

碳中和实现路径及碳信息的披露

熊昀青
顾问总监
ERM

演讲大纲

碳中和规划

碳核算

制定碳中和计划

碳减排和碳中和的途径和措施

碳信息报告/披露



嘉宾介绍

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- 熊昀青是一位经验丰富的EHS顾问，拥有20多年的工作经验。熊女士在EHS管理体系、EHS审核、培训和法规审查服务方面有着丰富的经验。在过去的10年里，她为当地、合资企业和跨国公司管理和实施大量的项目，并为跨国公司客户管理各种复杂的咨询项目，涉及多种服务和地点。
 - 熊女士熟悉国家可再生能源技术指导和中国碳政策，在制造业碳减排和碳中和策略和路线图发展方面积累了很多经验。最近几年，她协助多家客户在中国的制造企业实施温室气体减排和碳中和计划。



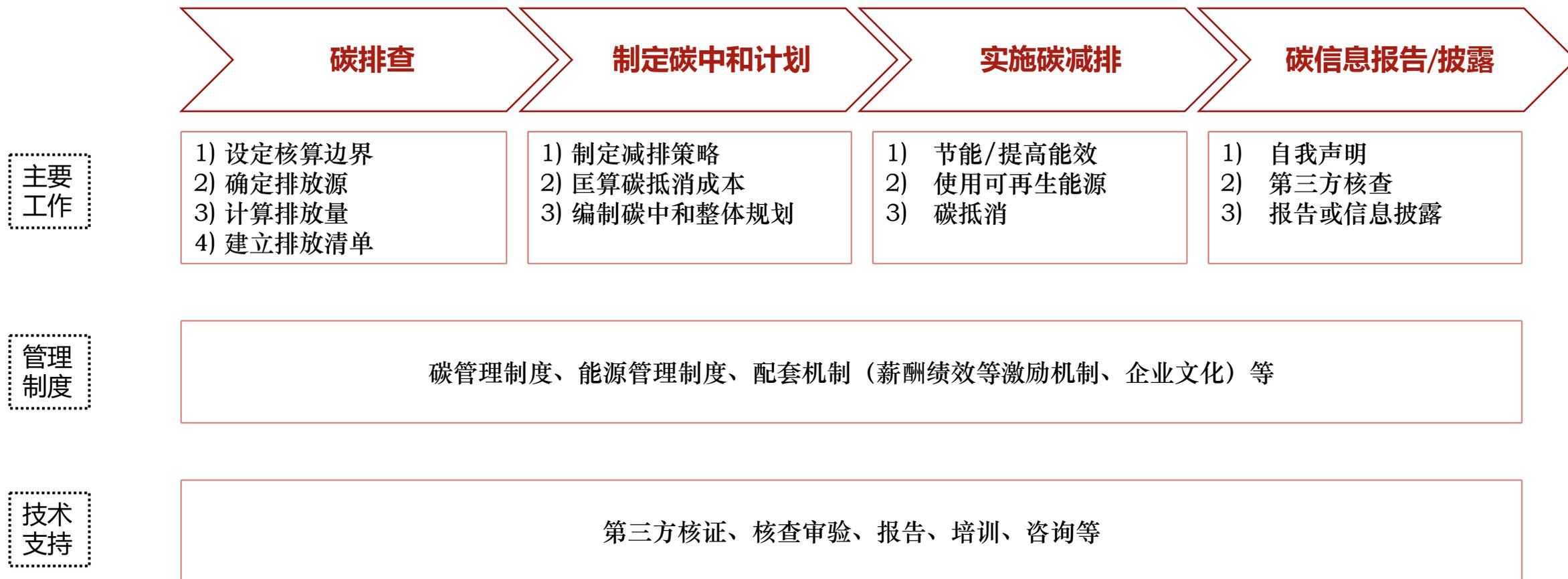


企业走向碳中和的规划

- 企业为什么要走向碳中和
 - 实现社会责任(非强制性要求)
 - 率先垂范，带动产业链提出更有力的减排目标
 - 规避未来可能的风险
- 在全球范围内，已有超过800家企业提出了碳中和目标，超过50家企业宣布已经实现碳中和



