

2024臭氧气候技术工业圆桌会议

2024 Ozone2Climate Technology Industry Roundtable



海南省冷链物流绿色低碳发展路径研究

Research on Hainan Green and Low-Carbon Development Path of Cold Chain Logistics

海南省环境科学研究院

国家生态文明试验区（海南）研究中心

Hainan Research Academy of Environmental Sciences

National Pilot Zone for Ecological Conservation (Hainan) Research Center



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1. 海南概况 Overview of Hainan Province
2. 研究进展 Advances in the Research
3. 路径思考 Thoughts on the Path



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海南概况

Overview of Hainan Province

区位优势：海南是中国面向太平洋和印度洋的重要对外开放门户

Location Advantages: Hainan is China's vital gateway to the Pacific and Indian oceans.

- 处于华南经济圈、北部湾经济圈、东盟经济圈、东南亚经济圈的几何**交汇中心**，中国连接东南沿海和东盟、东南亚的区域航运枢纽。
- 作为“一带一路”战略支点和西部陆海新通道的重要枢纽，海南省也是我国最靠近东南亚的省份，位于**4小时**飞行经济圈内，具有和东南亚地区开展合作的巨大优势。



从中国内地的角度看，海南岛是一个神经末梢；但从面对太平洋和印度洋、面对世界的角度看，海南岛乃新一轮改革开放的最前沿。

For China, Hainan is the southernmost island province. However, for the Pacific and Indian oceans or even the world, Hainan is the frontline of the new round of reform and opening-up.

海南基本概况 About Hainan

10.08 百万人 million

人口 Population

19 个 piece

市县 Cities and counties

62.1 %

森林覆盖率 Forest coverage rate

354000 平方公里 square kilometers

陆地面积 Land area

2 百万平方公里 million square kilometers

海域面积 Sea area

1944 公里 kilometers

海岸线 Coastline

海南生态环境是大自然赐予的宝贵财富，必须倍加珍惜、精心呵护，建设生态一流、绿色低碳自由贸易港

新征程：加快建设具有世界影响力的海南自由贸易港

New Journey: The Development of Hainan into a Free Trade Port with Global Influence is Accelerated.

2018年4月：逐步探索、稳步推进中国特色自由贸易港建设

2020年6月：印发实施自由贸易港建设总体方案

2022年4月：加快建设具有世界影响力的
中国特色自由贸易港



战略定位：“三区一中心”

Strategic Importance: “Three Zones and One Center”



对海南而言，“三区一中心”既是明确的建设目标，也是清晰的战略定位

争做“双碳”工作优等生

The Outstanding Performance in Peaking Carbon Dioxide Emissions and Achieving Carbon Neutrality

