全国碳市场建设进度及配额分配方案解读

Progress in China ETS & Introduction on Allocation

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覆盖范围
Scope & Coverage

全国碳市场第一阶段覆盖的行业

行业	行业代码	行业子类 （主营产品统计代码）
石化	2511 2614	原油加工（2501） 乙烯（2602010201）
化工	261 262 263 265	电石（2601220101） 合成氨（260401） 甲醇（2602090101） 其他
建材	3011	水泥熟料（310101）
	3041	平板玻璃（311101）
钢铁	3120 3140	粗钢（3206） 钢压延加工
有色	3216	电解铝（3316039900）
	3211	铜冶炼（3311）
造纸	2211 2212 2221	纸浆制造（2201） 机制纸和纸板（2202）
电力	4411	纯发电 热电联产
	4420	电网
航空	5611 5612 5631	航空旅客运输 航空货物运输 机场

Sectoral categories	Sub-categories
Electric power supply	Power generation
	Grid companies
Petroleum processing	Crude oil refinery
Chemical raw materials and chemical products manufacturing	Ethylene manufacture
	Synthetic ammonia manufacture
	Calcium carbide manufacture
	Methanol manufacture
	Other chemical products
Non-metallic mineral products manufacturing	Manufacture of cement clinker
	Flat glass manufacture
Ferrous metal smelting and rolling processing	Steel smelting
	Steel rolling processing
Non-ferrous metal smelting and rolling processing	Manufacture of electrolytic aluminum
	Copper smelting
Paper and paper products manufacturing	Pulp making, paper and board manufacturing
Aviation transport	Air passenger transport & air cargo transport
	Airports

排放类别 Emission Sources

化石燃料燃烧导致的CO_2排放

- 全国温室气体排放总量72%
- 全国CO2排放总量90%

过程排放

- 化工行业：能源做原材料
- 水泥行业：煅烧石灰石

电、热消费所对应的排放

- 与统计制度、节能政策、企业核算与报告指南的一致性，将此部分排放计入消费侧

Fuel Combustion

- 72% of China's total GHG emissions
- 90% of China's total CO2 emissions

Industrial Process

- Chemical manufacturing: None Energy use
- Cement manufacturing: Calcination of limestone

Electricity and Heat Consumption

- Consistency with China's statically mechanism, energy conservation policy and MRV guidelines

核算与报告指南的补充

Improvement on MRV

已有核算报告指南不能完全满足ETS的需求
Gap between existing MRV guidelines and ETS

文件	已有指南	全国ETS
行业范围	全口径	八大重点行业20多个子类
温室气体	CO2、非CO2（6种）	仅CO2
报告门槛	13000tCO2eq或5000tce	1万tce
核算边界	企业黑箱	企业与主要生产设施相结合
排放类别	燃烧、过程、电力消费、热力消费	抓大放小，暂不纳入排放占比较小或不确定性大的过程排放