企业实施“碳中和”目标的步骤



碳排查

碳排查

制定碳中和计划

实施碳减排

碳信息报告/披露

目的

- 进行碳排放量的统计与核算，对自身的排放情况进行“摸底”
- 企业实现碳中和的前提和首要步骤

碳排查的方式

- 国家或政府层面
- 市场主体
 - 行业
 - 企业
 - 项目
 - 产品等



企业碳排查的常用标准-国内

标准名称	编制机构	适用对象	发布年份
24 个“温室气体排放核算方法与报告指南（试行）”	中国国家发展和改革委员会	1个综合 • 工业其他行业企业温室气体核算方法与报告指南（试行）_2015 23个行业（不含制药行业）	2013-2015 年
《工业企业温室气体排放核算和报告通则》（GB/T 32150-2015）系列温室气体管理国家标准	中国国家标准委员会	• 1个通则 • 10个重点行业（不含制药行业）	2015 年
企业温室气体排放核算方法与报告指南-发电设施	生态环境部	发电行业	2021年
7个试点碳交易省/市地方核算和报告指南 • 上海市温室气体排放核算与报告指南（试行）+8个行业（2012） • 深圳市《组织的温室气体排放量化和报告规范及指南》（2013） • 天津市企业碳排放报告编制指南（试行）（2013） • 广东省企业二氧化碳排放信息报告指南(试行)+4个行业（2014） • 重庆市工业企业碳排放核算和报告指南(试行)（2014） • 湖北省工业企业温室气体排放监测、量化和报告指南(试行)+11个行业（2014） • 北京市企业(单位)二氧化碳核算和报告指南(2015版)	各碳交易试点省、直辖市	通用行业及特定行业（皆不含制药行业）	2012-2015年

企业碳排查的常用标准-国际

标准名称	编制机构	适用对象	发布年份
IPCC 国家温室气体清单指南	政府间气候变化专门委员会 (IPCC)	国家和区域层面	2006
温室气体核算体系：企业核算与报告标准（企业标准）	世界资源研究所 (WRI) 世界可持续发展工商理事会 (WBCSD)	企业层面	2001
温室气体核算体系：产品生命周期核算和报告标准（产品标准）		产品层面	
温室气体核算体系：企业价值链（范围三）核算与报告标准（范围三标准）		企业层面	
ISO 14064-1: 温室气体 第一部分 组织层面上对温室气体排放和清除的量化和报告的规范及指南	国际标准化组织 (ISO)	企业层面	2006
ISO 14064-2: 温室气体 第二部分 项目层面上对温室气体减排和清除增加的量化、监测和报告的规范及指南		项目层面	
ISO 14064-3: 温室气体 第三部分 温室气体声明审定与核查的规范及指南		第三方适用	
PAS 2050:2008 商品和服务在生命周期内的温室气体排放评价规范	英国标准协会 (BSI)	产品层面	2008

碳排查流程

1) 设定核算边界

- 确定组织边界 (法人边界)
- 确定运营边界 (直接排放或间接排放)