成为在国际上展示我国积极参与应对全球气候变化和生态文明建设成果的靓丽名片

能源结构清洁低碳化
Clean and low-carbon
energy mix

交通运输结构去油化
Less petrol and diesel for transportation

城乡建筑低能耗化
Low energy
consumption by urban
and rural buildings

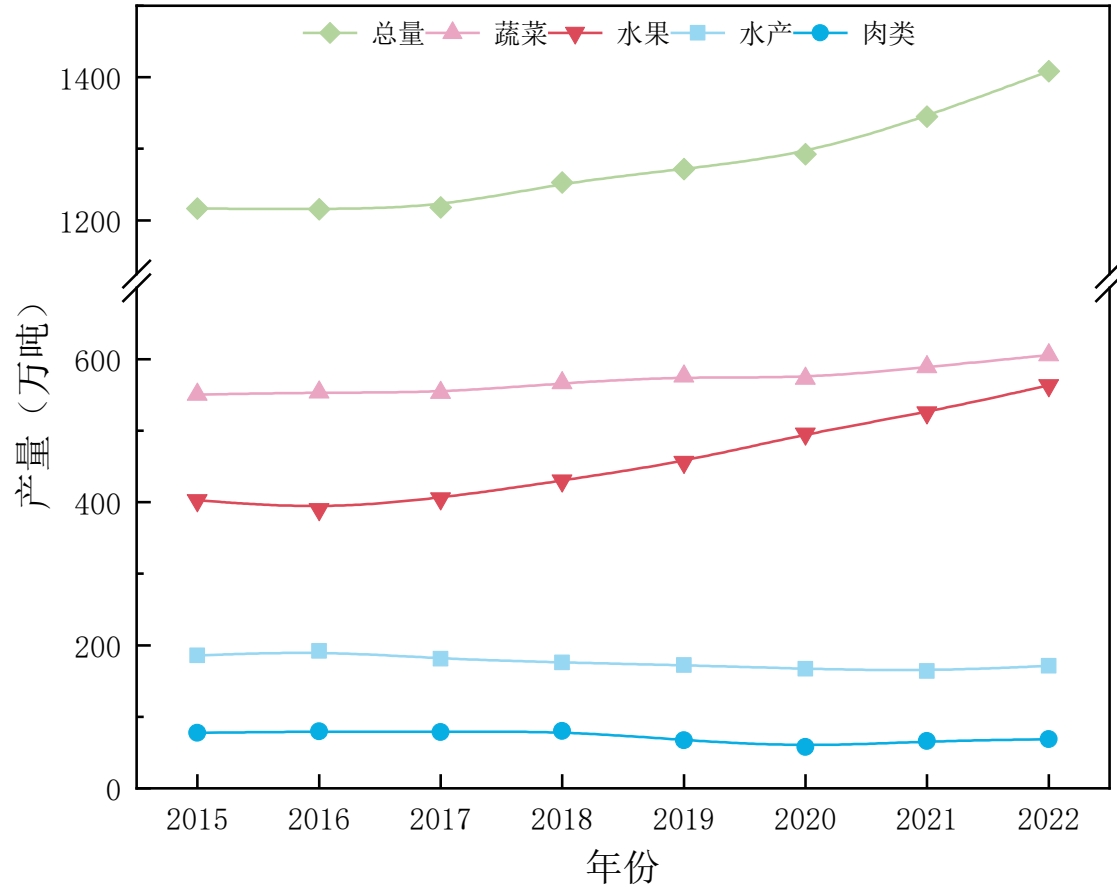
产业结构优质现代化
Sound and modern industrial structure



- ✓ 海洋和森林碳汇贡献
Carbon sinks of oceans and forests
- ✓ 低碳技术推广应用
Publicity and application of low-carbon technologies
- ✓ 低碳政策体系制度集成创新
Integrated innovations of low-carbon policies and the institutional system

海南冷链需求持续增长

Growing Demands for Cold Chain Logistics in Hainan



水果蔬菜产量逐年攀升

The production of fruits and vegetables has increased year by year.

2022年海南**水果**总产量达到**563万吨**，**蔬菜**总产量达到**606万吨**。
The **fruit** production amounted to **5.63 million tonnes** across the province in 2022 and the **vegetable** production reached **6.06 million tonnes**.

农、牧、水产总体呈增长趋势

There is an overall growing trend for agriculture, animal husbandry, and aquaculture.

海南自由贸易港建设后，海南农、牧、水产品产量保持**年均3%的增速**增长。

When the construction of the Hainan Free Trade Port is completed, the production in the fields of agriculture, animal husbandry, and aquaculture will **rise at an annual rate of 3%**.



