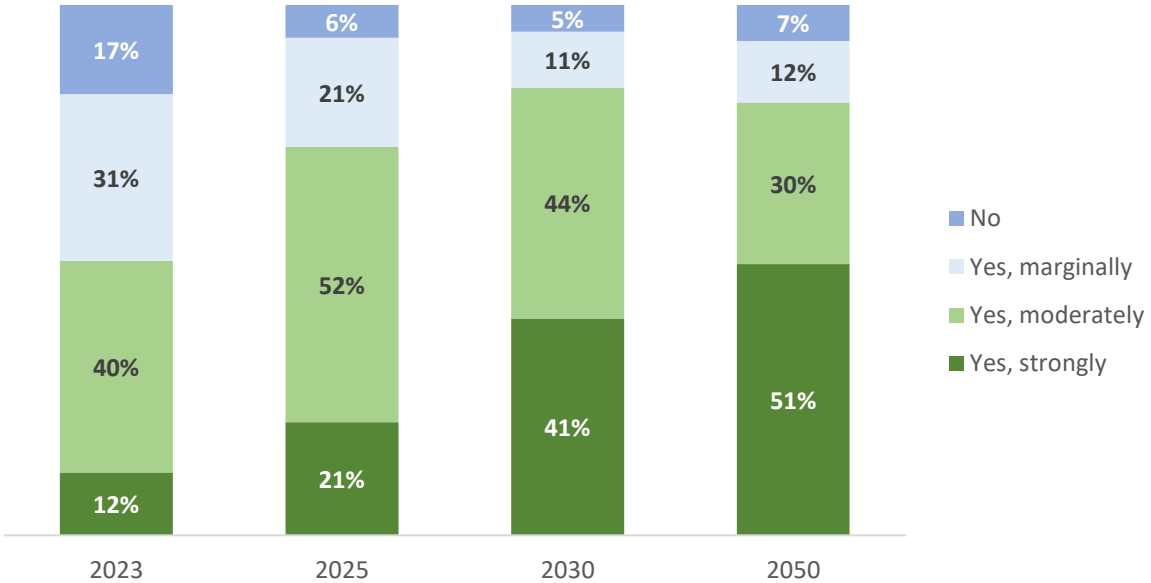

Figure iii: Do you expect the carbon market in China to affect investment decisions in 2023, 2025, 2030, 2050? (n=423,422,416,397)

Price expectations

The national carbon price is expected to rise steadily. The average price expectation in the national market is expected to be CNY 59/t in 2022, rising to CNY 87/t in 2025 and CNY 130/t by the end of the decade. While the actual price levels remain highly uncertain, the range of expectations has narrowed somewhat since last year's survey. The 20th-80th percentile range grows from CNY 49-60/t in 2022 to CNY 58-180/t in 2030. Expectations to the end of this decade are slightly lower than in last year's survey, however they remain substantially higher than previous surveys up to 2020. Future expectations may be influenced by a higher-than-expected starting price in the first compliance phase of the national carbon market. Expected prices towards the middle of the century are much lower than the average prices in the EU in the month of January 2023 (about 83 EURO or around CNY 600).

China's carbon price is expected to steadily rise

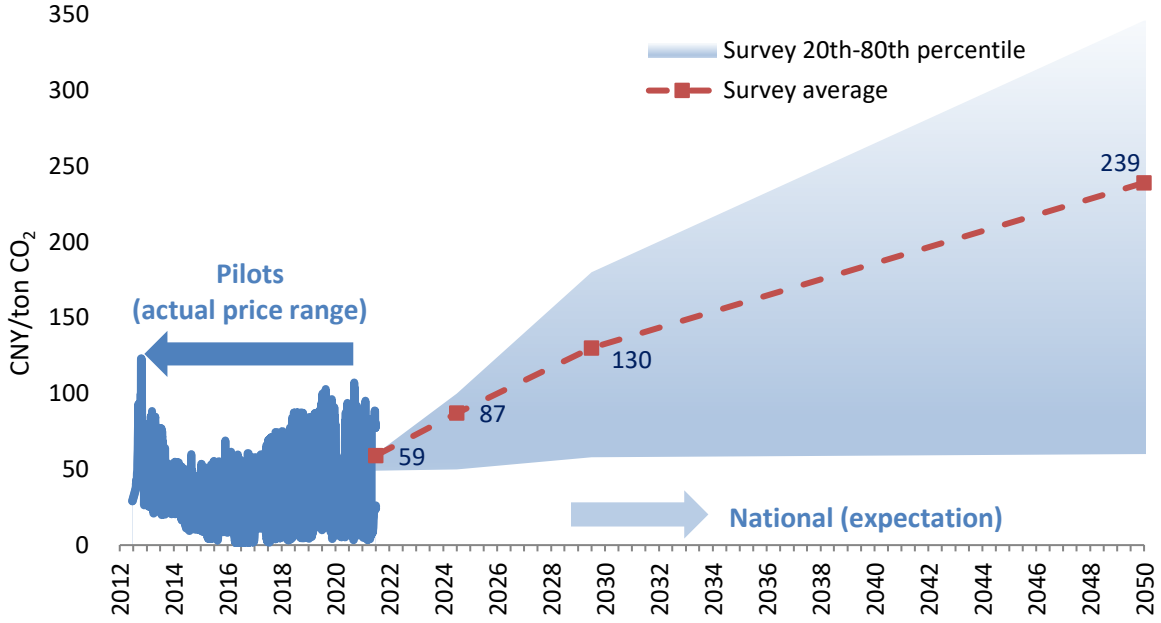

Figure iv: Range of prices in the regional systems to-date, and estimated prices for the national system.

China's emissions targets and peak emissions

In September 2020, President Xi Jinping increased China's climate ambition by committing to peak its carbon emissions 'before 2030' (up from 'around 2030'). 85% of respondents to this year's survey expect China to achieve the carbon emissions peak before, or no later than 2030. Only 13% expect China's emissions to peak by 2025 or earlier, down from 36% two years ago in the 2020 survey.

China's emissions are expected to peak before or no later than 2030

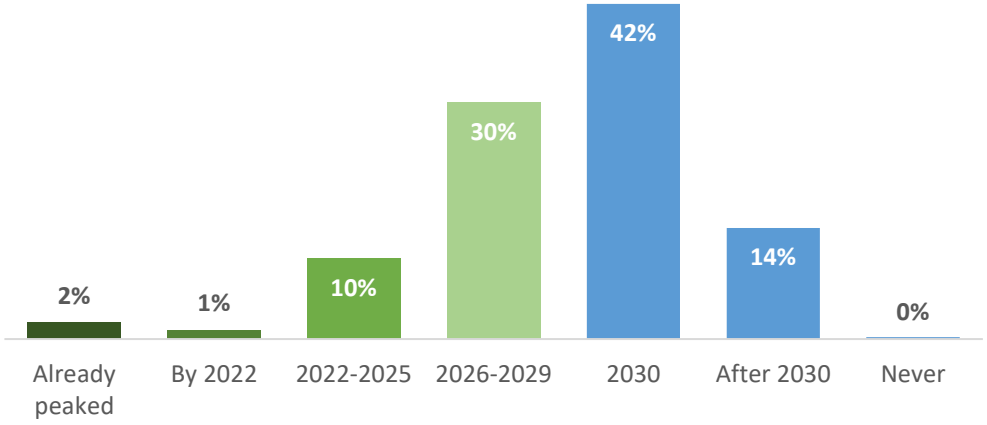

Figure v: When do you expect China's emissions will peak? (n=434)

Introduction

This report presents the results from the *2022 China Carbon Pricing Survey*. The project builds on similar surveys conducted in 2013, 2015, and annually since 2017. Many of the questions asked were the same or similar in each survey so that comparisons can be made over time. In addition, since this year's survey comes after the end of the first compliance cycle of China's national carbon market, some more questions were designed to reflect the feedback to the first compliance cycle.

When the surveys began in 2013, there was a strong indication of the Chinese central government's interest in using carbon pricing as a tool to reduce emissions, as it had begun to launch a series of seven pilot carbon markets in various regions of the country. At that time, there was also active consideration of the potential for carbon taxation to also be used.

Global interest has recently been focussed on President Xi Jinping's 2020 commitment that China will strive to achieve peak carbon dioxide emissions before 2030 and carbon neutrality by 2060. These targets come on top of the existing target to reduce the carbon intensity of the country's economy by at least 65 per cent by 2030.[1] The national carbon market has the potential to play a key role in helping China to achieve these targets.

As China's first explicit nationwide policy to directly limit carbon emissions, the start of trading in the national carbon market in July 2021 signifies that China has taken a significant step forward in the process of achieving its carbon peaking and carbon neutrality goals. More than 40% of China's carbon emissions have so far been covered by the national carbon market, adding to the real cost of carbon emissions for those enterprises. With the continuous improvement of the carbon pricing mechanism, China's carbon market is expected to grow into a large market with accumulated trading value of CNY 100 billion by 2030,[2] which will provide a price signal and financial support for carbon emission reduction across the economy.

The 2022 China Carbon Pricing Survey was conducted anonymously through an online survey platform, *Diaochapai*, from October 17 to November 22, 2022. Through cooperation with related industrial associations, efforts were made to survey representatives from China's carbon-intensive industries, with a special focus on the power sector, which is already subject to carbon pricing nationally. This included dissemination of the survey to the members of industry associations. The survey was also sent to participants in the 2021 survey who provided contact details. Finally, the survey was made available by the authors to potential respondents through targeted social media channels, in particular WeChat.

The survey received 465 responses from professionals in a range of sectors, including industry, market-related services and research institutes. About half (49%) of all respondents are either already covered by the national or regional emissions trading systems or expect to be covered by the national system. In addition, a further 34% of survey responses were from industry representatives that will either be covered in the future, are unsure, or do not expect to be covered by the national carbon market, and 3% were from sectoral associations, bringing the collective representation of industry views to 86% (400 responses).

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[1] *Carbon intensity refers to the level of carbon emissions per unit of GDP (CO2/CNY GDP).*

[2] *Ministry of Ecology and Environment: Gradually Expanding the Industrial Coverage of the National Carbon Market: http://www.zqrb.cn/finance/hongguanjingji/2022-07-22/A1658421363931.html*

This survey gauges expectations by experts and market participants about the future of carbon pricing in China, and how it fits into China's broader climate change mitigation efforts. It quantifies expectations about market design, relevant policies, carbon prices, and the impact on investment decisions. As such, it can make an important contribution to improving understanding for the markets and for policymakers, of how the prospects for carbon pricing are perceived in the industry and expert communities.

There is no claim that the survey is representative of the views of all experts and industry on these questions, both because it is not possible to create a representative list of experts, and due to self-selection by those who chose to respond to the survey. The expectations elicited in this report are best interpreted as an aggregation of "best guesses" by a subset of people who have knowledge and informed views about the factors that will affect the operation of carbon pricing in China.

For industry respondents, the survey's sample may be biased towards market participants with a higher-than-average level of preparedness, given that less well-prepared companies may have less certainty regarding the carbon market, and therefore be less willing to complete a survey. We have sought to mitigate this effect by working with sector associations to elicit more representative industry responses. Expectations have probably also been impacted by the realisation of trading in the national carbon market and therefore a national price on carbon, at least in the power generation sector.

The expectations about future carbon prices derived from surveys such as this differ conceptually from forward prices in markets, which reflect market expectations but adjust them for risk and are subject to demand and supply of capital. They also differ conceptually from forecasts of prices that are based on quantitative analysis of underlying market factors, and assumptions about policy settings.

This report begins with an update on the status of carbon emissions trading in China to-date. It then outlines the key results from the survey, covering prices in the regional emissions trading systems, expectations about the national system, the voluntary carbon market and offsets, the readiness of enterprises, and the impact of carbon pricing on investment decisions. This report is intended to objectively present the opinions of respondents as a reference for policymakers and market participants.

Update on carbon emissions trading in China

Carbon markets are a policy tool adopted by China's government to promote the reduction of greenhouse gas emissions and accelerate the clean energy transition. Since mid-2013, China has seen the successive introduction of eight regional pilot carbon markets in Beijing, Chongqing, Hubei, Guangdong, Shanghai, Shenzhen, Tianjin, and Fujian, providing valuable experience for the central government to put in place a national carbon pricing mechanism.

Since the pilot carbon markets were launched in 2013 and 2014, most have matured substantially, have introduced measures to improve liquidity and considered whether and how to expand the scope of their system. Prices in the pilot markets have varied substantially since the initiation of the markets, and daily prices are displayed in Figure 1 below.

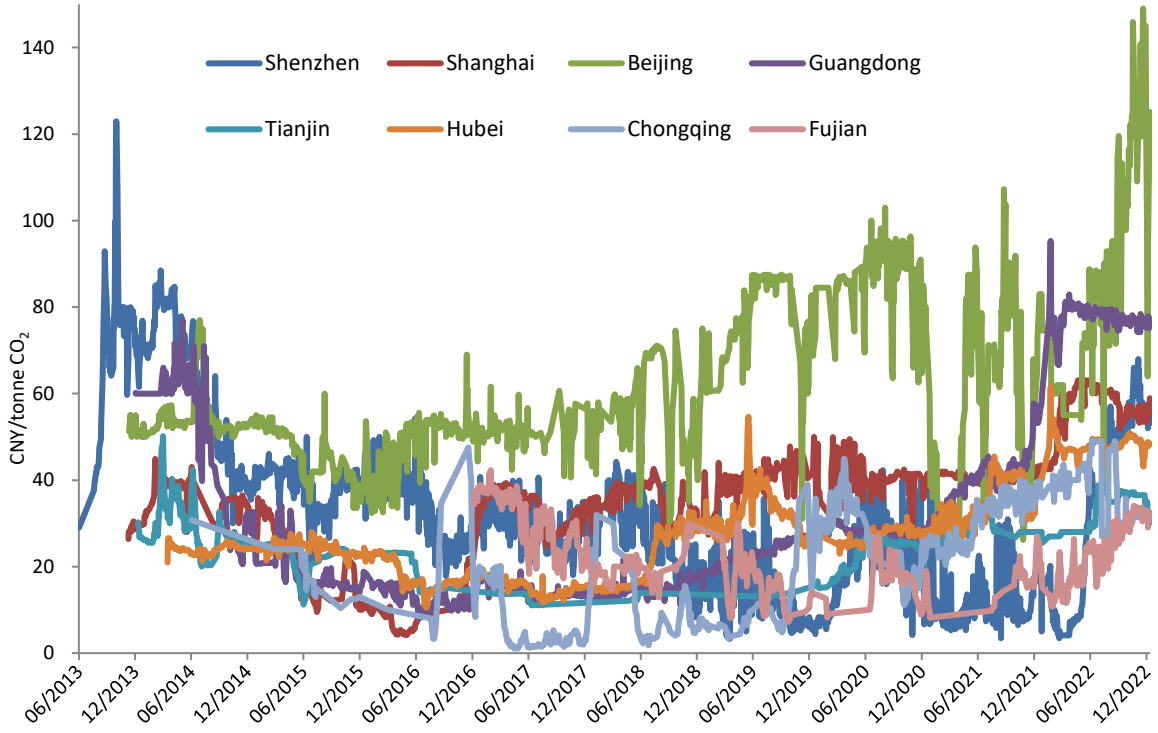

Figure 1: Daily closing price of online trading (CNY/tonne), June 2013 – December 2022. Source: SinoCarbon; VCarbon.

In 2017, the National Development and Reform Commission of China (NDRC) issued the *Development Plan for the National Carbon Emissions Trading Market (Power Sector)* (hereinafter referred to as the "National Carbon Market Development Plan"). The national carbon market has so far involved trading between covered entities in the power sector, and is planned to gradually expand its coverage to other key emitting sectors. According to the National Carbon Market Development Plan, the development of China's national carbon market would follow a "three-step" approach: a basic infrastructure establishment stage, a simulated operation stage, and a stage for improvement and market maturation.

China systematically restructured government ministries under the State Council in 2018. Since then, the responsibility for developing the national carbon market shifted to the Ministry of Ecology and Environment (MEE).