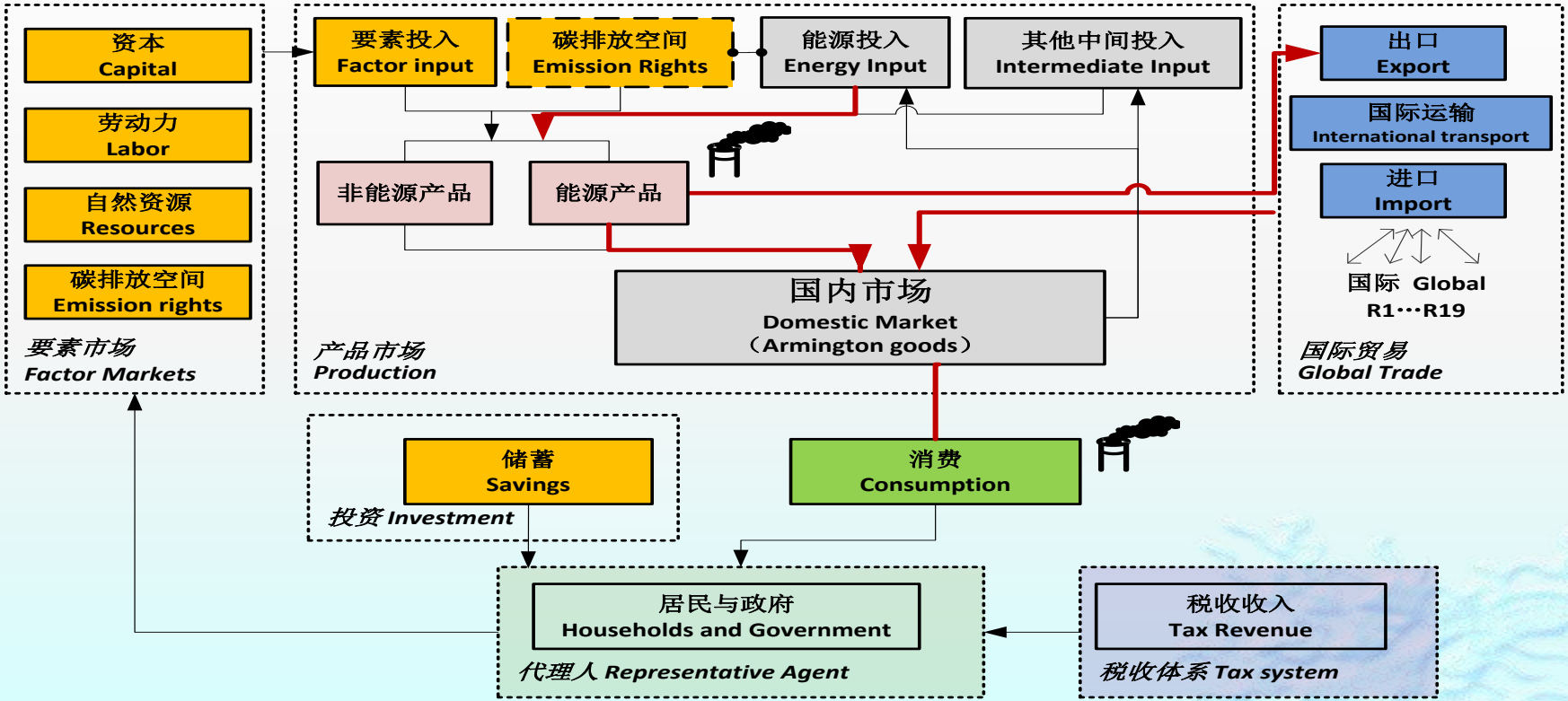
Issue	Existing MRV guidelines	ETS
Sectors	All national economic sectors	8 key sectors (20 sub-sectors)
GHG types	CO2 & non-CO2 (6 GHGs)	Only CO2
Thresholds	13000tCO2eq or 5000tce	10000tce
Accounting boundaries	Enterprise (black box)	Integration of an enterprise and its main facilities
Emission sources	All sources within an enterprise boundary	Small sources and sources with big uncertainty are not included in Phase I

16个补充数据报告模板（Reporting Formats for ETS）

总量设定

Cap setting

自上而下： Top down: C-GEM Model Framework



自下而上 Bottom up method

$$r_{ets} = \sum_{j=1}^{N} \varepsilon^{j} \times r_{ci}^{j}$$

交易体系总碳生产力提高幅度
Improvement of total carbon productivity in ETS

子行业碳生产力提高幅度/配额分配松紧程度
Improvement of sectoral carbon productivity/Allocation criteria

配额分配

Allowance Allocations

主要的免费配额分配方法

Free Allocation Methodologies

- Benchmarking methodologies
- Historical emission intensity reduction methodologies