2

研究进展

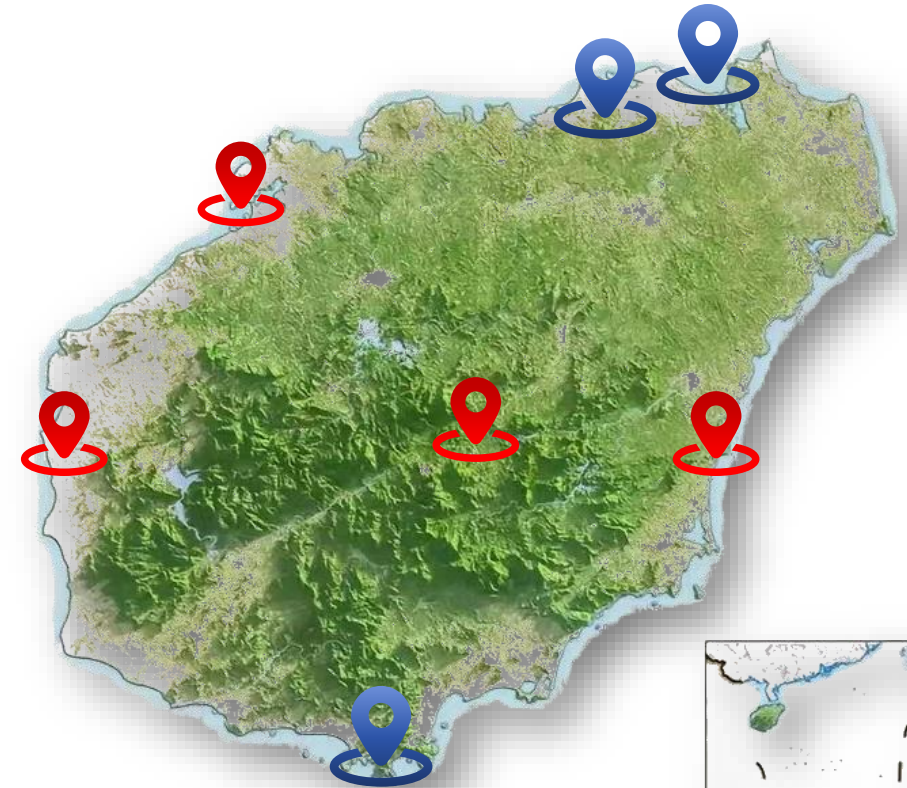
Advances in the Research

海南冷链物流规划布局

The Provincial Planning of Cold Chain Logistics

“十三五”期间，全省初步形成了以海口市、澄迈县和三亚市为核心的冷链物流发展格局。

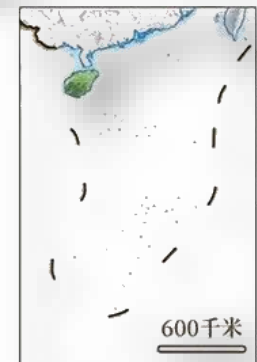
海口市以日用生活消费品及农产品冷链物流业为主导，
澄迈县以水海产品冷链物流业为主导，
三亚市以农副产品冷链物流业为主导，
其他瓜菜主产区市县零星布局建设田头预冷库。



“十三五”期间建设核心
Core development areas during the
13th Five-Year Plan period



“十四五”期间建设核心
Core development areas during the
14th Five-Year Plan period



海南冷链物流绿色发展存在问题

Problems Concerning the Green Development of Hainan Cold Chain Logistics



- 冷链技术装备落后，HCFCs使用普遍

Relevant techniques and equipment are outdated and HCFCs are commonly used.

- 老旧冰厂冷库缺乏有效的保温围护结构

The cold storage of old ice factories lacks effective building envelopes for retaining heat.

- 冷藏车每万人0.19辆，远低于全国平均水平

The number of refrigerated vehicles per 10,000 people was 0.19, which is far lower than

the national average.