From October to December 2019, the MEE organised 17 large-scaled training activities and allowance allocation trials across mainland China, aiming to further enhance the capacity of enterprises from the power sector in carbon market day-to-day tasks and simulate the allowance allocation programme to test the reasonableness of the allowances allocated to each emitting enterprise under the allocation programme so as to avoid any market risk.

On 31 December 2020, the Ministry of Ecology and Environment (MEE) issued *Trial Measures for the Administration of Carbon Emissions Trading*[3] (hereafter "*Administration Measures*"), and subsequently also issued a series of rules for covered entities in the power sector to register and interact with the national registry systems, based in Hubei and Shanghai respectively.[4]

Trading in China's national carbon market was officially launched on 16 July 2021, marking a new milestone for the establishment of China's carbon emissions trading market, i.e. the third phase of the government's plan for the national market. The trading started at CNY 48, very close to the average value (CNY 49) expected by respondents for the opening price in the *2020 China Carbon Pricing Survey*.

The first compliance cycle of China's national market came to an end on 31 December 2021, achieving a performance completion rate of 99.5%. By this point, the national market had run for 114 trading days and recorded 179 million tonnes in cumulative trading volume and CNY 7.7 billion in value of traded carbon emission allowances.

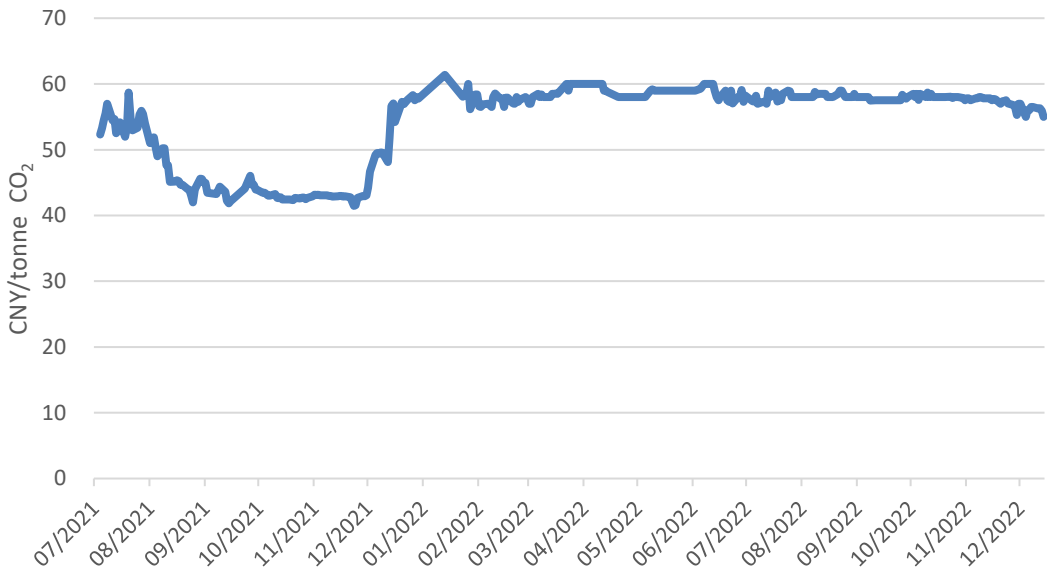

Figure 2: Daily online trading price in the national carbon market. Source: SinoCarbon; VCarbon.

[3] *Trial Measures for the Administration of Carbon Emissions Trading:*
https://www.mee.gov.cn/xxgk2018/xxgk/xxgk02/202101/t20210105_816131.html

[4] The *Rules on Carbon Trading Registration Management (trial)*, the *Rules on Carbon Trading Management (trial)*, and the *Rules on Carbon Trading Settlement Management (trial)* were released by MEE in May 2021:
http://www.mee.gov.cn/xxgk2018/*xxgk*/xxgk01/202105/t20210519_833574.html

From 4 January to 30 December 2022 (the last trading day of 2022), the annual cumulative volume of allowance transactions in China's national carbon market was almost 51 million tonnes, and the annual cumulative turnover was over 2.8 billion CNY.

Since last year's survey, several key developments occurred in the development of the national carbon market. For example, in March 2022, the MEE emphasised that accurate and reliable data is the "lifeline" for an effective and regulated operation of the national carbon market, and required the strengthening of supervision and management of carbon emission data quality to ensure the smooth and healthy operation of the national market.

The MEE requested provincial authorities to organise emitting enterprises from the power sector and seven other key emitting sectors to account for and submit their GHG emission reports for the year 2021, which would form the basis of data for allowance allocation when these sectors are included in the national carbon market in the future. Enterprises from the power sector were required to disclose their verified GHG emissions information in the first compliance cycle of the national carbon market no later than the end of March 2022. Moreover, these enterprises also had to update their emission data quality management plan and report verified key factors related to carbon emissions accounting monthly, such as fuel consumption, elemental carbon content, low level heat content of fuel, aiming to strengthen the management of enterprises' emission data and improve the oversight of data quality going forward.

A new plan for allowance allocation for 2021 and 2022 emissions was issued by the MEE in November 2022. According to the *Implementation Plan for Allowance Cap Setting and Allocation for the National Carbon Trading Market in 2021 and 2022*, the second compliance cycle of China's national carbon market remains a two-year cycle, and the allowances will continue to be allocated for free. Enterprises from the power sector are required to surrender their allowances for the years 2021 and 2022 separately on an annual basis, with the same deadline for compliance by 31 December 2023.

It is worth noting that while some carbon trading systems with compliance obligations adopt auctioning as the main approach to allowance allocation, in China's national carbon market, free allocation is currently the only allocation method. According to the *Administration Measures*, which regulates trading in China's national carbon market and relevant activities, the allowances in China's national carbon market will be mainly free allocated, and auctioning (paid allocation) may be introduced in due course in accordance with relevant requirements by the authority.

In December 2022, the MEE issued updated guidelines for monitoring, reporting and verification (MRV) of emissions within the power sector[5], to improve the quality of carbon emission data. These updated MRV guidelines optimise the formulas involved in carbon emissions reporting verification, improved the system for data quality control, and adjusted some factors for calculation of emissions, for example by giving more scientific and reasonable default values for carbon content per unit of heating value.

[5] *Guidelines on Enterprise Greenhouse Gas Emission Accounting and Reporting (Power Generation Facilities), Guidelines on Enterprise Greenhouse Gas Emission Verification (Power Generation Facilities):*
https://www.mee.gov.cn/xxgk2018/xxgk/xxgk06/202212/t20221221_1008430.html

China Certified Emission Reductions (CCERs) are allowed to be used as qualified carbon offsetting credits for emitting enterprises to cover up to 5% of their carbon emission allowances to be surrendered, as defined in the *Administration Measures* of December 2020. Market stakeholders are looking forward to the return of the CCER market. Experience from the first compliance cycle shows that demand for CCERs in the national carbon market is very strong. In the first compliance cycle, around 32.73 million tonnes of CCERs were used, exceeding the total amount of the used CCERs for the period from 2012 to 2017. According to the MEE, it will strive to restart the registration of new CCER credits as soon as possible, and will support Beijing in establishing a national voluntary emissions trading centre.

The expansion of the national carbon market to more sectors is still under consideration, based on indications from the MEE, such as its work on MRV guidelines for iron and steel, aluminium, and cement sectors, and engagement with related industrial associations. However, the impact of COVID-19 and the need for economic recovery after the pandemic brings some uncertainty regarding the timing of expanding the coverage of the national market.

Survey respondents

465 eligible responses are included in the analysis. The number of respondents this year was the second highest so far, after the 2020 survey (567).

The survey features strong representation from industry, as well as a significant number of responses from China's expert community on carbon markets, consultancies and academic expert advisors. It provides a reasonable indication of views and expectations among China's carbon market community.

Within this report, unless otherwise stated, percentages refer to the proportion of respondents who provided an answer to a particular question, excluding those who selected 'Don't know'.

Survey respondents by groups

Of the 465 respondents, 84% of respondents identified as being from carbon emitting enterprises, including at least 49% from companies already covered by either a regional carbon market or the national one.[6] Of the emitting enterprises, the highest representation is from the power generation sector (38% of all respondents), followed by building materials including building materials (inc. cement) (21%), steel (13%), chemicals (5%), non-ferrous metals and chemicals sectors (3% each).

4% of respondents are from companies providing carbon market-related services, including consultancy, verification, offset development and trading, while 3% each came from research institutes and sector associations. Other responses came from academia, the financial industry and government officials.

Survey respondents by group

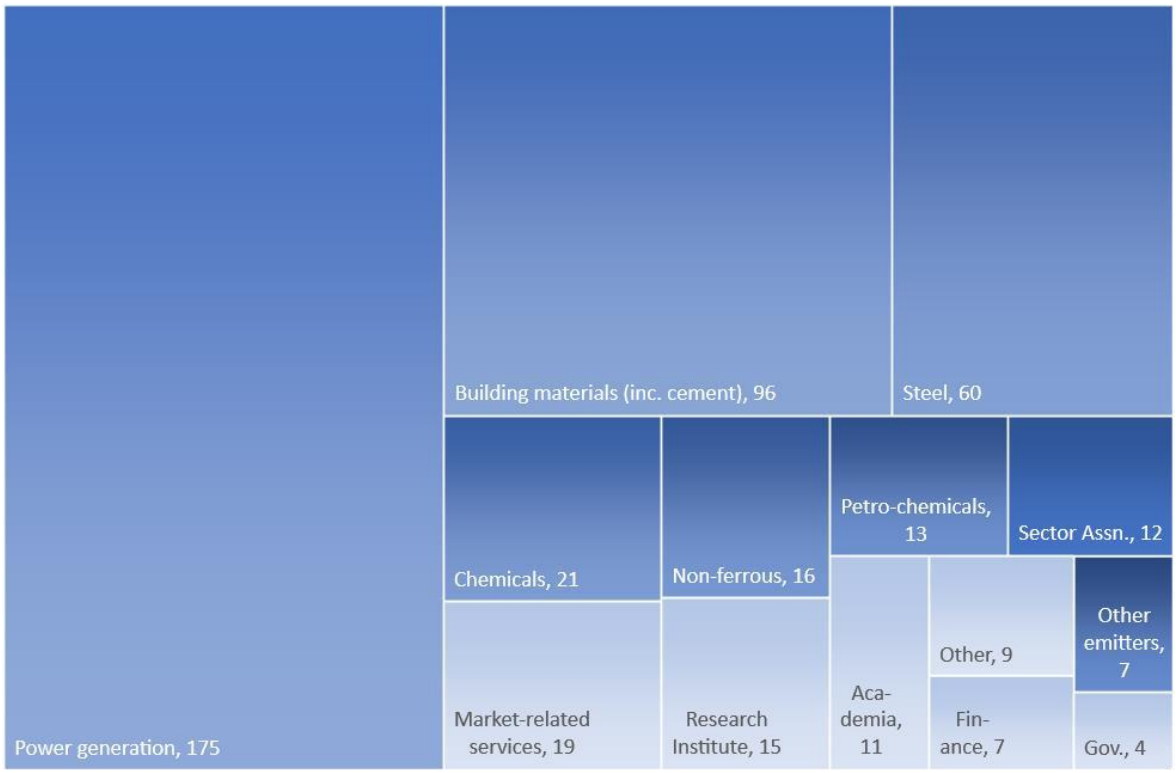

Figure 3: How would you classify your organization?
Note: total number of responses n=465.

[6] A further 10% of respondents indicated that they did not know whether their company was already covered by a carbon market.

Responses by region

15% of the respondents to the survey are from organizations located in Beijing. 32% were from provinces with regional pilot carbon markets. Only 1 response came from organisations not based in mainland China.

The relatively high level of responses from Beijing reflects the concentration of the policymaking, consultancy and expert communities in the capital city, and also because the project partners have stronger networks in Beijing. After Beijing, the highest number of respondents were from Jiangsu, Hubei, Shandong and Xinjiang (6% each).

The geographic spread of respondents has increased with each iteration of the survey, reflecting a growing engagement in carbon markets across the country.

Survey respondents by region: increasingly widespread

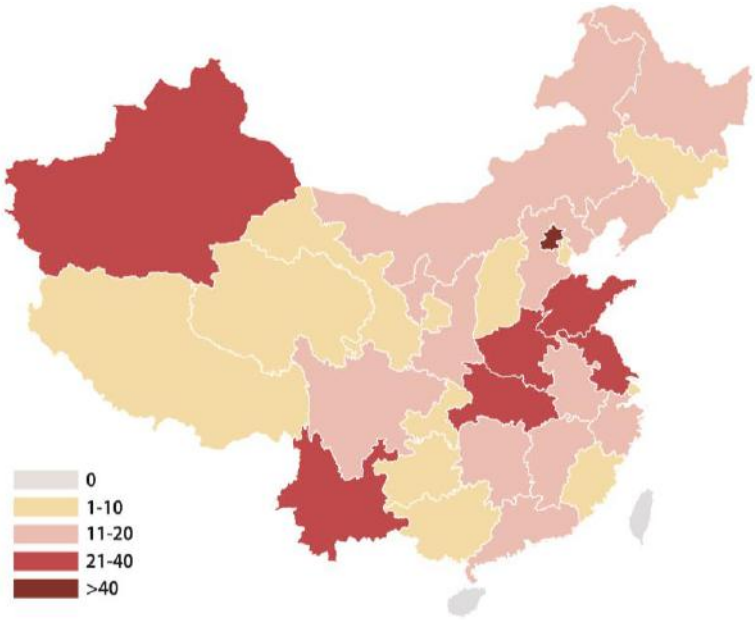

Figure 4: Location of respondent organisations (n=465)

Industry responses

The share of respondents from industrial enterprises, as well as sectoral association, has risen steadily over the years: representing 86% of this year's respondents, up from 81% in 2021, 76% in 2020, 68% in the 2018 and 2019 surveys, 29% in 2017, 23% in 2015, and 7% in 2013.

This year's survey included 229 respondents from already covered entities (pilot and national systems). Insights from respondents with practical experience in emissions trading have increased greatly since the 2021 survey, with the start of the national carbon market. The gradual maturing of the market nationally means that respondents' expectations are likely to be better informed.

29% of emitting enterprises have participated in the regional pilot emissions trading systems, with especially good representation from companies operating under the Shanghai (36) and Hubei (35) systems.

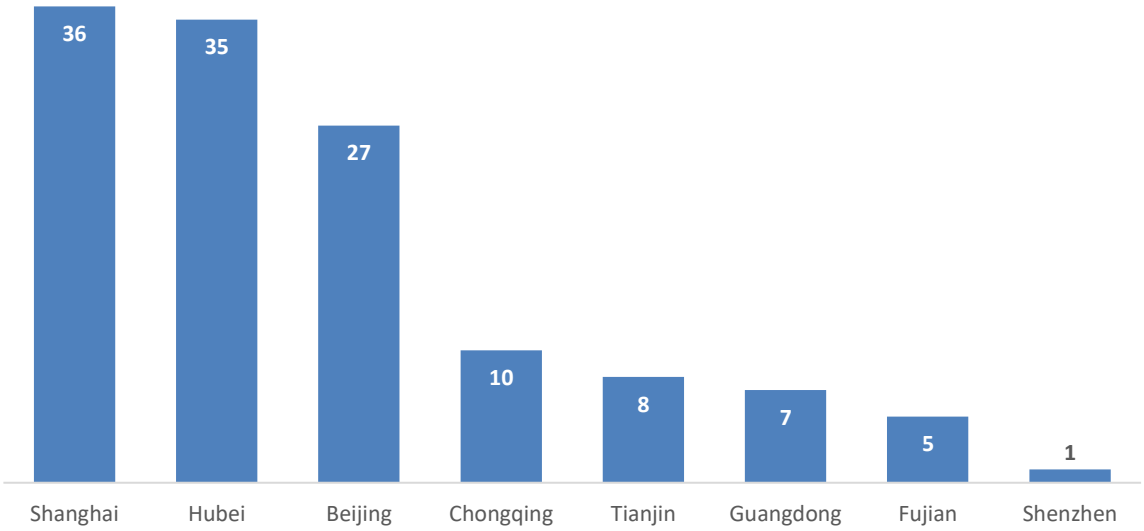

Figure 5: Is your company currently operating under an emissions trading system(s) in China? If Yes: Which of the following? (n=90)

Six industry respondents were from companies currently operating in compliance carbon markets outside of China, three of which are involved in the EU Emissions Trading System (ETS), two in the California cap-and-trade system, and one in the Kazakhstan ETS. For these companies, working under more than one carbon market jurisdiction may facilitate experience sharing, industry peer to peer learning, and eventual integration across systems.