2) 确定排放源

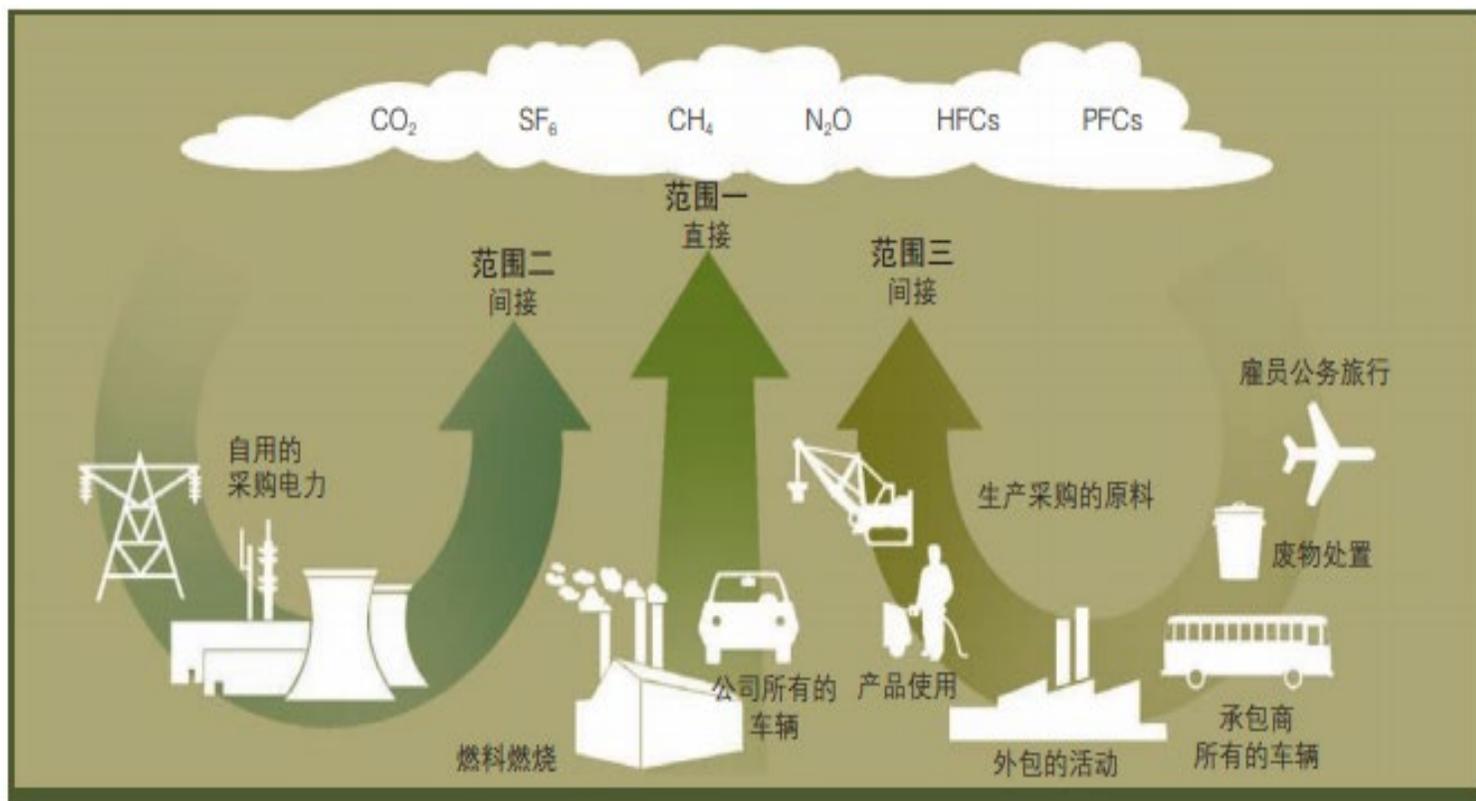
- 识别排放源
- 建立盘查台账

3) 计算排放量

- 收集活动水平数据
- 选择排放因子
- 计算并汇总数据

4) 建立排放清单

- 记录数据
- 编制排放清单



摘自《温室气体核算体系：企业核算与报告标准》（修订版）

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- 记录数据
- 编制排放清单

排放类型	范围分类	举例
直接排放	范围一：直接排放	<ul style="list-style-type: none">• 固定燃烧排放 (如锅炉、焚烧炉、应急发电机、柴油泵)• 移动燃烧排放 (如叉车)• 工业过程直接排放• 逸散排放
	范围二：与能源使用相关的间接排放	外购电力、外购热力、蒸汽、制冷、压缩空气
间接排放	范围三：其他间接排放	外包运输、购买货物、使用服务、产品使用、废物处理回收、员工商务旅行、员工通勤等价值链上下游所产生的排放

碳排查流程

1) 设定核算边界

- 确定组织边界 (法人边界)
- 确定运营边界 (直接排放或间接排放)

2) 确定排放源

- 识别排放源
- 建立盘查账册

3) 计算排放量

- 收集活动水平数据、选择排放因子
- 实测排放量 (现场测量+非现场测量)
- 计算并汇总数据

4) 建立排放清单

- 记录数据
- 编制排放清单

温室气体排放量核算方法概括为三种

■ 排放因子法 (IPCC基本方程)

- 碳排放量 = 活动水平数据 × 排放因子
- 采用权威机构、政府部门、供应商 (如本地电网) 等公布的通用的排放因子
- IPCC (<https://www.ipcc-nggip.iges.or.jp/EFDB/main.php>)
- GHG企业标准([Calculation Tools | Greenhouse Gas Protocol \(ghgprotocol.org\)](#))
- 国家/省级主管部门推荐使用的排放因子 (http://www.mee.gov.cn/ywgz/ymqhbh/wsqtzk/202012/t20201229_815386.shtml)