信息管理不畅缺乏监控和溯源系统

Poor information management and a vacuum of the monitoring and traceability system

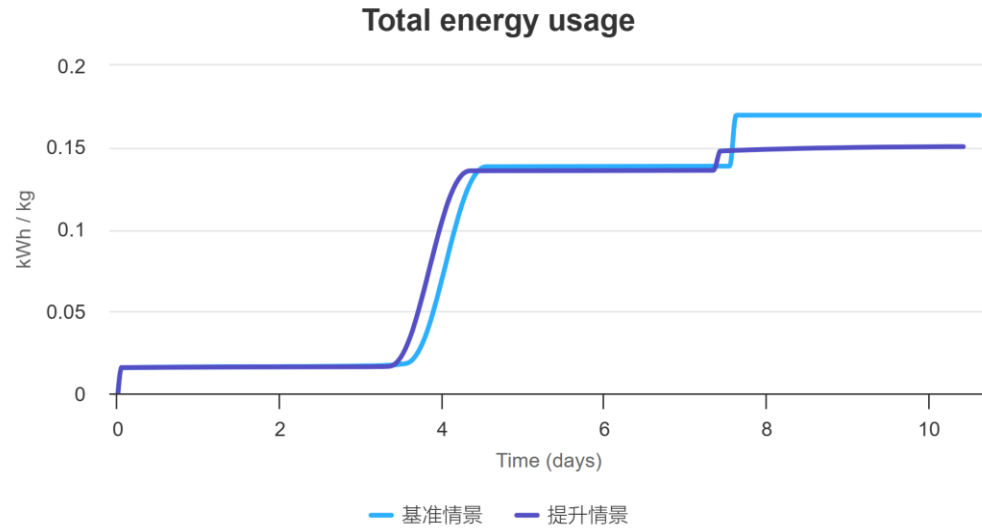
省内只有大型冷库和具有自营物流的公司建设TMS和WMS系统

TMS and WMS systems were merely set up by large cold storage and companies with self-operated logistics across the province.