For respondents from emitting enterprises, two thirds identified as general staff, while 26% of responses were from mid-level managers. This year's survey received 17 responses from senior manager.

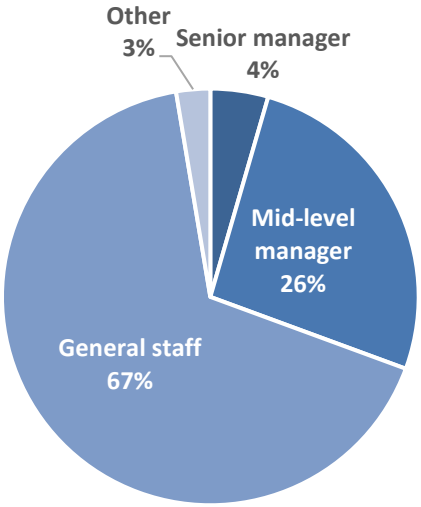

Figure 6: In the management structure of your company, what position do you hold? (n=379)

Of the responses from emitting enterprises, 52% identified themselves as belonging to central state-owned companies, with another 19% from local state-owned enterprises. 15% of respondents from emitters were from privately owned companies, and 10% were from joint ventures. 44% of the emitters were very large energy consumers, reporting energy consumption of over 1 million tce/year. 11% came from small companies with energy consumption of under 10,000 tce/year, which is the threshold for inclusion in the national carbon market. Responses from large emitters were concentrated in centrally state-owned enterprises, which tend to be among the largest emitters in China.

Industry respondents by size and ownership type

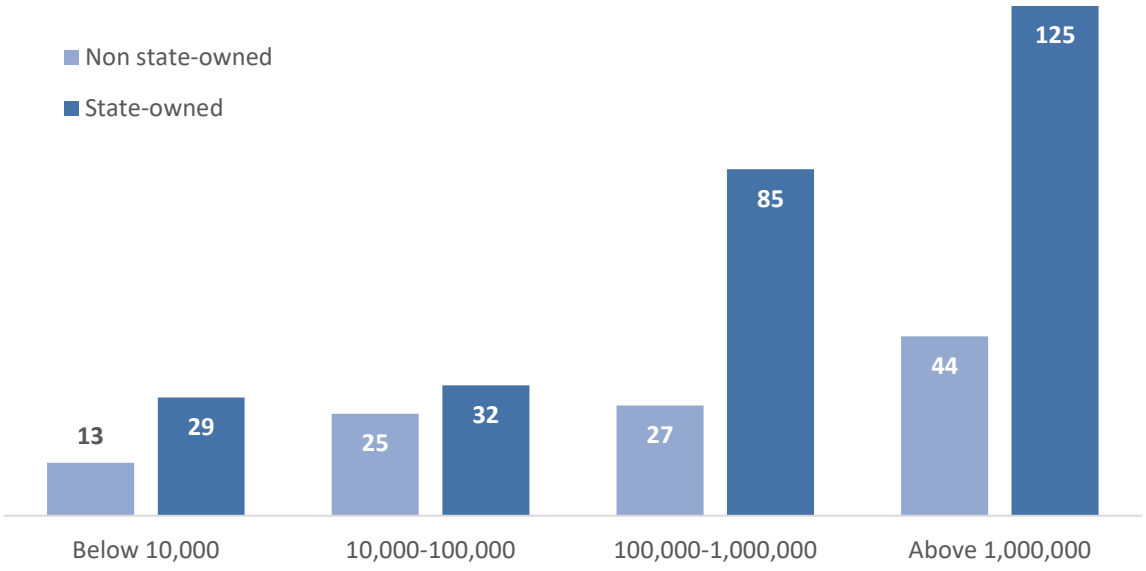

Figure 7: How much energy does your company annually consume in China? – by enterprise type (tce/year) (n=380)

National emissions trading system

Survey respondents were asked a number of questions regarding the national emissions trading system, including with regard to sectoral coverage, management of the market and price expectations.

Sectoral coverage

After electricity generation, the cement sector and the iron and steel sector stand out in terms of perceived carbon market readiness, with over a third of respondents expecting them to be ready to join the national carbon market by as early as 2023, and the average of responses being that those sectors will have joined by 2024. The other key emitting sectors are expected, on average, to join by 2025.

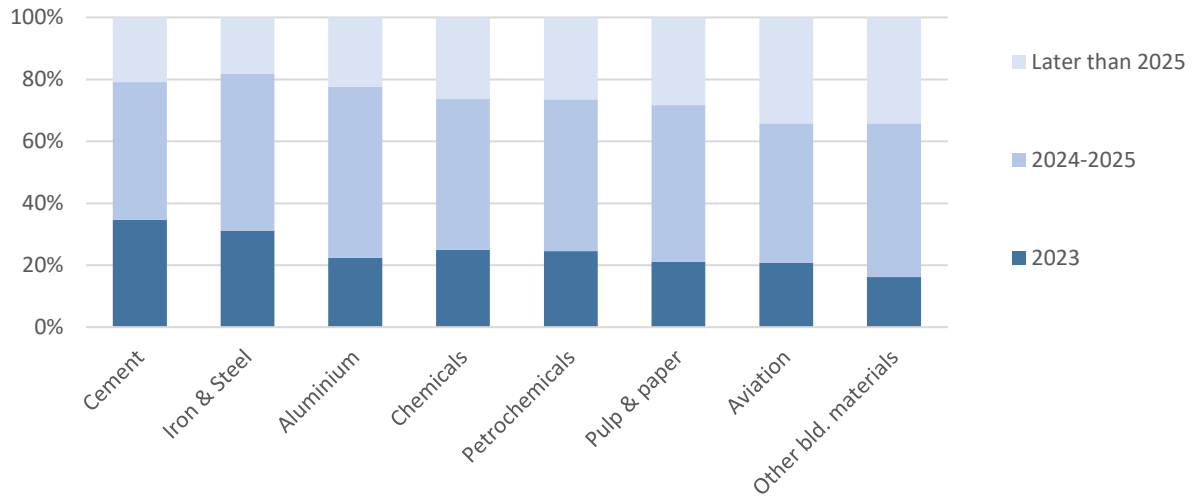

Figure 8: Which other sectors do you think will be ready to join the national system? (n=392,385,371,368,367,356,342,371)

Allowance allocation

Benchmarking and historical (grandfathering) allocation are two common methodologies for free allowance allocation in an emissions trading system. Benchmarking calculates allowance allocation to installations or entities based on a benchmark value in one sector, which usually represents good performance in that sector and is determined based on reported GHG emissions data. Historical allocation calculates the allowance allocation in relation to an installation or entity's historical GHG emissions level in past years. Historical allocation may be unfair to companies which have already performed well in past years, and/or which are growing quickly. Benchmarking allocation tends to be fairer but is more complex to regulate and calculate.

Allocation for the first compliance period in the national carbon market for the power sector followed a benchmarking approach. In this year's survey, a clear majority of respondents from the building materials (inc. cement) and steel sectors identified benchmarking as the most appropriate methodology for allocating allowances. Two significant shifts have occurred in results for this year's survey compared to for 2021. First, a majority in the non-ferrous metals (inc. aluminium) sector now believe that historical intensity is a better allocation method, a reversal of last year's results. Second, respondents from the chemicals and petrochemical sectors are split fairly evenly on this question, whereas three quarters were in favour of benchmarking in last year's results. Consistent with previous results, very few industry representatives consider auctioning to be the best method of allocation at the current time.

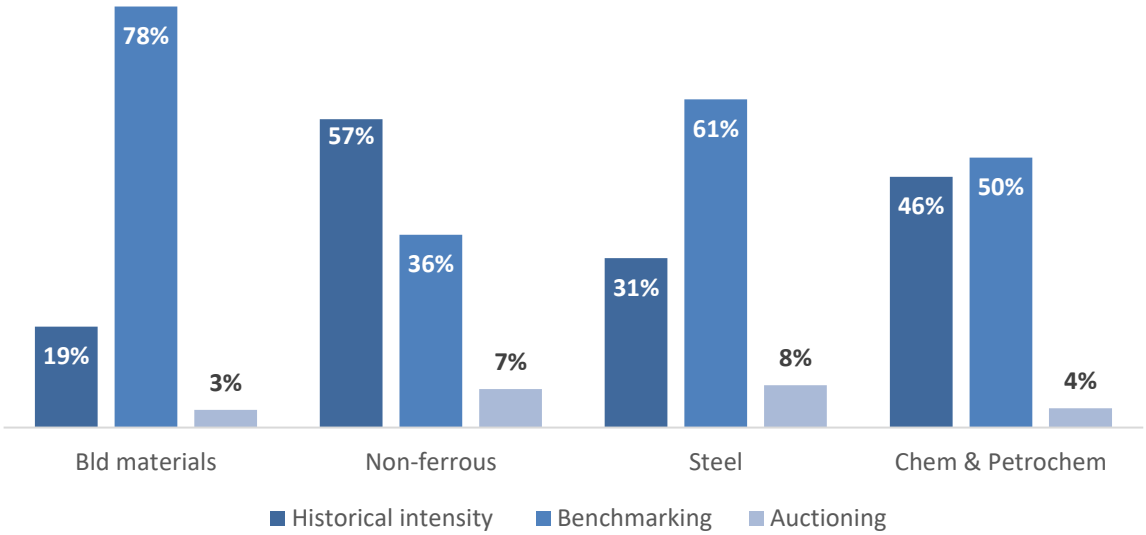

Figure 9: What do you think is the best method to allocate allowances? (n=91,14,51,28)

The allowance allocation plan for the power sector under than national carbon market, published in November 2020, defined separate benchmarks for coal power units with capacity of over 300 megawatts (MW), and for those 300MW and under. The survey asked power sector respondents whether the benchmarks set are adequate to encourage GHG emission reduction. Very few respondents suggested that the benchmarks were 'too generous'. Respondents working for enterprises that have been covered by the regional systems are less likely to consider the benchmarks strict, compared to those that haven't. Updated benchmarks for the second compliance cycle[7] were announced on 31 October 2022, which is just after the survey was conducted, where smaller installations are proposed to face a stricter tightening than the large ones.

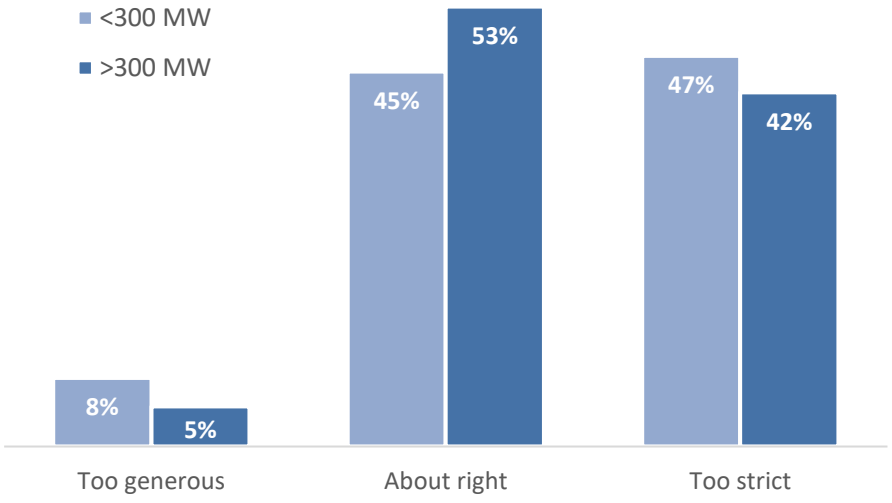

Figure 10: Are the benchmarks set for the national carbon market adequate to encourage GHG emission reduction? (n=127,119)

[7] *Implementation Plan for Allowance Cap Setting and Allocation for the National Carbon Trading Market in 2021 and 2022: https://www.mee.gov.cn/xxgk2018/xxgk/xxgk06/202211/W020221103336161991455.pdf*

Selected quotes from power generators on the adequacy of allowance allocation benchmarks:

- As power market reform continues to deepen, thermal power plants will play more of a backup role and frequently participate in peak shaving for the power grid, resulting in a significant increase in the cost of coal plant operations. If the allowance allocation method is further tightened, the costs for enterprises will be further increased. – *Large Hubei power generator*
- The surplus of allowances for 300MW and below units is large, while many 600MW units have suffered losses, and the 1000MW units have a large allowance surplus. This seems unfair to 600MW units. – *Beijing headquartered large power generator*
- Judging from the implementation in the past two years, the benchmarks are basically appropriate. – *Large Henan power generator*
- At present, the 600 MW level units in service in China face the same benchmark as 1000 MW units. However, coal consumption varies greatly, energy-saving transformations have been carried out for many years, and the space for further upgrade is limited. – *Large Shanxi power generator*
- There is a large deficit in the allowances for 600MW units, and a large surplus for 300MW units. – *Medium-sized Sichuan power generator*
- The baseline for 600MW units is too stringent. – *Large Shandong power generator*

Power sector respondents were asked how frequently the benchmark should be updated. Over half prefer a frequency of every five years, while 38% believe that annual updates are appropriate. Eight of those who chose 'other' suggested intervals between one and five years (i.e. two or three years). Multiple respondents suggested that benchmarks should be adjusted for each compliance cycle, which currently cover the emissions for two years at a time.

Benchmarks need to be regularly updated

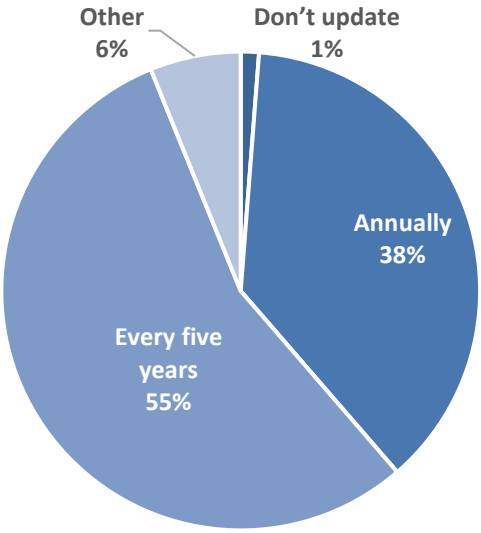

Figure 11: How frequently should the benchmark be updated? (n=163)

Selected quotes on the updating of benchmarks:

- The structure of the power generation industry is currently in a stage of rapid change, and it is suggested to adjust benchmarks each year to adjust to market demand. – *Large Hubei power generator*
- If the benchmark is updated too frequently, it will be hard for market players to accurately predict their demand and therefore be unwilling to trade. If the baseline is not updated, or updated infrequently, it may not be suitable for meeting government targets, as it must keep pace with market changes. Therefore, it is suggested to update every five years. – *Beijing headquartered large power generator*
- It would be more reasonable to adjust benchmarks in conjunction with the compliance cycle. – *Large Sichuan power generator*
- Setting baselines is time-consuming and labour-intensive, and the cost of verification and accounting is too high. – *Small Xinjiang power generator*
- Updating each year is not necessary because the iterative changes to technology are not so frequent. Updating every five years should be considered. – *Large Ningxia power generator*
- Reasonably adjust the baseline according to the economic situation in that year, to limit the pressure on thermal power generators. For example, due to the high coal price last year, as well as environmental protection controls, survival has become difficult, and the pressure from carbon compliance has increased sharply. – *Large Shanxi power generator*

Half of those with a view expect auctioning of allowances will be introduced to the national carbon market in the second half of this decade.