■ 碳质量平衡法

■ 实测法

碳排查流程

1) 设定核算边界

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2) 确定排放源

- 识别排放源
- 建立盘查账册

3) 计算排放量

- 收集活动水平数据、选择排放因子
- 实测排放量 (现场测量+非现场测量)
- 计算并汇总数据

4) 建立排放清单

- 记录数据
- 编制排放清单

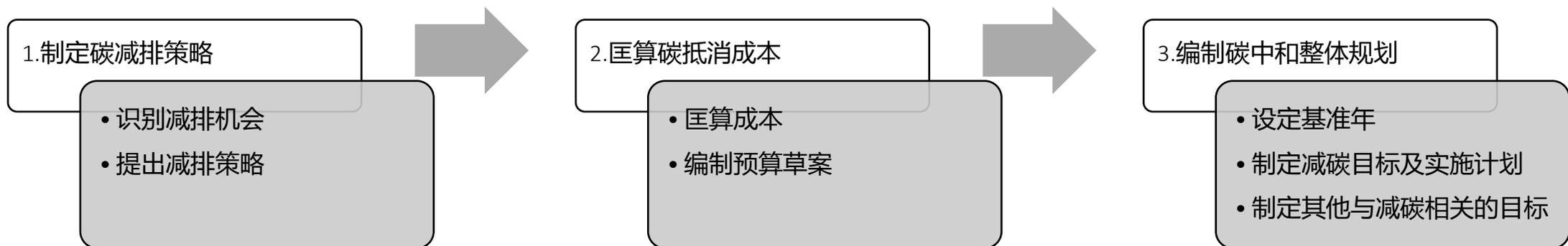
图 5: 温室气体排放清单示意图

排放源	温室气体排放量 (吨二氧化碳当量)						总和
	二氧化碳 (CO2)	甲烷 (CH4)	氧化亚氮 (N2O)	氢氟碳化物 (HFCs)	全氟化碳 (PFCs)	六氟化硫 (SF6)	
范围一: 直接排放							
汽油							
空调制冷剂							
.....							
A) 范围一排放合计							
范围二: 与能源相关的间接排放							
外购电力							
外购热力							
.....							
B) 范围二排放合计							
范围三: 其他间接排放							
废纸处理在堆填区引起的甲烷排放							
商旅搭乘飞机							
.....							
C) 范围三排放合计							
温室气体排放总计 (A+B+C)							

制定碳中和计划



- 在完成温室气体量化、全面掌握自身的排放情况之后，企业需要思考如何将碳排放降至“净零”，建立碳中和的实现路径，设定优先级
- 制定碳中和计划的关键步骤



制定碳目标 - 科学碳目标 (SBTi)

■ 科学碳目标倡议(SBTi)

- 由世界自然基金会 (WWF) 联合全球环境信息研究中心 (CDP)、世界资源研究所 (WRI) 以及联合国全球契约项目 (UNGC) 共同发起, 是全球商业气候联盟(We Mean Business Coalition)的组成部分。
- 倡议提供工具、最佳实践指导和针对不同行业的特定资源, 帮助企业设定符合联合国政府间气候变化专门委员会第五次评估报告中远低于2°C或1.5°C的脱碳水平的、基于科学的减排目标。

■ 已设立科学碳目标的一些制药企业

Company	Target Qualification	Target Set Year	Targets
GSK	1.5°C	2019/3/1	<ul style="list-style-type: none"> • Reduce absolute scope 1 and 2 GHG emissions 34% by 2025 from a 2017 base year. • Reduce absolute scope 3 GHG emissions 16% by 2030 from a 2017 base year
Novartis	1.5°C	2019/7/1	<ul style="list-style-type: none"> • Reduce absolute scope 1, 2 and 3 GHG emissions 35% by 2030 from a 2016 base-year.
Bayer	1.5°C	2020/8/1	<ul style="list-style-type: none"> • Reduce absolute scope 1 and 2 GHG emissions 42% by 2029 from a 2019 base year. • Reduce absolute scope 3 GHG emissions from purchased goods and services, capital goods, fuel and energy related activities, upstream transportation and distribution, and business travel 12% by 2029 from a 2019 base year.
J&J	1.5°C	2020/11/19	<ul style="list-style-type: none"> • Reduce absolute scope 1 and 2 GHG emissions 60% by 2030 from a 2016 base year. • Reduce absolute upstream scope 3 GHG emissions 20% over the same target period.
Pfizer	1.5°C	2021/4/1	<ul style="list-style-type: none"> • Reduce absolute scope 1 and 2 GHG emissions 46% by 2030 from a 2019 base year. • Increase annual sourcing of renewable electricity from 9% in 2019 to 100% by 2030. • Reduce absolute scope 3 emissions 25% from business travel by 2025 from a 2019 base year. • Reduce absolute scope 3 emissions 10% from upstream transportation and distribution by 2025 from a 2019 base year. ...