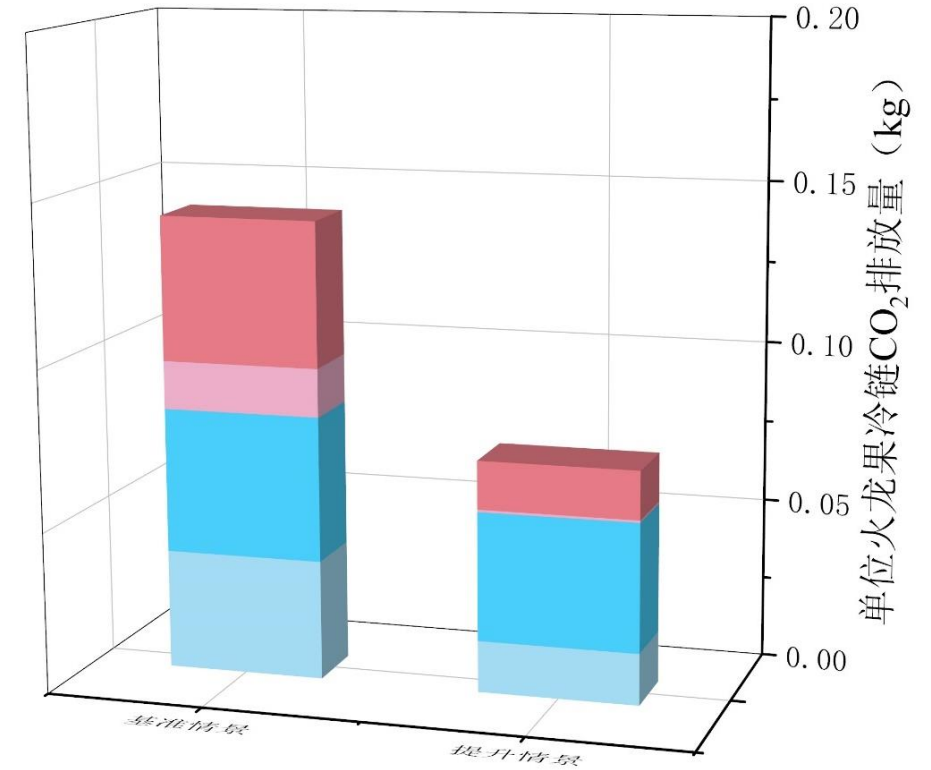


典型果蔬冷链碳足迹评价---火龙果

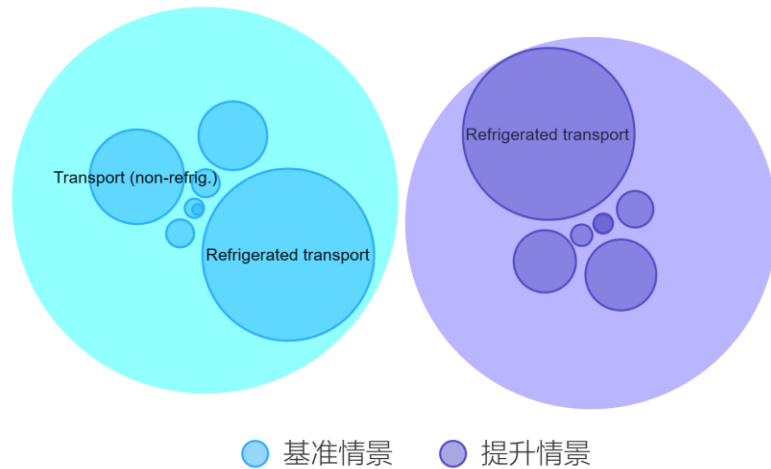
Carbon Footprint Evaluation for the Typical Cold Chain Logistics of Fruits and Vegetables--Dragon Fruit



废弃物处理排放 包装排放 运输过程排放 制冷过程排放



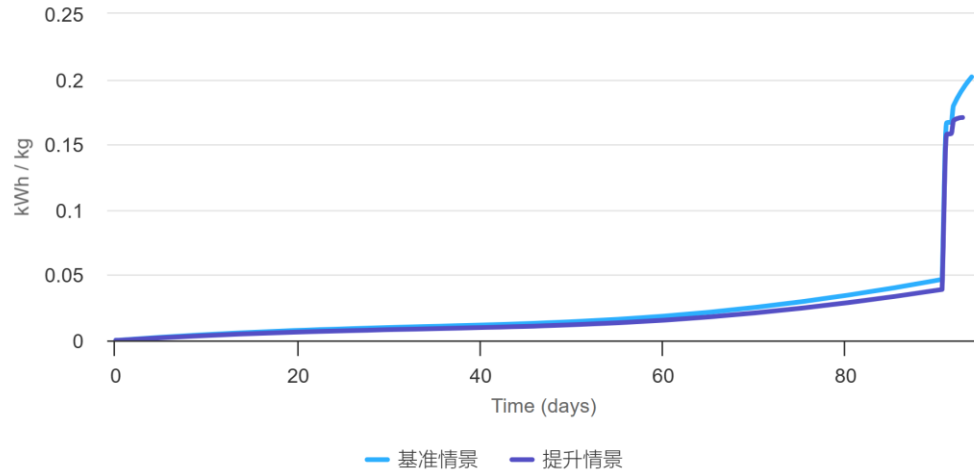
Steps contribution to Energy consumption



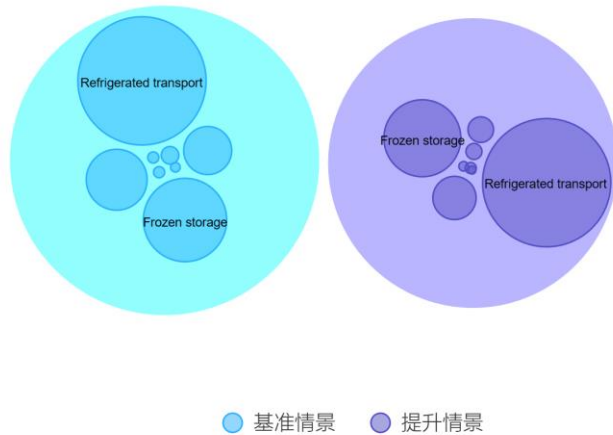
典型果蔬冷链碳足迹评价---冷冻猪肉

Carbon Footprint Evaluation for the Typical Cold Chain Logistics of Meat--Frozen Pork