Auctioning of allowances expected to be introduced by 2030

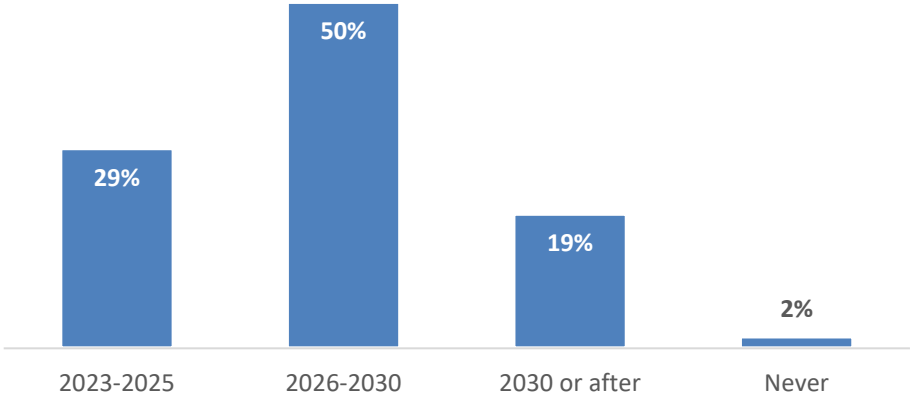

Figure 12: By when do you expect auctioning of emission allowances to be introduced into the national carbon market? (n=412)

Measuring emissions

The vast majority of power sector respondents prefer using actual values measured by the entity in acquiring key emission factors for calculating the total GHG emissions of installations.

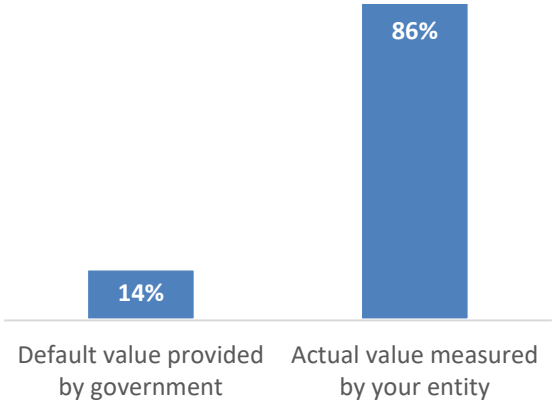

Figure 13: Which approach do you prefer in acquiring key emission factors when calculating the total GHG emissions of your installations? (n=122)

Selected quotes on acquiring emission factors:

- The actual practice of measurement is difficult. The technical requirements are high, and it is difficult to supervise. – *Large Beijing headquartered power generator*
- There are large differences in coal types between regions, and using measured values is more helpful for undertaking carbon measurement. This will increase the importance that enterprises attach to it, and encourage investment in testing equipment and training. – *Medium-sized Xinjiang power generator*
- For entities with low consumption of fossil fuels, the default value can be adopted. Actual measured values should be used for large fuel consumers. In fact, the default value is much larger than the actual measured value. – *Large Ningxia power generator*

38% of respondents believe that the installation of a constant emissions monitoring system (CEMS) is the most crucial measure to ensure the credibility of GHG emissions data of entities. A further quarter of respondents believe that clarification of the legal responsibilities of emitters and verifiers to be the most important measure.

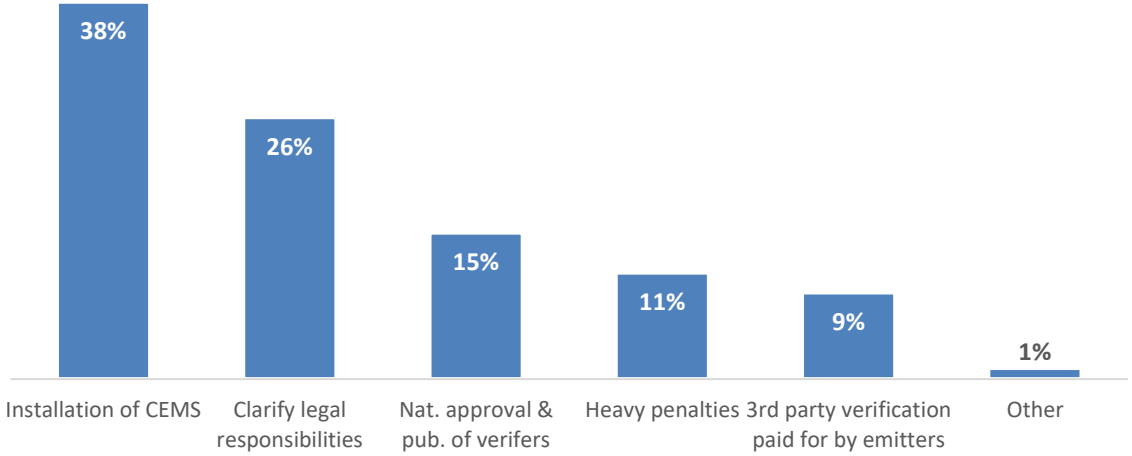

Figure 14: Which measure do you consider most crucial to ensure the credibility of GHG emissions data of entities? (n=446)

Management of the national carbon market

Respondents were asked about the level of penalty or incentive structure would be strong enough to ensure a high percentage of compliance. The most popular choice was a negative credit record for non-compliant companies, whereby companies' ability to secure finance from banks may be affected. This is consistent with previous results.

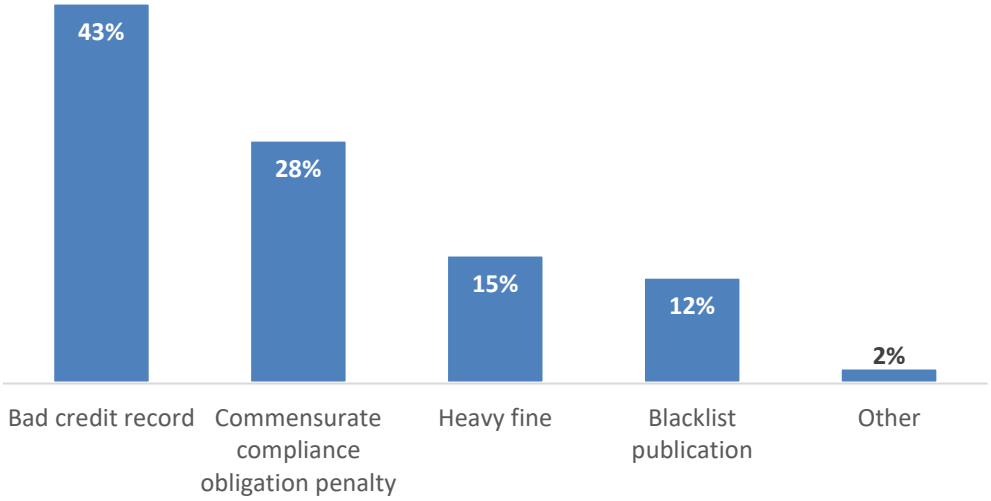

Figure 15: What level of penalty/incentive structure would be strong enough to ensure a high percentage of compliance? (n=435)

Respondents were asked what types of data should be made public, in order to support transparency of the market. Almost two thirds identified annual company-level emissions data as the main priority.

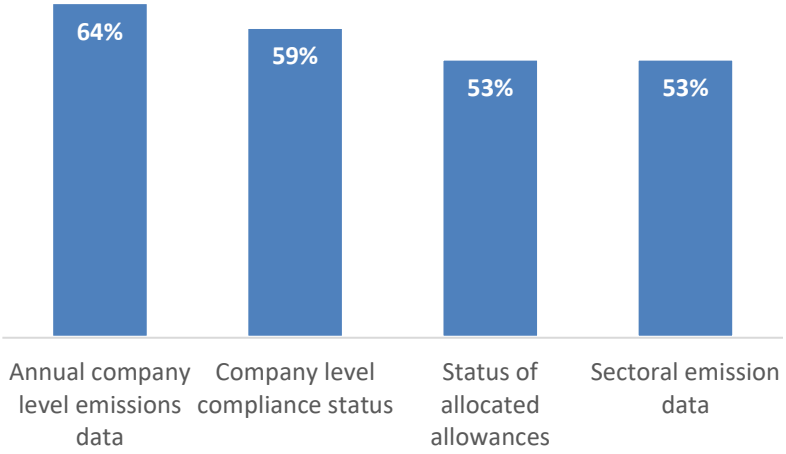

Figure 16: What data should be made public, to support transparency of the market? (n=450)

Half of respondents believe that non-covered entities (for example trading companies and institutional investors etc.) should be able to participate in the national carbon market by 2025.

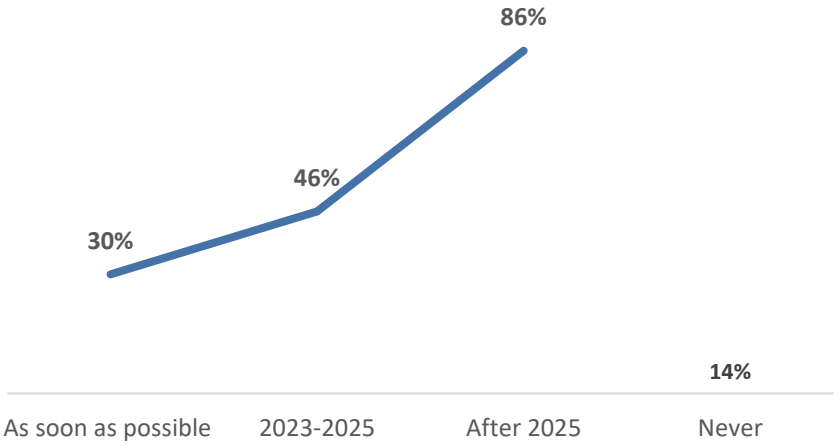

Figure 17: By when do you think that non-GHG emitting entities should be able to participate in the national carbon market? (n=412)

Selected quotes on the participation of non-emitting entities:

- Carbon emission allowances are attributable to industry, and non-emitting enterprises will participate with a financial motive, which can easily lead to higher carbon prices, disrupt the market, and increase the burden on enterprises. – *Guangxi steel producer*
- The early involvement of financial institutions will help the rapid development of the carbon market, while at the same time it can help to mature the role of the financial system in the carbon market as soon as possible. – *Anhui building materials company*

Respondents from organisations that are not emitting enterprises were asked to identify one type of carbon financial product that they consider most suitable for early introduction in the national carbon market. The most popular choice was 'futures'.

Carbon futures are derivative financial contracts that obligate the parties to transact allowances at a predetermined future date and price. Here, the buyer must purchase, or the seller must sell the underlying allowances at the set price, regardless of the current market price at the expiration date. A repurchase agreement is the equivalent of a short-term, collateralised loan. An owner of allowances sells those allowances to a buyer for cash. As part of the deal, the seller agrees to buy back the securities at a later date. The price paid to repurchase the allowance is higher than the original selling price.

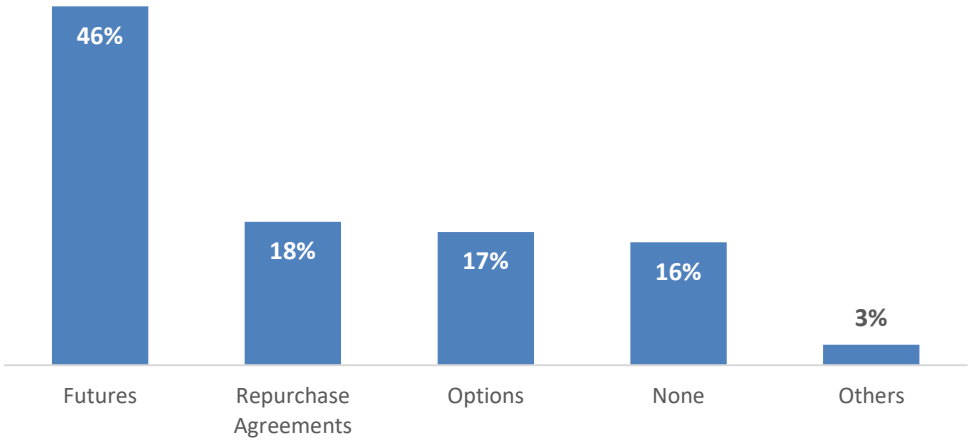

Figure 18: What types of carbon finance products are most suitable for early introduction in the national carbon market? (n=76)

According to ***Administrative Rules for Carbon Emissions Trading (Trial)*** issued by MEE in 2021, the transaction methods through the national trading system include agreement transfer, one-way bidding or other compliant methods. Agreement transfer refers to the transaction method in which the parties of the transaction reach an agreement and confirm the transaction, including listing agreement transactions and block agreement transactions. Of these, listing agreement transaction refers to a transaction method in which the transaction entity submits a selling or buying listing declaration through the trading system, and the intended transferee or transferor negotiates the listed declaration and confirms the transaction. Block agreement transaction refers to a transaction method in which both parties already have initial agreement to make a deal but have to inquire about the price and confirm the transaction through the trading system. The transaction volume of a single block transaction should be over 100,000 tonnes.

Just over half of the respondents with a view think that block agreement trading does not reflect the real price of carbon (the marginal abatement cost).

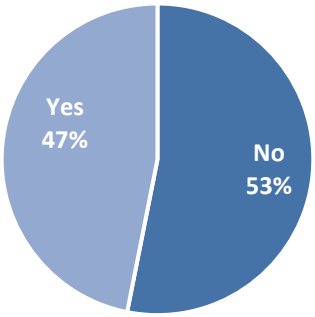

Figure 19: Do you think that block agreement trading reflects the real carbon price/marginal abatement cost? (n=352)

Enterprises covered by the national carbon market were asked about their experience to-date during the first and second compliance cycles. The results suggest that as of November 2022, there remains a substantial gap regarding the in-company capacity of many covered enterprises.

Companies require further capacity building

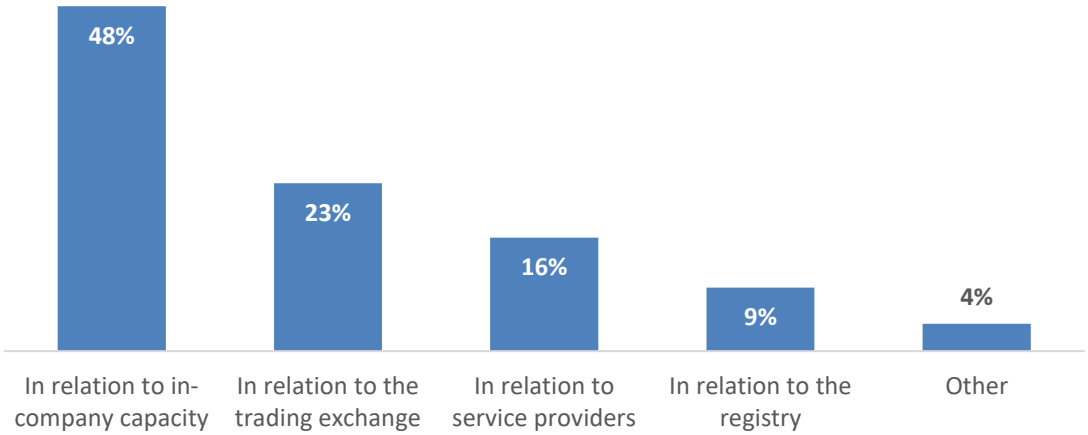

Figure 20: To-date, have you faced any difficulties during the compliance cycle? (n=158)

Selected quotes on difficulties faced during the compliance cycle:

- Low quality of personnel, frequent staff turnover. – *Inner Mongolia power generator*
- Government has organised enterprise emissions accounting clearly, but there is still a lack of capacity with regard to trading. Enterprise leaders pay a basic level of attention to the issue, but implementation is difficult for staff in practice. Internal management of the group is conducted by a dedicated institution, while specific enterprises have little autonomy in trading. – *Xinjiang power generator*

Survey respondents were asked whether they expect that China will specify an absolute emissions target by certain dates. This step has been discussed for some time amongst the expert community and policymakers and would have implications for the design of the national carbon market. Only 37% of respondents said that they expect an absolute target by 2030 (down from 48% last year), while almost half expect this to occur post-2030.