例子：一些已经承诺建立SBTi目标的中国企业

<https://sciencebasedtargets.org/companies-taking-action?country=China®ion=Asia§or=Chemicals#table>



About Us Business Ambition for 1.5°C News & Events Contact FAQs [SET A TARGET](#)

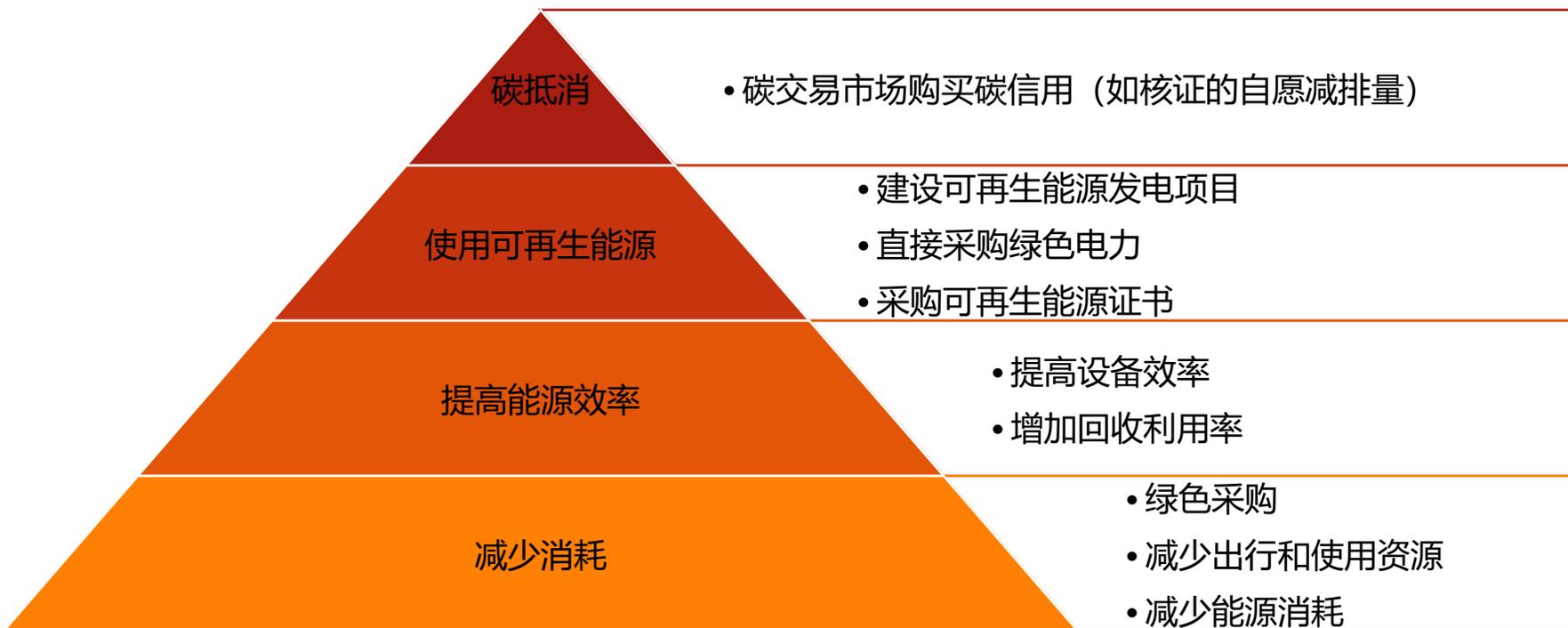
How it works Set a target Companies taking action Sector guidance Resources Net-zero

COMPANY	STATUS	TARGET CLASSIFICATION	LOCATION	REGION	SECTOR	DATE
SHANDONG NHU PHARMACEUTICAL CO., LTD.	Committed	-	China	Asia	Chemicals	Jan 2021
JIANGSU HONGBANG CHEMICAL TECHNOLOGY CO., LTD	Committed	-	China	Asia	Chemicals	Jan 2021
Yingyang (China) Aroma Chemical Group	Committed	-	China	Asia	Chemicals	Dec 2020
Hebei Chengxin Co. Ltd	Committed	-	China	Asia	Chemicals	Dec 2020
Group Fu Plastic Co., LTD	Committed	-	China	Asia	Chemicals	Jan 2020