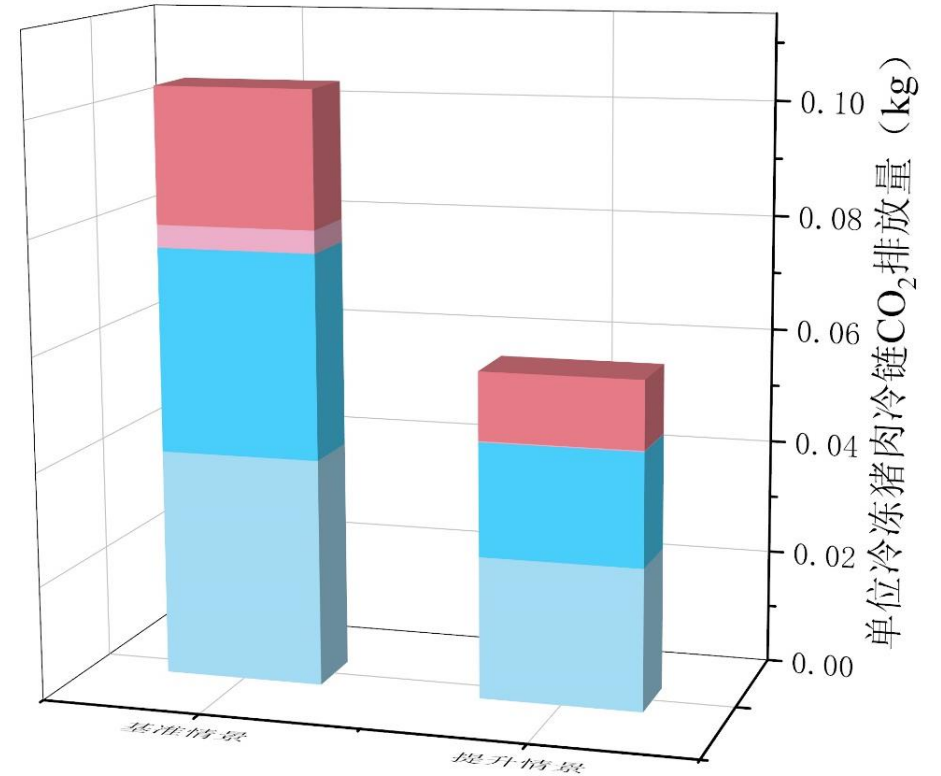
Total energy usage



Steps contribution to Energy consumption

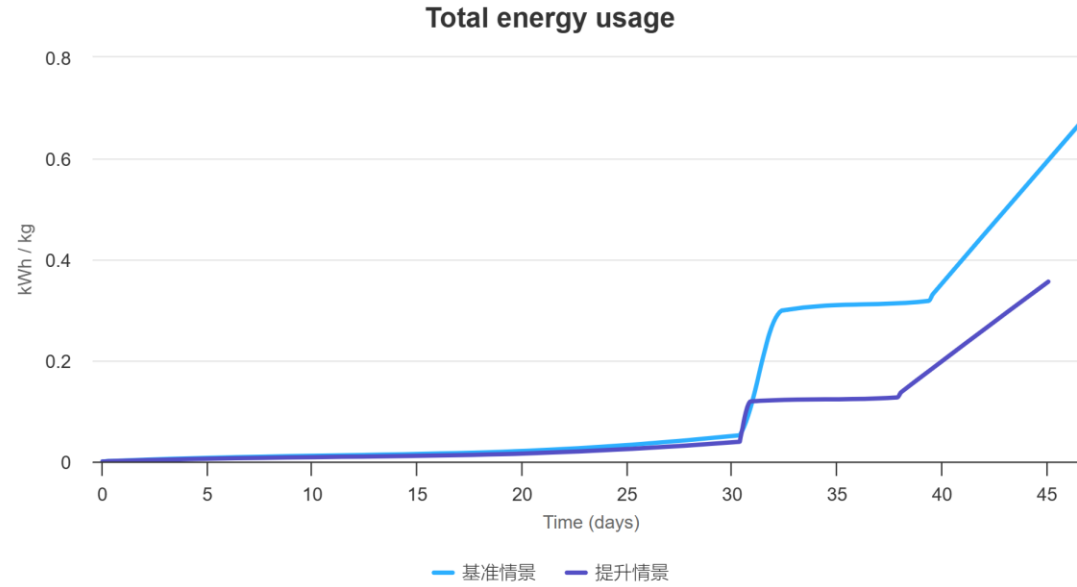


废弃物处理排放 包装排放 运输过程排放 制冷过程排放