行业基准法简介

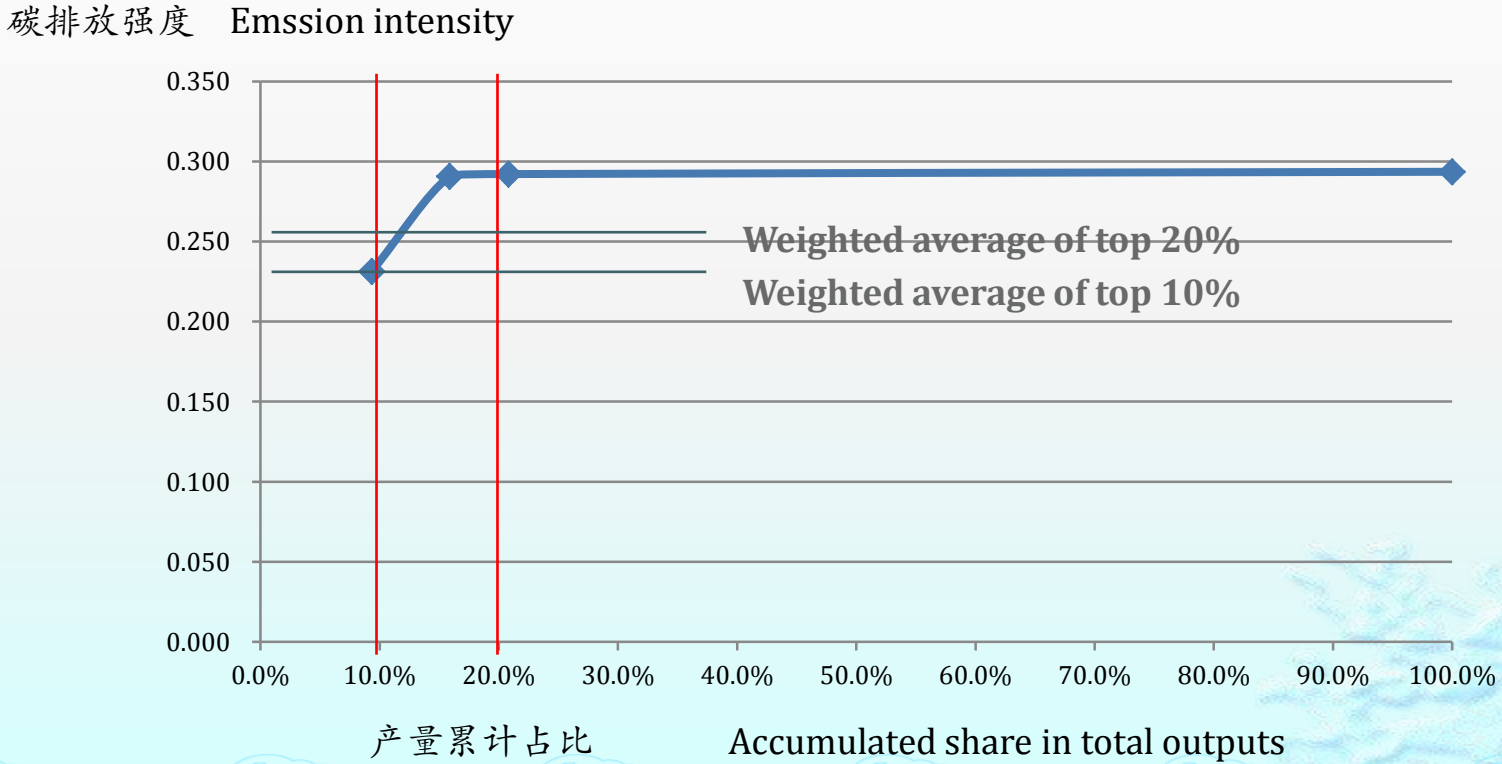
Introduction on benchmarking methodologies

- 企业配额 =
  ∑（行业基准×履约年度实际产量）
- 履约边界：主产品生产系统（工序、分厂、装置），能耗可以单独计量，计量准确性高，易于核查
- 产品和工艺具有同质性，行业内横向可比
- **确定基准值**：行业二氧化碳排放强度**对标**研究
  - ✓ **既有**生产系统碳排放基准：相对宽松，例如行业平均
  - ✓ **新增**生产系统碳排放基准：相对严格，行业先进

- Enterprise Allowances =
  ∑ (Emission benchmark × Output)
- Compliance boundary: main production system rather than a complete enterprise level, energy consumption and other allocation supportive data within which could be accurately measured and verified
- Products and technologies are homogeneous and thus comparable within the same industry
- Benchmarks are under construction based on sample enterprise benchmarking analysis taking into account the differences between existing and new production system

行业二氧化碳排放基准对标研究示意图

Sample enterprise benchmarking analysis



企业历史碳排放强度下降法

Historical emission intensity reduction methodologies

- 企业配额 = 企业历史强度×履约年度实际产量×减排系数
- 履约边界：企业或主产品生产系统（工序、分厂、装置）
- 生产工艺复杂
  - 铜冶炼和造纸单个工序的生产技术有多种、产品多种
  - 钢铁生产在轧钢之后的下游工序技术和产品也很多
  - 子行业横向可比性差
- 分工序能源计量准确性低
  - 钢铁和造纸企业涉及大量二次能源再利用
  - 分工序能源计量的准确性不高

- Enterprise Allowances = Historical emission intensity × Reduction factor × Output
- Compliance boundary: enterprise or plant level
- Complexity & diversity of production process
  - Different production technologies: copper smelting
  - Multiple products: pulp and paper making
  - Incomparable in emission intensity within the industry category
- Inaccuracy of energy measurement on installation level
  - Secondary energy reallocation between workshops: iron & steel enterprises, pulp and paper making enterprises

配额试分配

Trial allowance allocation

- 碳市场与已有产业政策的兼容性
- 数据报告情况、可靠性、可核查性
- 各个子行业配额分配方法和具体参数取值、适用性
- 基于试点企业的反馈优化方法

- analyze potential synergies/interactions between existing sectoral policies and the ETS
- analyze compatibility between energy reporting and benchmarking approaches and allowance allocation methodologies
- finalize the design of the ETS allocation methodologies with respect to existing sectoral approaches.

谢谢！

Thank you!