实施碳减排



■ 碳减排方法和途径

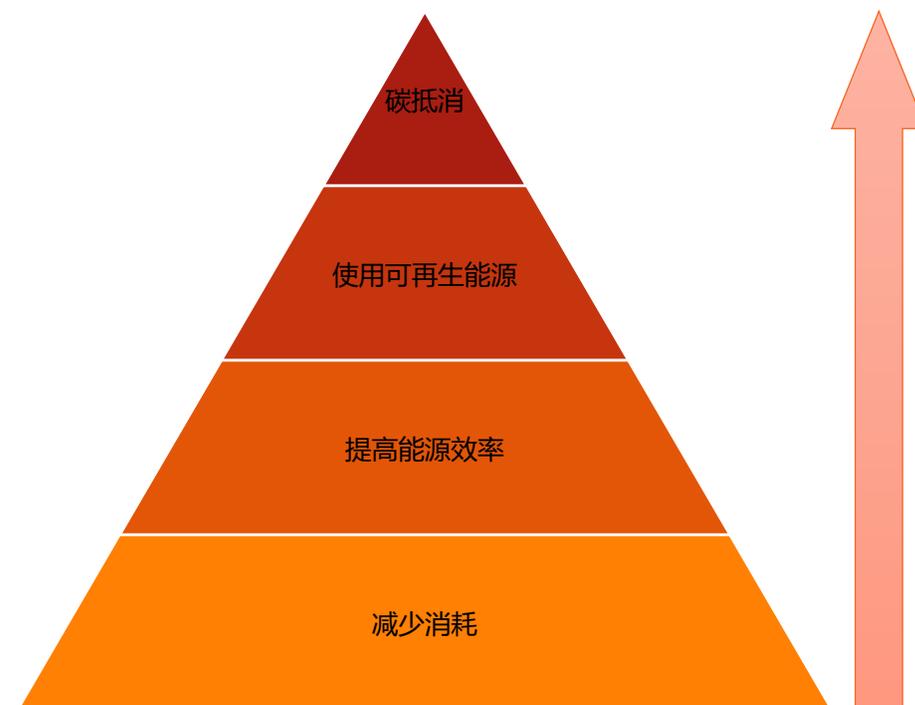


实施碳减排 - 设定优先级



设定优先级的基本规则

- 自身减排优先于碳抵消
- 一些约束条件
 - 如果参与自愿碳披露项目 (CDP)
 - 边界标准 – 只能使用相同边界内的可再生能源
 - 如果设立了SBTi目标, 必须按照SBTi的标准要求进行减排
 - C12 – 抵消: 不得使用碳抵消来减排
 - C15 – 可再生能源的使用, 采纳RE100的建议
 - 2025年80%的可再生能源
 - 2030年100%的可再生能源



实施碳减排 – 使用可再生能源

方式一：分布式可再生能源发电项目

- 分布式光伏和分散式风电
- 委托有能力的项目公司进行全盘考虑，针对所处地域、使用年限和面积等确定安装可再生能源设备的可能性（自建或第三方投建）
- 合理规划项目规模、投资方式以及取得的环境权益

方式二：直接采购绿色电力

被动式消费和主动式消费

目前可再生能源在日渐开放的电力交易市场上采购有难度，短期内无法满足“100%可再生能源”的采购诉求，可直接接触地方电力局了解直接采购绿电的可能性及流程

分布式发电市场化交易（隔墙供电）开始试点（江苏、河南、河北等16个省），关注试点进展

方式三：采购可再生能源证书

- 可再生能源证书是指由认证机构对可再生能源电力核发的证书，以证明其绿色属性，是一种可交易的能源商品
- 当前中国绿证制度尚未成熟，目前中国绿证不属于被CDPI认定为可直接作为凭据做出有效声明的绿证类型
- 可考虑其它在中国市场可获得的可再生能源属性证书，如I-REC, TIGR Registry (RECs)

实施碳减排 – 案例分享

Location: Jiangsu, Hubei etc.

Sector/Industry: **Cosmetics**

Target

Company has committed to a 100% reduction in CO2 emissions by 2020 Globally.

Approaches

Multiple measures to achieve reduction from 2005 to 2019:

- Implemented many energy efficiency improvement projects since 2005;
- Diesel fuel changed to natural gas, then replaced by electricity ultimately
- Installed solar panels on site
- Using hydropower since 2019
- Signed an green power credit purchase agreement with local Power Supply



CASE STUDY
Carbon Neutral

*Energy efficiency
Self Built Distributed Solar
Device
Green Power Purchasing*

实施碳减排 – 案例分享

Location: **Multiple locations**

Sector/Industry: **Health Care**

Target

*Client has SBTi target and committed to a 100% use of RE by 2025 Globally;
60% GHG reduction from self operation by 2030 against 2016*

Approaches

- Continual energy efficiency improvement projects;
- Several sites have installed the distributed solar panels;
- Keep looking for opportunities to use RE directly