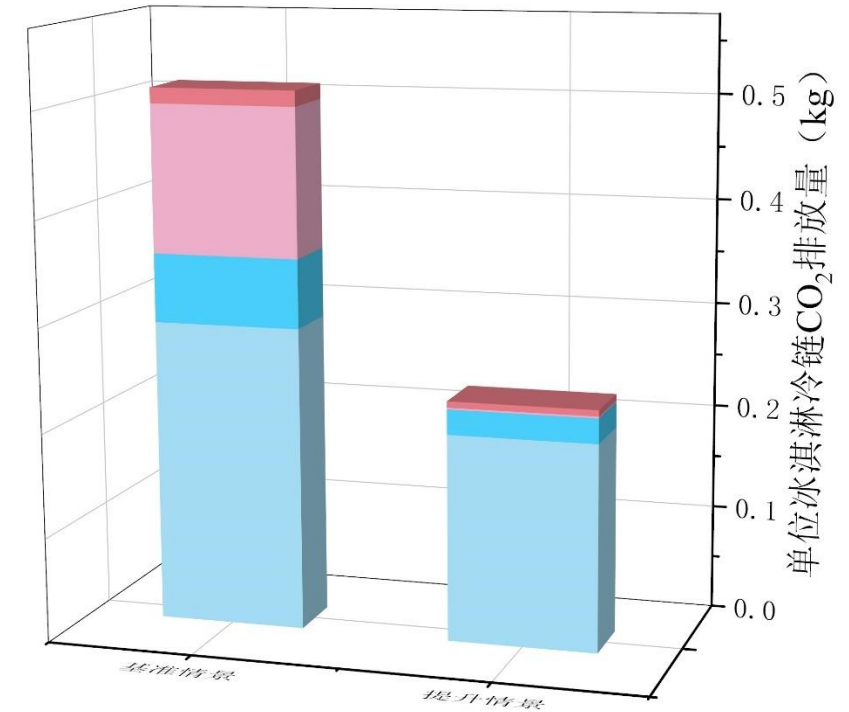


典型果蔬冷链碳足迹评价---冰淇淋

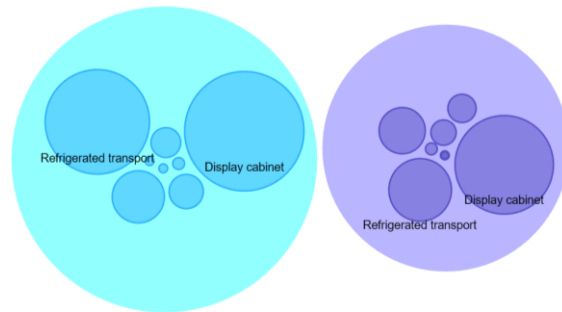
Carbon Footprint Evaluation for the Typical Cold Chain Logistics of Fast-Moving Consumer Goods--Ice Cream