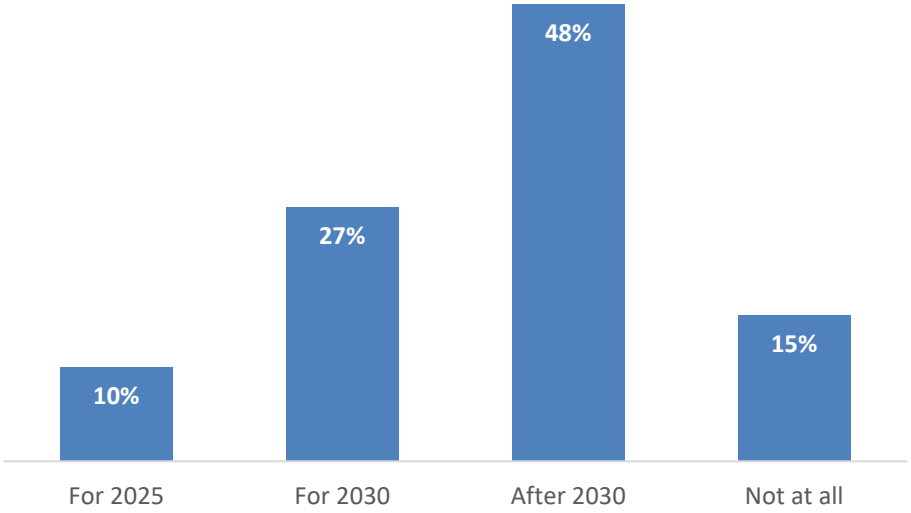

Figure 21: Do you expect that China will specify an absolute emissions target for: (n=423)

Carbon price expectations

The China Carbon Pricing Survey has been tracking expectations and views on real market developments in the regional emissions trading systems from the pilot phase through several compliance cycles to their current status as mature carbon markets.

Respondents based in pilot regions were asked about their expectations for prices in the regional markets, both for the highest and lowest prices in the regions, providing a range of expected prices for the years ahead. For context, prices in the regional systems ranged from CNY 31/t in Chongqing to CNY 104/t in Beijing around the time of the survey. The full spread of regional prices is outlined in Figure 1 on page 3.

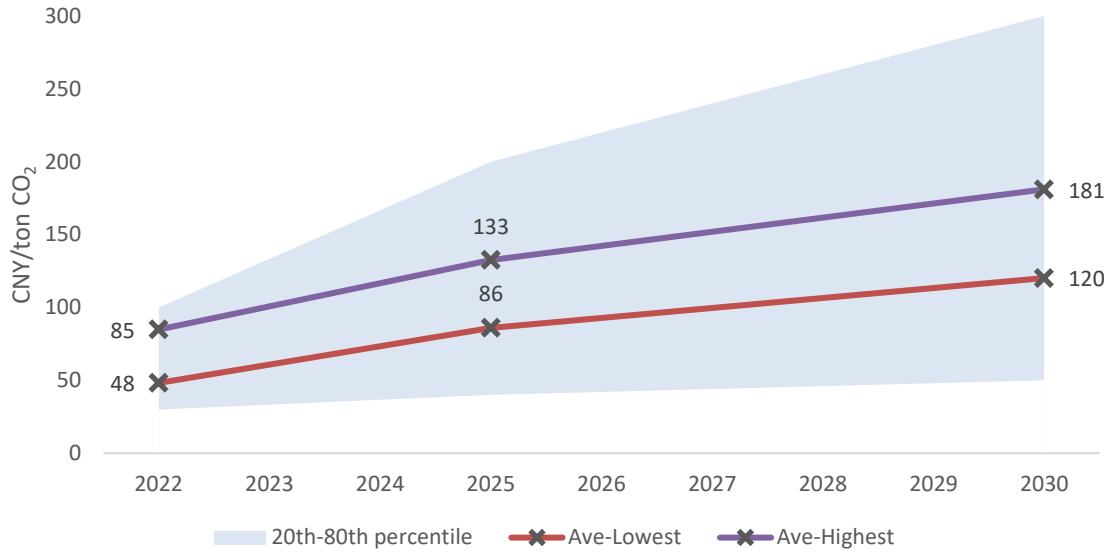

Figure 22: What do you expect the highest and lowest prices in the pilot regions to be in the coming years? (n=161,159,160)

Selected quotes on prices in the regional systems in the coming years:

- The current national allocation policy will tighten further, and the price of allowances is expected to rise to an extent before CCERs are fully opened to the market. However, with the further deepening of new energy development and liberalization of the CCER policy, the carbon price will fall to a certain extent, but the overall price will basically stay within a certain range. – *Hubei power generator*
- The price will gradually align with the international carbon price. – *Hubei academic*
- At present, the economy-wide marginal abatement cost in China is about 7 US dollars. For the carbon market to function effectively, the carbon price should be greater than or equal to $7 per ton. Moving towards the goal of carbon peaking in 2030 and carbon neutrality in 2060, the full-scale carbon emission reduction costs of the Chinese economy will also increase, so there is still room for carbon prices to rise. During the *14th Five-Year Plan* period, the carbon price in China's carbon market may be around US$8 to US$10 per ton. During the *15th Five-Year Plan* period, the carbon price may rise further to US$15 per ton. – *Hubei academic*

Almost 40% of respondents who expressed a view, said that the price in the national carbon market at the time of the survey were similar to what they had expected. There is a slight divergence in views between covered industry and other respondents, however – a larger share of covered entities says prices are higher than they expected.

Covered entities more likely to think that the price is higher than expected

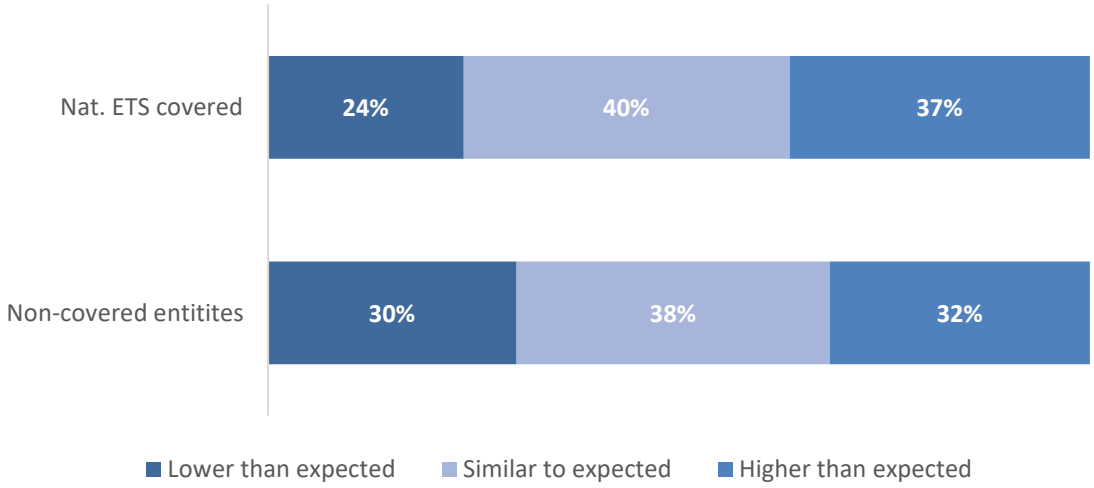

Figure 23: How do the current prices in the national carbon market compare with your expectations? (n=366)

Since 2013, this survey has been testing stakeholders' expectations of prices at the national level, allowing previous expectations to be compared with a real national price on carbon. The 2021 survey saw an average expectation of CNY 49/tonne CO_2 in that year, having been conducted just after the launch of trading in July.

This year, respondents were again asked what they expect the average carbon price to be at different points in time in the national carbon market in China. The results indicate an expectation of steadily rising prices, but with significant variance over the levels.

The average price expectation in the national market is expected to be CNY 59/t in 2022, rising to CNY 87/t in 2025, CNY 130/t in 2030, and CNY 239/t by mid-century (Figure 34). While the actual price levels remain highly uncertain, the range of expectations has narrowed somewhat since last year's survey. The 20th-80th percentile range grows from CNY 49/t to CNY 60/t in 2022 to CNY 58/t to CNY 180/t in 2030.

The authors removed several extreme responses.[8] The chart below indicates both the average (mean) of expectations, as well as the median. 34% of respondents provided no price estimates.

[8] The authors removed outlying responses from 3 respondents, defined as 1,000 CNY/tonne or above up to 2030 and over 2,000 CNY/tonne for 2050. These were considered to be extreme and therefore not included in the analysis.

China's carbon price is expected to steadily rise

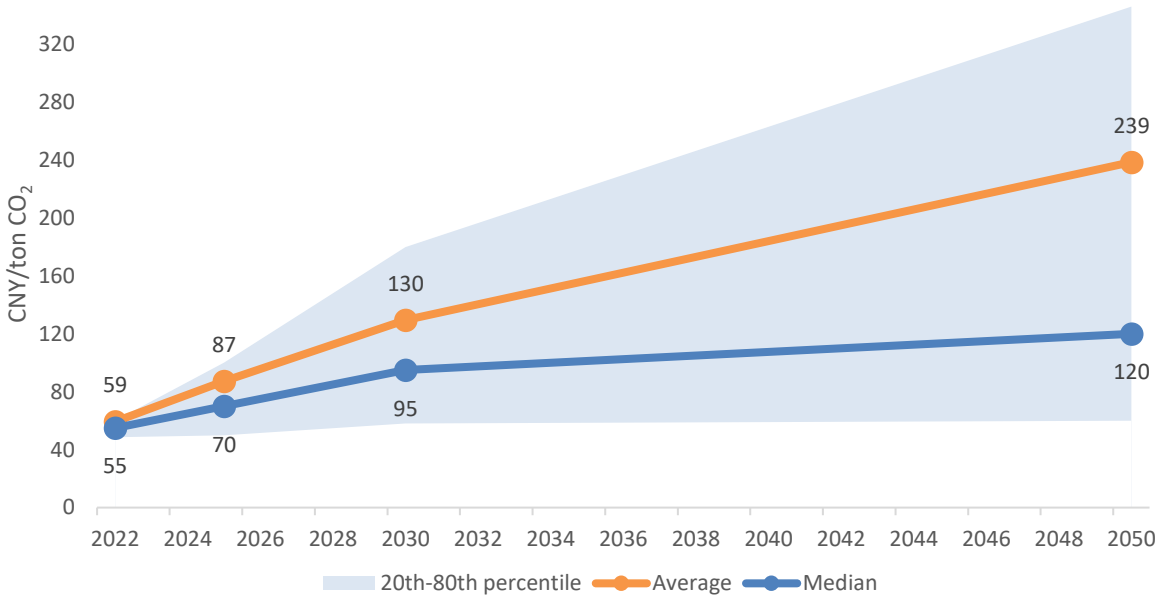

Figure 24: What do you expect the price in the national carbon market to be in the coming years? (n=297,299,289,289)

Long-term price expectations vary between industry and non-industry respondents, with industry consistently expecting lower prices.

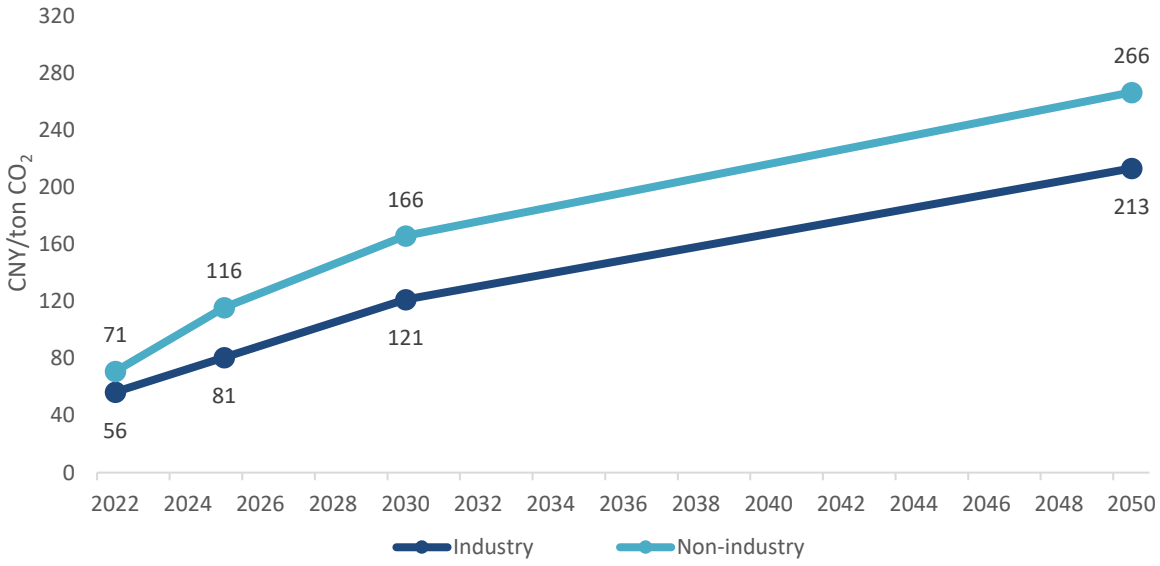

Figure 25: What do you expect the price in the national carbon market to be in the coming years? Industry vs Non-industry

The future price expectations to the end of this decade are slightly lower than in last year's survey, however they remain substantially higher than previous surveys up to 2020 (Figure 26). Expectations for future prices generally appear to be influenced by the current actual price levels.

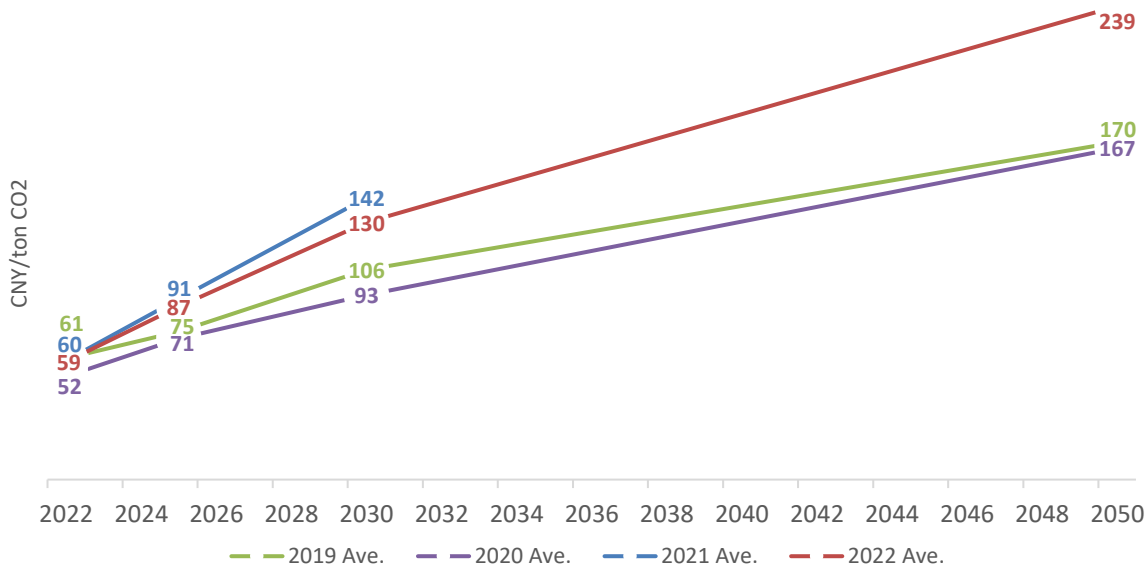

Figure 26: Expectations of the national carbon market price, 2019-2022 China Carbon Pricing Surveys.