CASE STUDY
RE Usage

*Self Energy Efficiency
Improvement
Self Built Distributed Solar
Device*

碳信息报告/披露



需要披露的碳信息/报告	法规要求强制性披露	非法规强制披露的要求
碳排查结果	重点排放行业	自愿
碳减排目标 (SBTi目标)	无	SBTi要求
碳中和目标	无	自愿
碳减排和目标达成的进展	无	SBTi要求
碳中和实现的声明/审定	无	自愿

碳信息报告/披露

■ 碳信息自愿披露

- 企业社会责任报告、ESG 报告、可持续发展报告
- 如果客户或投资方要求，通过国际上有权威和影响力的一些的报告工具
 - 全球报告倡议组织 (GRI)
 - 可持续会计标准委员会 (SASB)
 - 国际综合报告理事会 (IIRC)
 - CDP 环境信息披露 (CDP)
 - TCFD 和气候披露标准委员会 (CDSB)

附录二

中国上市公司参与CDP信息披露名单

公司	产业
三七互娱	服务
三生制药集团	生物技术、健康护理 & 医药
瑞声科技控股有限公司	制造
复康医疗控股有限公司	生物技术、健康护理 & 医药
百度集团	服务
交通银行	服务
北京控股集团有限公司	基础设施
京东方科技集团股份有限公司	制造
比亚迪	制造
中国广核电力股份有限公司	发电
中信银行	服务
中国建设银行	服务
中国光大国际有限公司	发电
中国文学有限公司	零售
中国移动通信集团有限公司	服务
华润电力控股有限公司	发电
中国神华能源股份有限公司	化石燃料
中国建筑国际集团有限公司	基础设施
中国电信集团有限公司	服务
广东东菱电器有限公司	制造
复星旅游文化集团	泛酒店
福建圣农发展股份有限公司	食品、饮料 & 农业
福耀玻璃工业集团股份有限公司	材料
广东欧珀移动通信有限公司	制造
河南中孚禽业股份有限公司	材料
信安国际集团有限公司	制造
华泰证券股份有限公司	服务
内蒙古伊利实业集团股份有限公司	食品、饮料 & 农业
京东商城电子商务有限公司	零售
江西墨猫炭业股份有限公司	材料
道恩科技股份有限公司	制造

摘自 <https://www.cdp.net/en/companies-discloser>

■ 碳中和信息公开

- 碳中和承诺声明合格说明 (QES)
- 碳中和实现声明

Carbon Neutrality Declaration

"Carbon neutrality of Jacobs' Scope 1 and 2 emissions from site operations and Scope 3 business travel will be achieved by Jacobs in accordance with PAS 2060 for Fiscal Year 2020 (October 1, 2019 – September 30, 2020) self-declared."

Signed by



Steve Demetriou
Chair and Chief Executive Officer

Our first declaration of commitment, this QES contains all the required information on the carbon neutrality of the given subject, and will be made publicly available on our Jacobs website.

以辉瑞公司为例

- Introduction
- Bold Moves
- Environment
- Social
- Governance
- Performance
- Appendix

PFIZER'S ANNUAL ESG PERFORMANCE



What this report covers

This report provides information on our ESG progress in the year from January 1, 2020, to December 31, 2020. It includes an overview of performance, as well as data on 28 key performance indicators.

For more information please see About this Report on page 49

This report represents a new chapter in Pfizer's commitment to enhance stakeholder awareness of our priority Environmental, Social and Governance (ESG) issues and disclose how our performance on non-financial metrics is contributing to long-term value creation and a sustainable, responsible and patient-centric business model.

The disclosures contained in this report underscore our commitment to delivering breakthroughs that change patients' lives through ethical decision-making and our core values – Equity, Courage, Excellence and Joy.

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- 2019 Annual Review
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ENVIRONMENT OVERVIEW

Climate change

Rising global temperatures are associated with adverse health outcomes, including increases in water-borne diseases due to severe flooding, the prevalence of vector-borne diseases like Lyme disease and malaria, and cardiovascular conditions exacerbated by heatstroke. Climate change also has the potential to disrupt supply chains through severe weather events and rising sea levels. As a company committed to applying science to confront the world's greatest challenges, reducing the impact of Pfizer's operations and value chain on climate through greenhouse gas (GHG) emission reductions is a strategic priority. In addition to mitigation, prioritizing adaptation to the potential impacts of climate change is a focus area to increase supply chain resiliency.