废弃物处理排放 包装排放 运输过程排放 制冷过程排放



Steps contribution to Energy consumption



● 基准情景 ● 提升情景

冷链物流绿色低碳评价

Green and Low-Carbon Evaluation for Cold Chain Logistics

目标层	准则层	序号	方案层
海南省冷链物流行业绿色低碳发展	制冷剂控制A ₁	1	HCFCs物质削减A ₁₁
		2	制冷剂泄漏率A ₁₂
		3	易燃易爆制冷剂管理A ₁₃
		4	低GWP制冷剂使用率A ₁₄
	资源利用A ₂	5	冷库单位容积能耗A ₂₁
		6	运输过程管理A ₂₂
		7	土地资源利用效率A ₂₃
		8	水资源利用效率A ₂₄
	低碳管理A ₃	9	节能技术应用情况A ₃₁
		10	企业供应链碳足迹水平A ₃₂
		11	企业创新投入A ₃₃
		12	员工素质与培训发展率A ₃₄



3

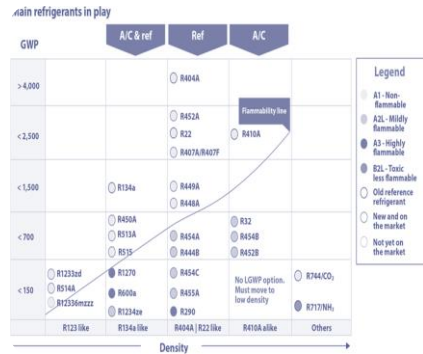
路径思考

Thoughts on the Path

努力降低环境影响

More Efforts to Reduce the Impact on the Environment

促进制冷剂绿色替代
Green replacements
of refrigerants



- 践行基加利修正案
- 积极淘汰高GWP制冷剂
- 优先利用天然工质
- 制冷剂全生命周期管理

提高资源利用效率
Better resource
utilization rate



- 结构与需求相匹配
- 大力推广新能源冷藏车
- 建设高效节能冷库
- 优先使用清洁能源

加强废弃物回收管理
Enhanced
management and
recycling of wastes



- 减少废弃物产生量
- 制冷设备的规范化回收
- 积极应用可重复利用材料
- 废弃物的资源化利用

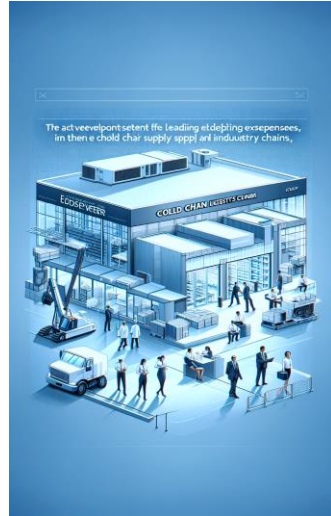
构建循环低碳体系
A low-carbon
circulation system



- 建立全程可追溯体系
- 调动全球冷链资源
- 建立循环物流体系
- 提高冷链物流附加值

强化科技创新

More Efforts in Scientific and Technological Innovations



积极发展冷链供应链与产业链龙头企业
Progress will be made in developing the supply chains of cold chain logistics and creating relevant leading enterprises.

- 吸引国际一流企业
- 鼓励国内一流企业
- 扶持本地一流企业

持续提高研发投入推进智能化升级
R&D inputs will increase to further the intelligent upgrade.

- 产学研用联动
- 产业数据赋能
- 绿色低碳转型

强化质量监管与安全管理
Quality inspection and safety management will be strengthened.

- 质量保障是前提
- 流程清晰有记录
- 安全管理成体系

制定科学碳中和目标

Carbon neutrality goals should be set scientifically.

- 评估当下碳排放水平
- 精准识别减排重点
- 建设碳排放监测体系
- 制定ESG战略规划



激励公众和从业者低碳发展意识

There should be incentives for the public and the relevant employees to raise the awareness of low-carbon development.

- 开展低碳培训宣传
- 举办低碳竞技活动
- 鼓励公众积极参与
- 形成普惠激励机制



完善产品碳足迹信息

Product information concerning carbon footprint should be refined.

- 确定产品碳足迹框架
- 核算全流程碳足迹
- 形成产品碳标签
- 发展低碳供应链





Thank You