It is worth noting that the expected carbon price is only a partial indicator of the overall effort to reduce carbon emissions, because the carbon market is complemented by non-pricing policies such as mandatory closure of inefficient facilities, incentives for energy saving, support for renewable energy, etc.

Selected quotes on the price of carbon in the national carbon market in coming years:

- If the benchmark is reduced annually, the price will increase. – *Shandong power generator*
- With the stringent implementation of the dual 30/60 goals, the energy-saving and emission-reduction work of enterprises is also accelerating. As the baseline is gradually tightened, the amount of tradable allowances will gradually decrease! – *Jilin power generator*
- As the government increasingly emphasises development of the carbon market, the carbon price will increase. – *Xinjiang chemicals company*
- As the peaking/neutrality goals approach, pressure to reduce carbon emissions will be enormous, and the carbon allowance deficit for companies will increase, leading to higher prices. – *Hubei academic*
- With reference to foreign carbon market prices, and the government's approaching 2060 carbon neutrality target, the carbon price should be high. Before 2025, there will be a single compliance unit, and the carbon price will see a steady upward trend. After 2030, with the addition of non-emitting entities, market activity will increase and the carbon price will rise sharply, which is conducive to enterprises increasing carbon reduction efforts. – *Jiangsu steel producer*
- Before the carbon peak, it may be a wait-and-see period, and there will be a steady decline. Once national policies are further developed, the price of carbon will be pushed up and allowances will be in short supply. After the peak, the national goal will shift to carbon neutrality, the supply of green carbon will gradually exceed demand, and the price of carbon will fall. – *Yunnan building materials company*
- 2030 will be an important turning point. The growth rate will moderate, carbon will peak somewhat higher than the current level, and the economic foundations will be built. After 2030, there will be a process towards carbon neutrality in 2060. At this stage, carbon emissions will basically be controlled. At the same time, government policy will lead to a certain amount of domestic population growth, and the employment demand generated is a problem that must be solved. At this time, the carbon price should return to a more reasonable range, so as to balance the relationship between economic development, people's livelihoods and sustainable development. – *Xinjiang chemicals producer*
- The price of carbon trading is too low and enterprises are not motivated. – *Xinjiang petrochem company*

Voluntary carbon market/offsets

The demand for offset credits from Chinese companies has been accelerating quickly since the announcement of China's national 2060 carbon neutrality goal. On the one hand, enterprises covered by emissions trading systems (compliance markets), are able to meet a small share of their compliance obligation with China Certified Emission Reduction (CCER) credits. On the other hand, many large enterprises not currently covered by compliance markets are making voluntary commitments to become carbon neutral including through the use of offset credits that may be validated by a wide range of accreditation systems.

In this year's survey, respondents from emitting enterprises were asked whether their companies currently purchase offset credits. Only 16% who were sufficiently informed to answer said that their company was a purchaser of offsets.

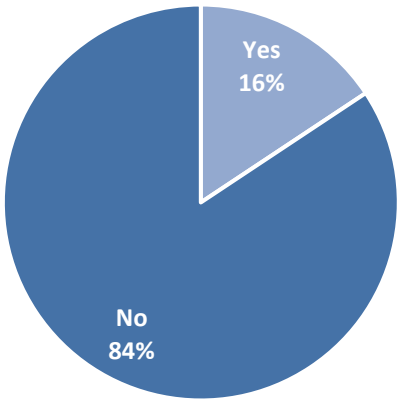

Figure 27: Does your company purchase offset credits? (n=287)

Of those companies that do currently purchase offset credits, CCERs are by far the most popular type of offset purchases.

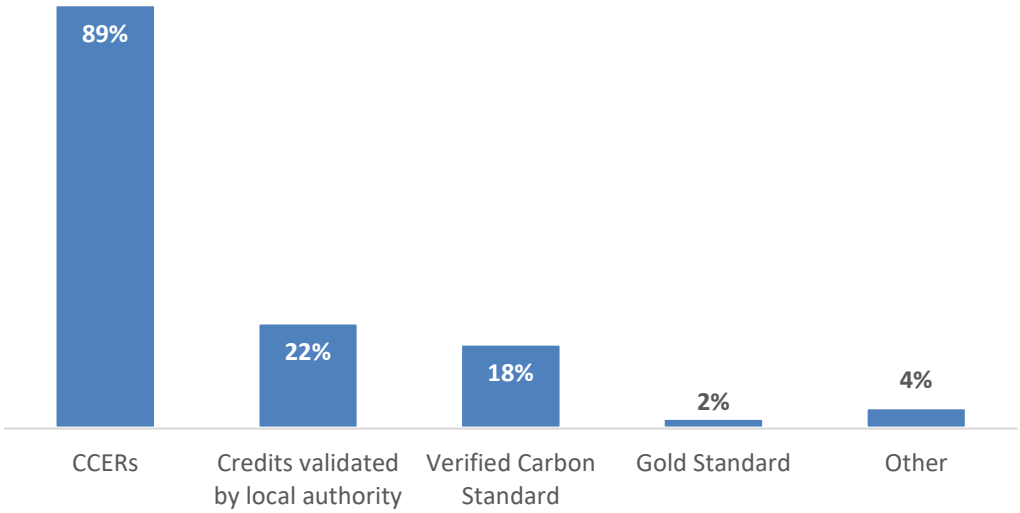

Figure 28: If yes, what type? (select one or more) (n=45)

Emitting enterprises were asked whether they prefer certain types of offset credits. Only 14% said that they had a preference, and of those the most common preference was for projects involving well-established technologies like solar and wind power generation.

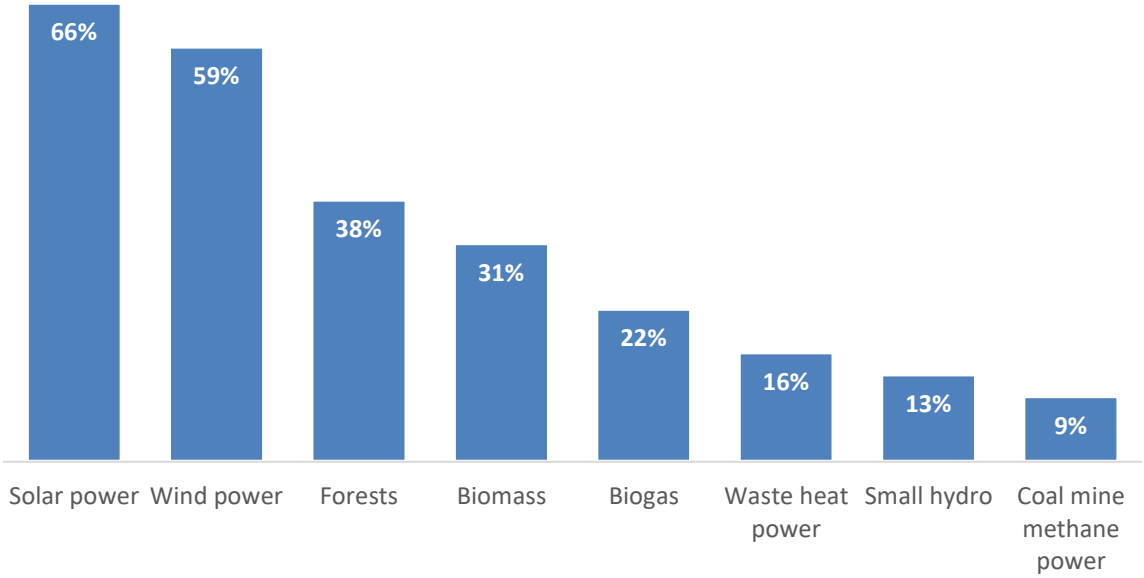

Figure 29: Does your company prefer certain types of offset credits? If yes, what type? (select one or more) (n=32)

Apart from CCERs, at least half of respondents expect that credits validated by local authorities will also be eligible for providing offset credits in the national carbon market. Credits via Verra's Verified Carbon Standard (VCS) also have significant support, though lower than in last year's survey (56%).

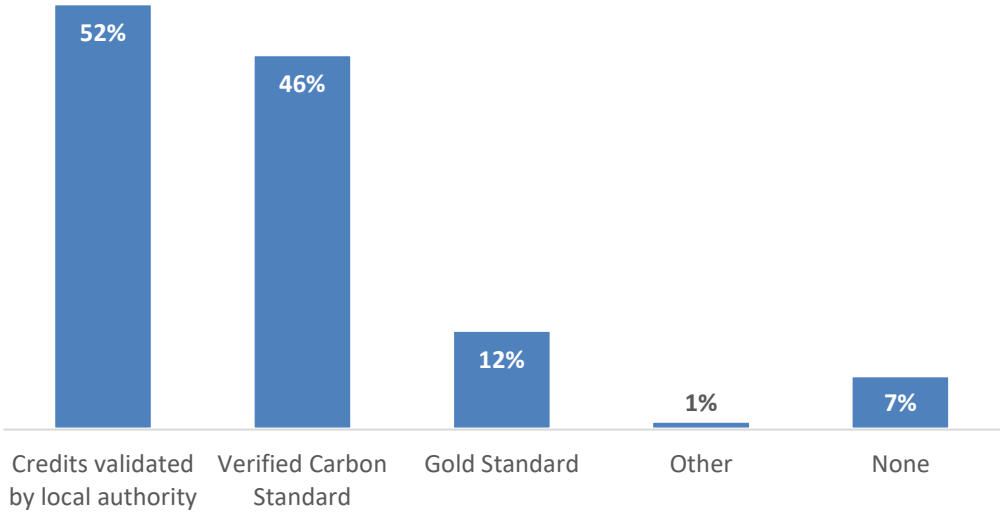

Figure 30: Apart from CCERs, what products do you expect to be eligible for national carbon market as offset credits? (select one or more) - % of total respondents (n=364)

The national *Administration Measures* specified that a maximum of 5% of a company's compliance obligation can be met by CCERs, and that they cannot be generated from emission reduction projects that result from actions taken by covered entities as a result of the national carbon market. Respondents were asked whether they expect any other restrictions to be applied to the offset credits utilised within the national carbon market. The most commonly expected restriction relates to the vintage year of credits.

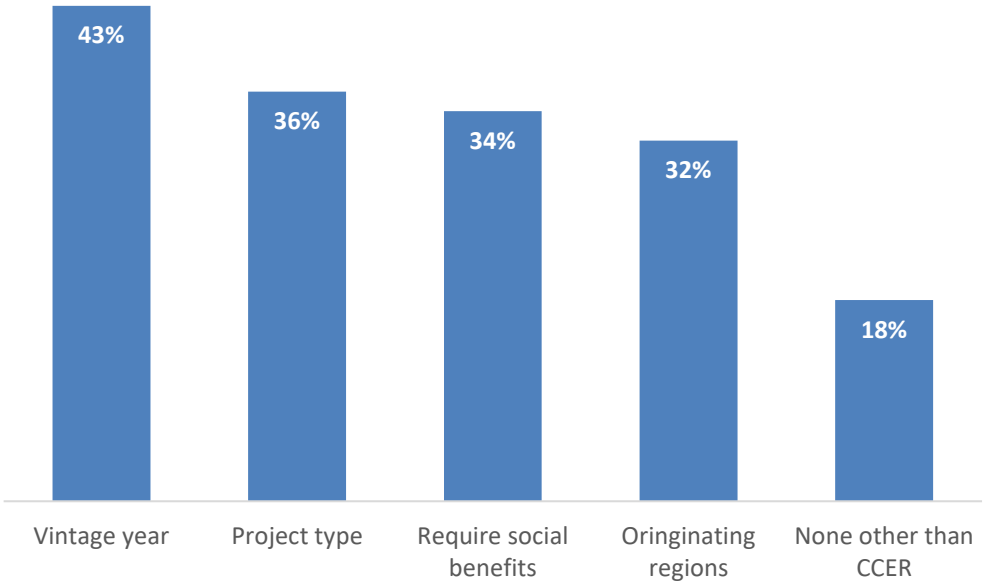

Figure 31: Do you expect any restrictions in the use of offset credits? (n=357)

Readiness for emissions trading

Respondents were asked whether they required further training to perform/administer tasks under the national carbon market, and 89% responded that this was indeed the case, including the same proportion for power sector respondents who are already covered by the national market.

Among the 367 responses from emitting enterprises, the highest demand for capacity building relates to basic understanding of the framework of an emissions trading system, however there are needs across a wide range of areas.

Capacity building is needed in many respects

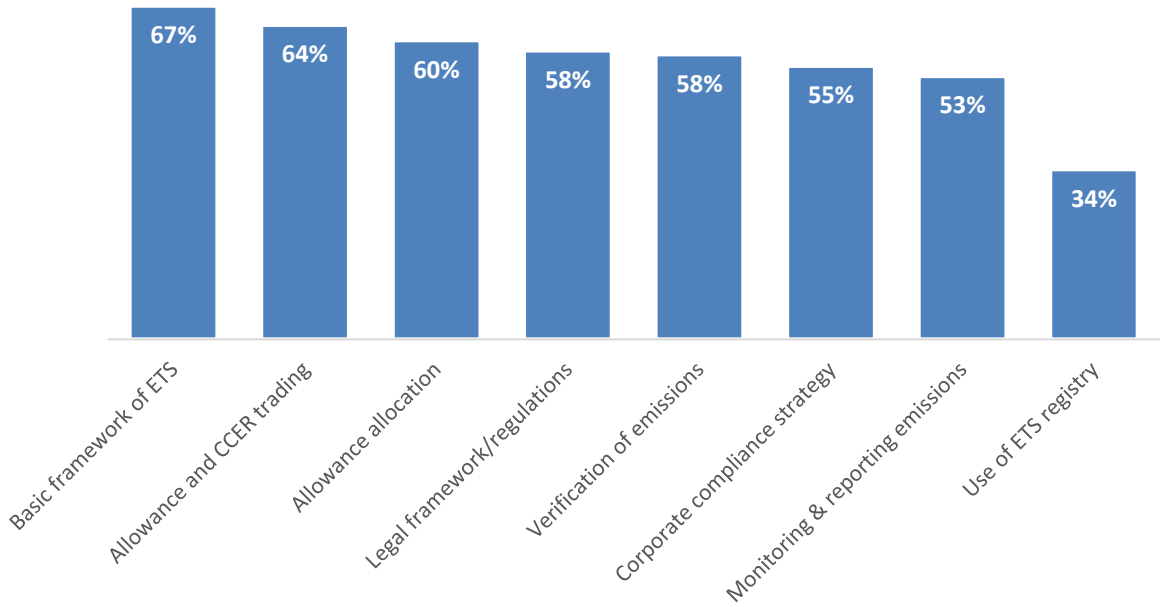

Figure 32: Do you need further training in order to perform/administer tasks under the national carbon market? (% of total emitters, not just those that require training) (n=367)

Comparing the responses of companies which have participated in regional pilot carbon markets, versus those who didn't, the survey shows a slightly lower demand for further training on average (80%).

The emitting enterprises were asked whether they had formulated a dedicated team to handle carbon trading obligations. 63% of respondents had dedicated either an individual or a team (similar to last year).

Over half of companies have formed a team to handle carbon trading obligations

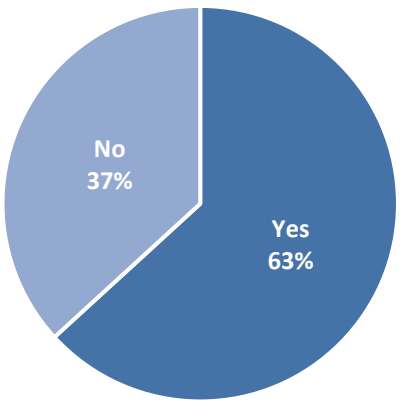

Figure 33: Has your company assigned a dedicated person (internal or external) or formed a dedicated team to handle your carbon trading obligations? (n=337)

For the industry respondents who have a team dedicated to handling carbon trading obligations, the vast majority have teams of less than 10 people, with the average team consisting of 7.7 people, up from 4.4 in last year's survey. The numbers vary significantly between industries, which is understandable given the different company sizes, and the fact that the power sector has developed more experience with carbon markets, including the previous Clean Development Mechanism (CDM). The results do not suggest that companies with small teams are understaffed. Even large compliance firms can manage with teams of five or less dedicated professional staff for MRV and allocation purposes.