Achieving our 2020 climate goals

We have demonstrated our commitment to climate action through our history of GHG emission reductions, with our first formal GHG goal set in 2001. Through successive goal periods, we have reduced our GHG emissions by more than 60%. Additionally, expectations were established with key suppliers in 2015, driving them to establish GHG reduction goals.

Overall:

- We exceeded our third-generation GHG goal, delivering a 33% reduction in emissions by the end of 2020 from a 2012 baseline.¹
- More than 75% of our key suppliers² are progressing GHG reduction goals. Our efforts to drive climate action within our supply chain were recognized through Pfizer's placement on CDP's 2020 Supplier Engagement Leaderboard in 2018, 2019 and 2020, and within CDP's [Stories of Change](#) as one of 11 companies with leading practices in environmental impact reduction.

Launching our 2030 climate ambitions

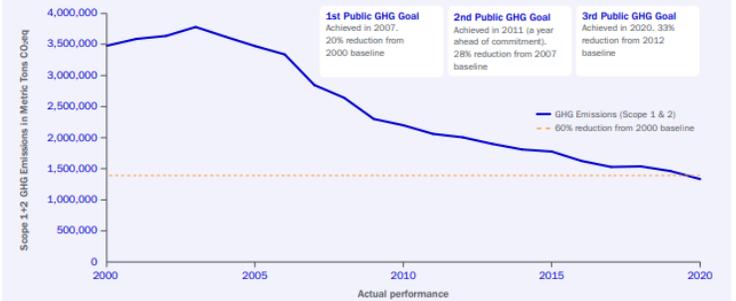
As one of the first companies to receive validation of our GHG reduction goal by the Science Based Target Initiative in 2015, Pfizer remains committed to ambitious long-term actions. We are therefore advancing our Science Based Target Initiative (SBTI) approved fourth-generation GHG reduction goals aligned with a 1.5°C pathway:

- By 2030, we aim to become carbon neutral across our internal operations, delivering a 46% absolute reduction in direct emissions from a 2019 baseline, including purchasing 100% renewable energy. Any remaining emissions will be offset through carbon credits.

¹ Environmental, Social & Governance Report 2020

Direct Greenhouse Gas Emission Reduction Journey

Pfizer has delivered significant reductions in greenhouse gas (GHG) emissions through sustained commitment. Our next generation goal increases our level of ambition to align with contemporary science.



- Recognizing that indirect emissions account for approximately 80% of our carbon footprint, we aim to use our influence to catalyze similar reductions across our value chain. We are implementing a multipronged approach, including embedding environmental sustainability criteria in our vendor selection processes, strengthening expectations within contracts and engaging with key suppliers of goods and services to drive the adoption of science-based GHG reduction goals.
- We also aim to reduce emissions related to upstream logistics by 10% and business travel by 25% by 2025 from a 2019 baseline.

Our progress

33% ↓ reduction in Scope 1 + 2 GHG emissions (2012 – 2020)

75% of our key suppliers are progressing GHG reduction goals

Future ambitions

- Carbon neutral:** We aim to be carbon neutral across our internal operations by 2030. This includes reduction of Scope 1 and 2 emissions by 46% from a 2019 baseline.
- Renewable energy:** We aim to purchase 100% renewable energy by 2030.

¹ Includes Upjohn data. Goal exceedance due to a range of factors including reductions in fleet and office activities in 2020 due to COVID-19.
² Includes Upjohn data. Key suppliers include 111 major contributors to our external environmental footprint, including suppliers of pharmaceutical ingredients, drug products, raw materials, product packaging services, key research and development collaborators, and freight forwarders. Key suppliers represent a portion of Pfizer's overall supply chain for goods and services.

辉瑞公司同时可通过CDP公开其信息

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Pfizer Inc.	Climate Change 2020	2020	Submitted	B
Pfizer Inc.	Water Security 2020	2020	Submitted	A-
Pfizer Ltd	Climate Change 2020	2020	See Another	B
Pfizer Inc.	Forests 2019	2019	Submitted	Not Scored
Pfizer Inc.	Climate Change 2019	2019	Submitted	B
Pfizer Inc.	Water Security 2019	2019	Submitted	B

Note: Not all companies requested to respond to CDP do so. Companies who are requested to disclose their data and fail to do so, or fail to provide sufficient information to CDP to be evaluated will receive an F. An F does not indicate a failure in environmental stewardship.



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We Chat

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About the Secretariat

Carnstone Partners Ltd is an independent management consultancy, specialising in corporate responsibility and sustainability, with a long track record in running industry groups.