Most companies have small teams to deal with carbon trading obligations

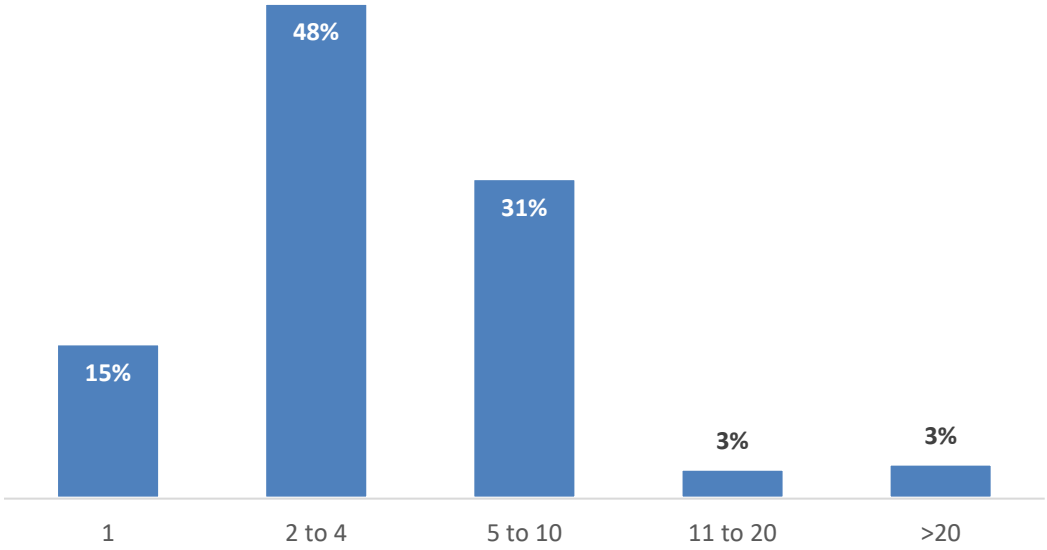

Figure 34: How many people are in the team? – Industry respondents (n=213)

In terms of the make-up of companies' carbon trading compliance teams, respondents for the first time identified 'management' as the most represented group involved. Other expertise best represented relates to 'safety and environment' and 'energy saving'. Financial experts and engineers are relatively under-represented.

Management is increasingly involved in carbon trading compliance responsibilities

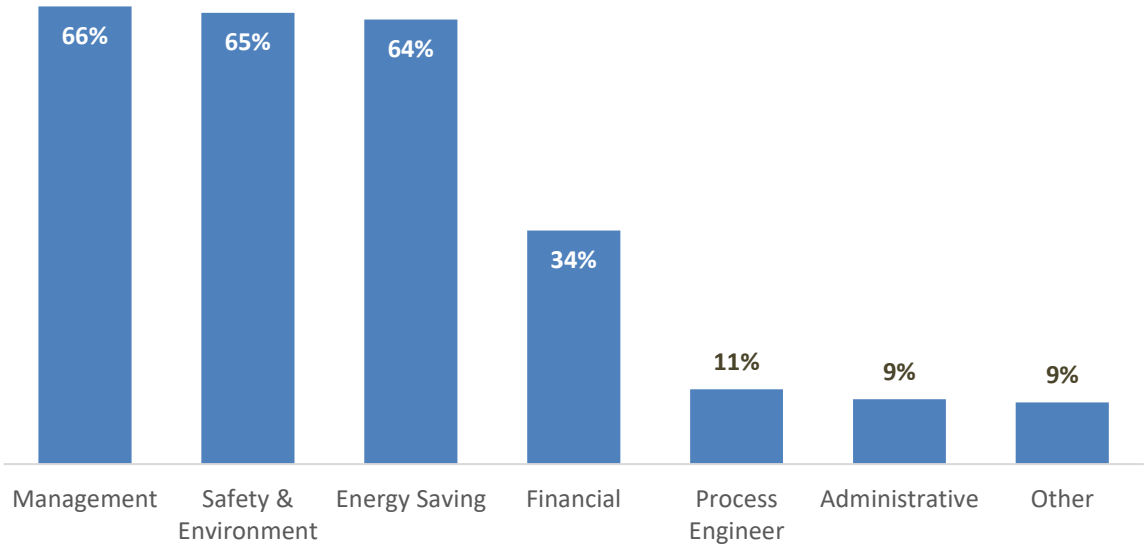

Figure 35: What are the competencies of the person(s) you have assigned to handle carbon trading obligations? (n=213)

'Emission reduction measures' was again the most frequently selected approach for emitters to meet their compliance obligations, however by a larger majority than in the past. In last year's survey half intended to pursue emission reductions, while at least 40% intended to purchase allowances or CCERs to meet their requirements. This year, two thirds now plan to reduce emissions firstly.

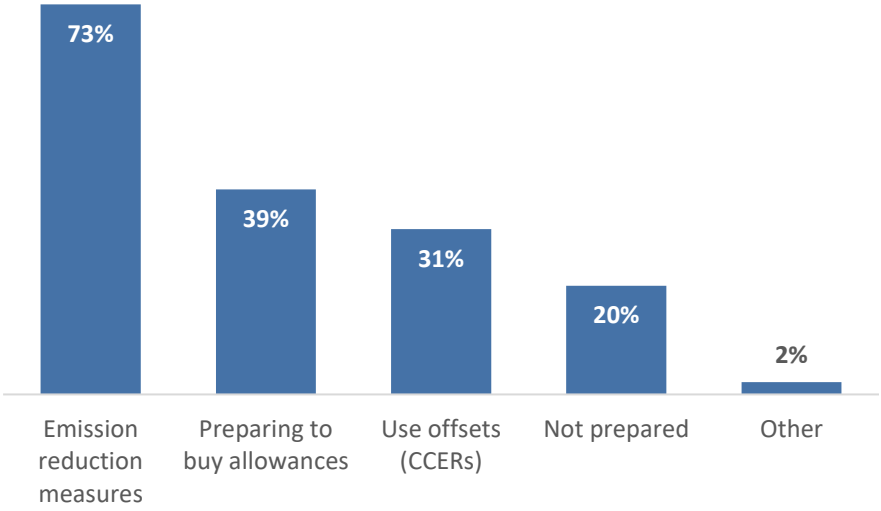

Figure 36: How does your company plan to meet its compliance obligation? (n=361)

Of the emitting enterprises, 68% state that their company has set an internal emission reduction target, significantly up from 43% last year. However, fewer power generation companies have set long-term targets than those in other sectors, despite their participation in the national carbon market.

More and more companies have set internal emission reduction targets

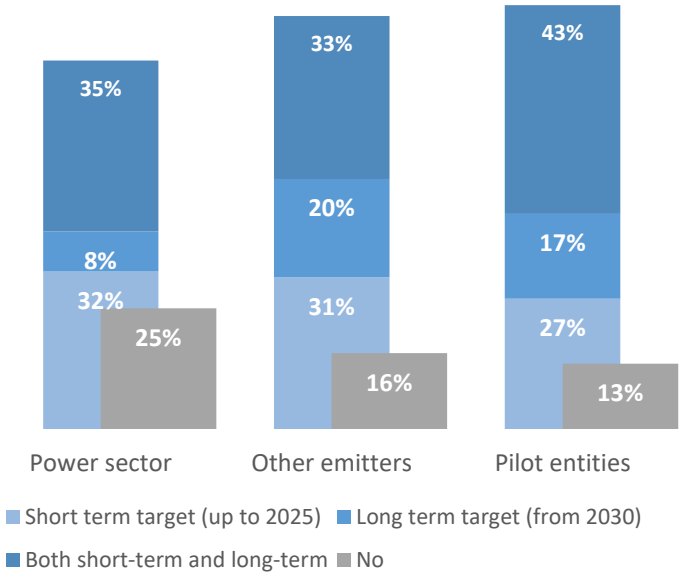

Figure 37: Does your company have an emissions reduction target? (n=278)

15% of emitting enterprise respondents who were aware of their company's approach indicated that they had implemented an internal carbon price, a slight increase from last year. For companies covered by regional pilots, the share with an internal carbon price is 20%. As much as 38% of industry respondents were unsure if their companies had implemented such a measure, similar to previous surveys. Internal

prices averaged CNY 72/tonne, up from CNY 61/tonne in last year's survey.[9] While there were limited positive responses to this question (only 35), it suggests that some companies are setting internal carbon prices above the current spot prices in China's national carbon market and most of the regional carbon markets.

Respondents at Group level of major companies were asked whether their company had undertaken internal distribution of allowances between subsidiary companies. A minority of these companies had undertaken such re-allocation measures, however this has increased since last year's survey (54% vs. 38%).

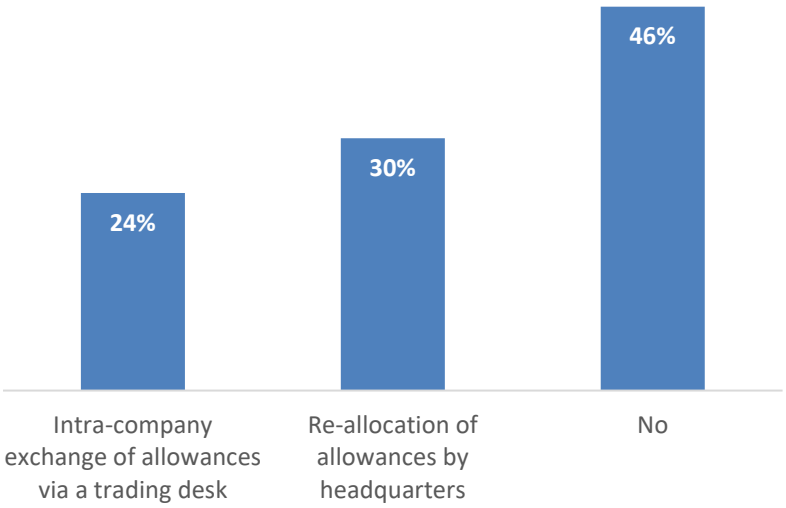

Figure 38: Has your company undertaken internal distribution of allowances between subsidiary companies? (for Group-level respondents) (n=68)

Power sector respondents were asked about their company's situation during the second compliance phase of the national carbon market regarding allowance allocation. A far higher proportion of respondents now expect that their company will need to buy allowances in the market in order to meet their compliance needs for the second period compared to last year's results for the first period (41% vs. 26%). Consequently, less respondents now expect to have a surplus (27% vs. 48%).

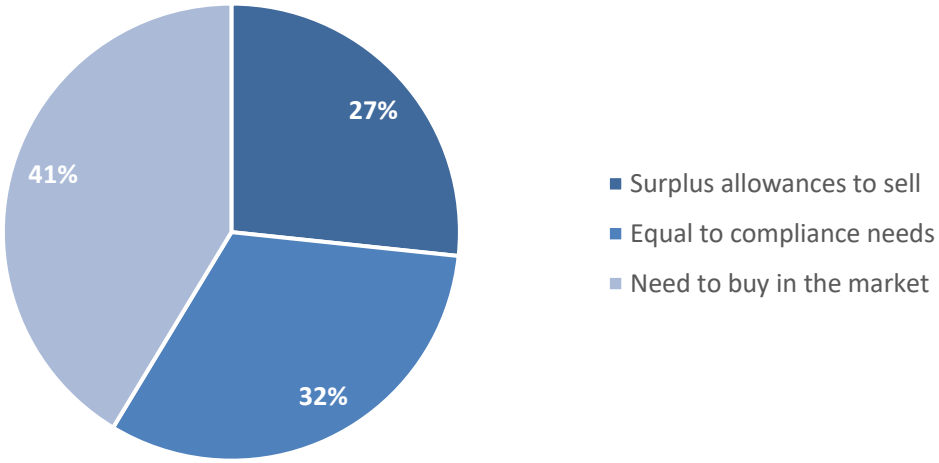

Figure 39: What do you expect your company's situation to be in the second compliance phase of the national carbon market regarding allowance allocation? (n=150)

[9] The results for this question excluded one response from a chemical sector responded who reported an internal carbon price of CNY 700/tonne. Authors excluded this response as an extreme outlier.

The same subset of respondents was asked which period they intend to trade their allowances. Contrary to conventional wisdom, very few respondents suggested that they would be trading very close to the compliance deadline. A larger share of respondents from entities that participate in the regional markets are prepared for trading across the whole compliance cycle.

Don't wait until the last minute to trade

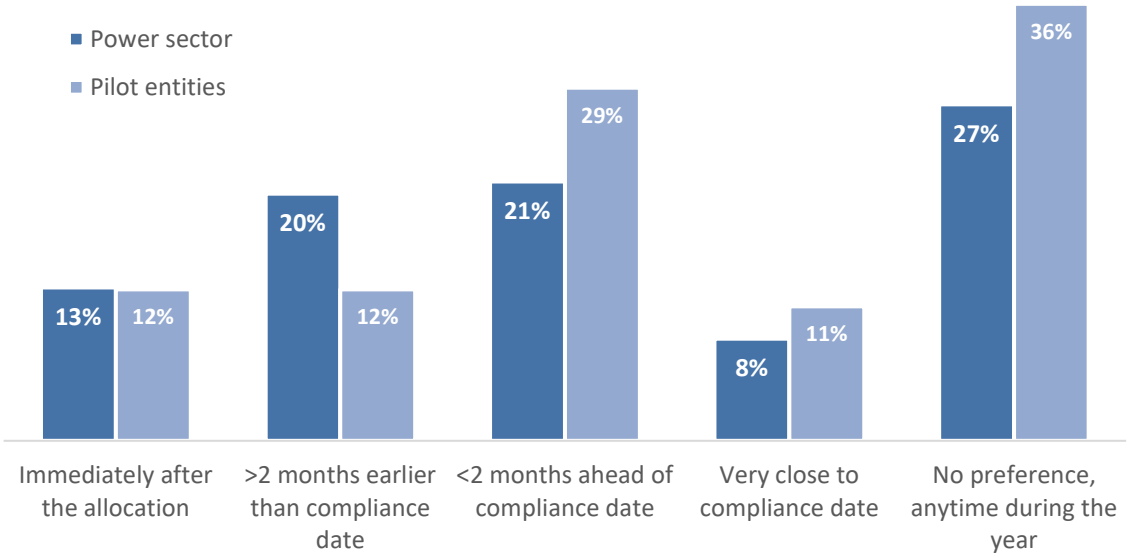

Figure 40: Which period do you intend to trade (sell or buy) your allowances? (n=144)

The power sector was also asked whether their company will primarily conduct block trading or regular spot trading. The majority that had a view said that block trading would be their company's main form of carbon trading. However a large proportion of power sector respondents (37%) were unaware of how to answer this question.

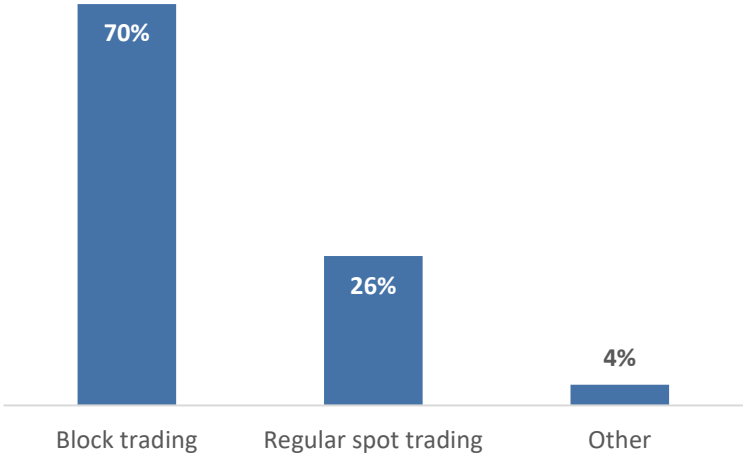

Figure 41: Will your company primarily conduct block trading or regular spot trading? (n=111)

Impacts of carbon pricing on investment

Respondents were asked if they expected the price of carbon to affect investment decisions in 2023, 2025, 2030 and 2050. Respondents expect the effect of carbon pricing on investment decisions to increase between the time of the survey and the end of this decade, though slightly lower impacts than in last year's survey. By 2025, about 3 out of every 4 respondents who expressed a view expect investment decisions to be at least moderately affected. Only 6% of respondents who answered this question expect investment decisions to be unaffected by 2025.

There is confidence that the carbon market will affect investment decisions by 2025

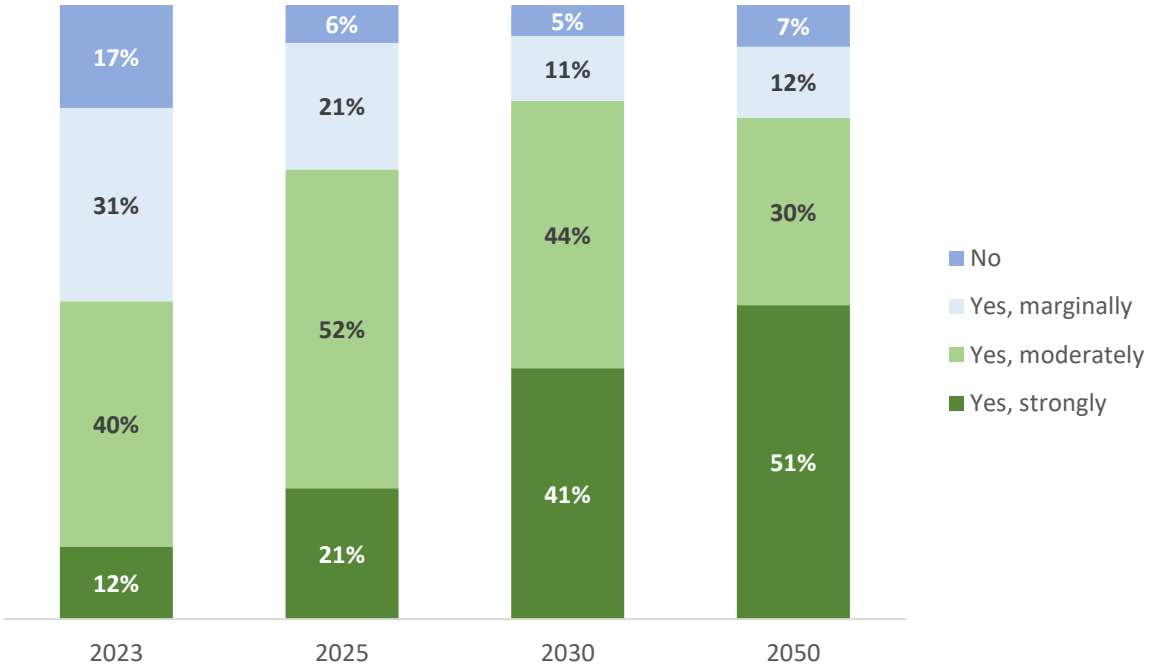

Figure 42: Do you expect the carbon market in China to affect investment decisions in 2023, 2025, 2030, 2050? (n=423,422,416,397)

Selected quotes on how the carbon market is expected to affect investment decisions:

- If the benchmark value is tightened, the company's allowances will not be enough to fulfil compliance obligations, carbon will become one of the company's major costs, and it will play an important part in the power trading decision-making. – *Zhejiang power generator*
- At present, allowance allocation for the iron and steel industry has not been initiated, and the industry has not been included in carbon market trading. – *Guangxi steel producer*
- The calcium carbide, power plant, cement, and coal chemical businesses in my company are all high-energy-consuming enterprises, and it is becoming more and more difficult to make decisions about their future investment. – *Xinjiang chemicals producer*
- At this stage policy goals are ambitious, while guidance on actual implementation is not equally strong, and actions have had little effect. I believe that the dual-carbon goals will have more influence on enterprises in the future, and the effect will become clearer. – *Sichuan food and beverage producer*
- After the implementation of carbon trading, enterprises with carbon intensive production facilities will be faced with halting and transforming their operations. It will be considered very carefully when conducting a new round of investment projects. – *Beijing headquartered petrochemicals company*

Power sector respondents were asked how the carbon market has affected their company financially. More say that the carbon market has so far had a positive rather than negative impact (49% vs. 34%).

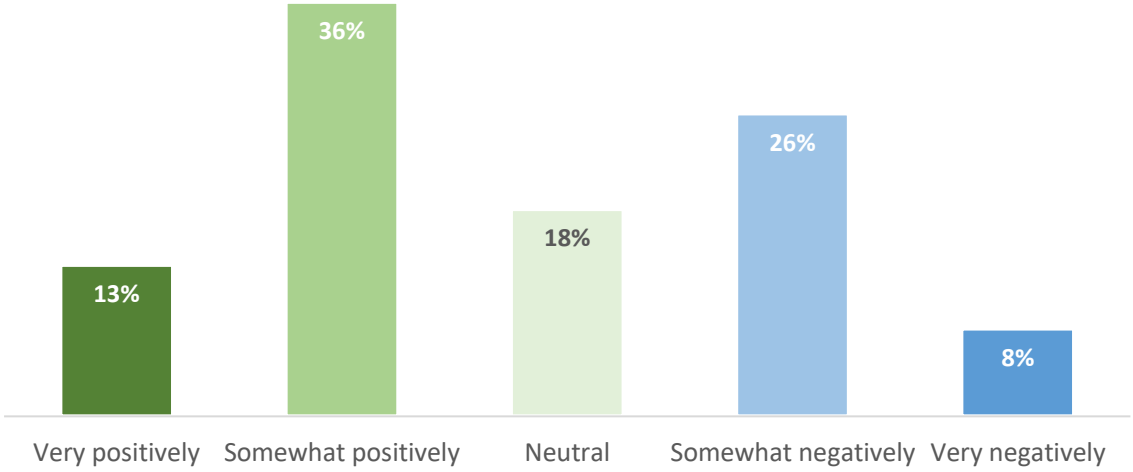

Figure 43: All considered, how has the carbon market affected your company financially? (n=146)

Selected quotes on how the carbon market has so far affected companies financially:

- Increased production costs have affected the company. – *Zhejiang steel producer*
- The group is deployed in a unified manner, and subsidiaries follow accordingly. – *Xinjiang power generator*
- The department responsible for carbon reduction technology for cement has taken many approaches, but the effect is not substantial. Reducing emissions is difficult. – *Chongqing cement company*
- Some small-scale production capacity was shut down, and the overall production capacity of the industrial chain was reduced, which caused a certain impact. – *Xinjiang chemicals company*
- The market has guided the company to plan and implement transformative energy-saving technology, and work to allocate more funds and management resources to help reduce carbon emissions. This is good for the future production, operations and financial situation. – *Inner Mongolia non-ferrous metals producer*

Unlike in most other jurisdictions with carbon pricing, China's electricity prices are currently fixed on an annual basis by the central government, with variations by region. This means that power generation companies cannot pass the carbon price on to consumers. Survey respondents were asked by what time they expect the carbon price to affect the price of electricity for consumers. Only 21% of respondents believe this will be the case by 2025, while more expect this reform to be achieve post-2030 than last year.

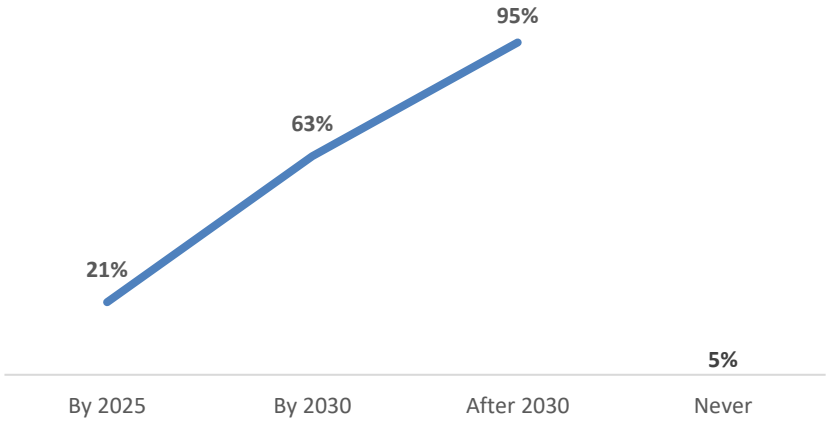

Figure 44: By when do you expect power market reform to allow for carbon price pass through from power producers to end users? (n=399)

Peak emissions

In September 2020, President Xi Jinping increased China's climate ambition by committing to peak its emissions of carbon dioxide from energy consumption 'before 2030' (instead of 'around 2030'). 43% of respondents to this year's expect China to achieve the carbon emissions peak before 2030. Only 13% expect China's emissions to peak by 2025 or earlier, down from 36% two years ago in the 2020 survey.

China is expected peak emissions before or no later than 2030

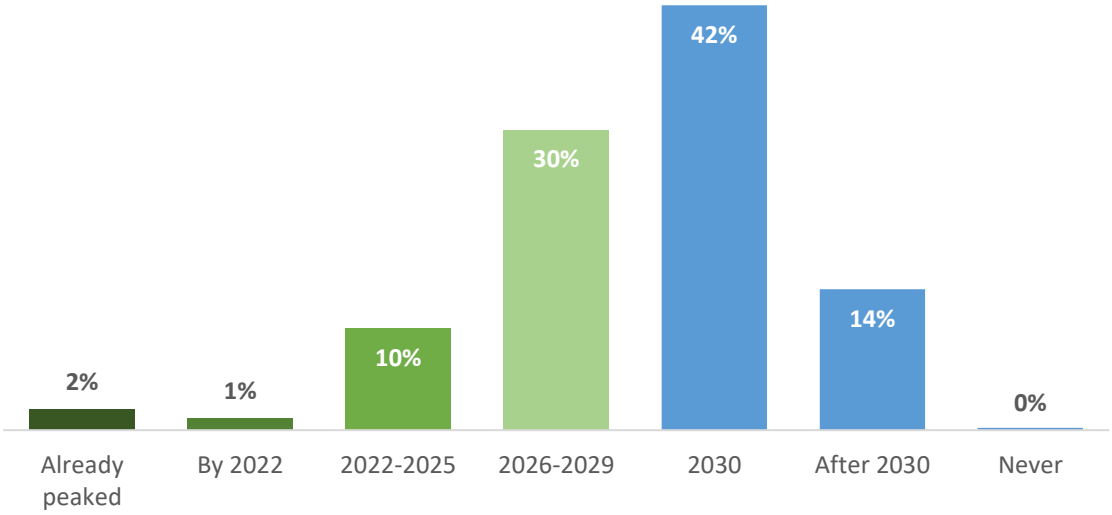

Figure 45: When do you expect China's emissions will peak? (n=434)

Carbon border adjustments

As climate change mitigation ambition increase globally, and the world is seeing rising carbon prices, especially in the European Union, there is increasing attention on the challenge of limiting carbon leakage. Avoiding carbon leakage is not solely a local economic concern, but also of relevance to the global decarbonisation agenda, because if emission reductions in some areas are offset by increases in others it will slow progress towards net-zero.

Respondents from the cement, steel, aluminium and chemicals were asked whether they exported to the EU, which is going to introduce a Carbon Border Adjustment Mechanism (CBAM), and if so, how well they understand the proposed measure and its implications for their industry.

17 of respondents in these sectors (12%) indicated that their companies are exporters from China to the EU. 41% of these said that they understood the CBAM moderately or very well, up from 30% in last year's survey, but it is notable that this is still a minority of those affected.

Europe's proposed Carbon Border Adjustment Mechanism (CBAM) is not yet well understood

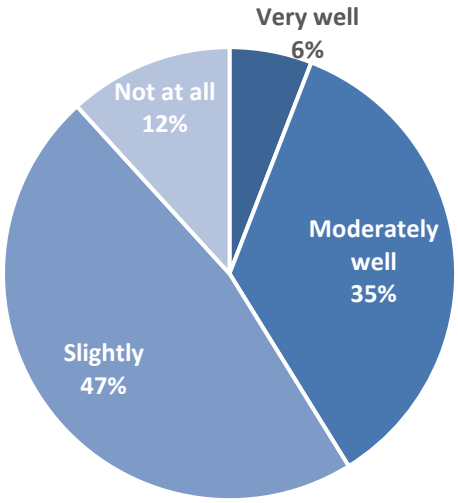

Figure 46: How well do you understand the EU's proposed CBAM (and its implications for your industry)? (n=20)

An even higher proportion of exporters expected that the CBAM will impact on their exports than in last year's survey (78% vs. 60%).

Exporters are concerned that the CBAM will impact their business

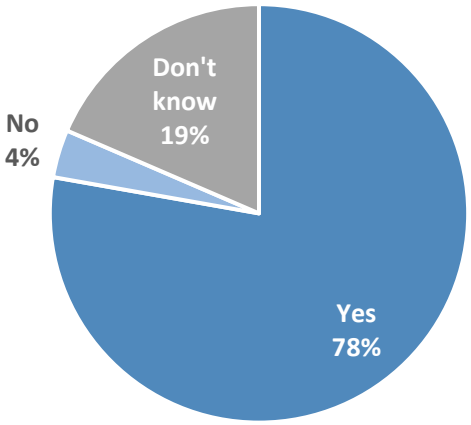

Figure 47: Do you anticipate that the CBAM will impact your exports to Europe? (n=20)

Project implementers

ICF is recognised as a leading global provider of climate change and low carbon related services. The firm has offices and energy/climate experts in the U.K., China, India, Nepal, Europe and North America. ICF has over 1,500 professional employees dedicated to the study of climate change, energy, and environmental issues. ICF's Beijing office, brings in-depth knowledge of the key energy, environment, economic, and policy issues in China with a 20-year plus track record of continuous climate policy capacity building in China and an extensive network of partners and relevant stakeholders. ICF was awarded the best Advisory/Consultancy in China Carbon Markets by Environmental Finance Magazine in the "Annual Market Rankings" for two years in a row (2017 and 2018).

Project funders

Environmental Defense Fund

Founded in 1967 and headquartered in New York, Environmental Defense Fund (EDF) is one of the world's leading environmental organizations. EDF has more than 3 million members, a staff of over 1000 professionals, and 12 offices around the world including the United States, China, United Kingdom, Indonesia and Mexico. Areas that EDF works in include: climate and energy, oceans, ecosystems, health, etc. Since inception, EDF has been guided by principles of science and economics to find practical and lasting solutions to the most serious environmental problems. EDF has been working in China since 1991 and in June 2017, EDF became the first foreign NGO registered under the supervision of China's Ministry of Environmental Protection.

ENERGY FOUNDATION
能源基金会

Energy Foundation is a professional grant-making charitable organization registered in California, U.S. It has been working in China since 1999 and is dedicated to China's sustainable energy development. The foundation's China office is registered with the Beijing Municipal Public Security Bureau and supervised by the National Development and Reform Commission of China. Our vision is to achieve prosperity and a safe climate through sustainable energy. Our mission is to achieve greenhouse gas emissions neutrality, world-class air quality, energy access, and green growth through transforming energy and optimizing economic structure. We deliver the mission by serving as a re-grantor, facilitator, and strategic advisor.

NORWEGIAN ENVIRONMENT AGENCY

The Norwegian Environment Agency is working for a clean and diverse environment. Its primary tasks are to reduce greenhouse gas emissions, manage Norwegian nature, and prevent pollution. It is a government agency under the Ministry of Climate and Environment and has 700 employees at its two offices in Trondheim and Oslo and at the Norwegian Nature Inspectorate's more than sixty local offices. It implements and gives advice on the development of climate and environmental policy. It is professionally independent. This means it acts independently in the individual cases that it decides and when it communicates knowledge and information or gives advice.

Environmental Defense Fund

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