



中國人民大學

环境政策与环境规划研究所

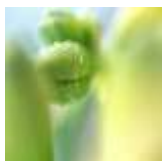
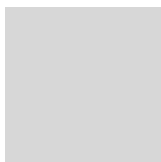
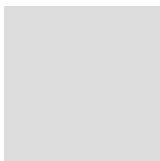
# 采暖城市煤炭減量方案及 燃煤总量配額交易制度試驗研究 —本溪案例

## Research on Cities' Total Coal Consumption Control Method, Case and Policy—Take Benxi as a Case

宋国君、赵文娟、何伟、黎静仪  
Guojun Song, Wenjuan Zhao, Wei He, Jingyi Li

中国人民大学环境政策与环境规划研究所  
Renmin University of China

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# 研究主要观点

## Main points of research



- ✦ 煤炭是商品，已有的法规还没有授权政府直接干预煤炭的使用  
Coal is a commodity and the existing regulations have not authorized the government to intervene directly in the use of coal.
- ✦ 城市煤炭减量需要数年时间  
It will take several years for cities to reduce coal.
- ✦ 主要工业燃煤用户的减量是技术进步和污染控制要求（包括碳减排）的结果  
It is the result of technological progress and pollution control requirements (including carbon emissions reduction) for coal reduction of major industrial coal users .
- ✦ 优先的减煤应当集中在中小用户  
Preferential reduction of coal should be concentrated in small and medium users
- ✦ 政府直接干预用户减煤成本很高，也缺乏法律依据  
The cost of direct government intervention in coal reduction is very high, which also lacks of legal basis.
- ✦ 大气污染防治法是城市减煤的主要法律依据  
Regulation on Air Pollution Control is the main legal basis for the reduction of coal.
- ✦ 城市减煤需要于法有据、有效率的政策手段  
City reducing coal needs effective policy means with law basis.



# 本溪市空气质量状况2014

## Air quality conditions of Benxi city in 2014



日均值超标率

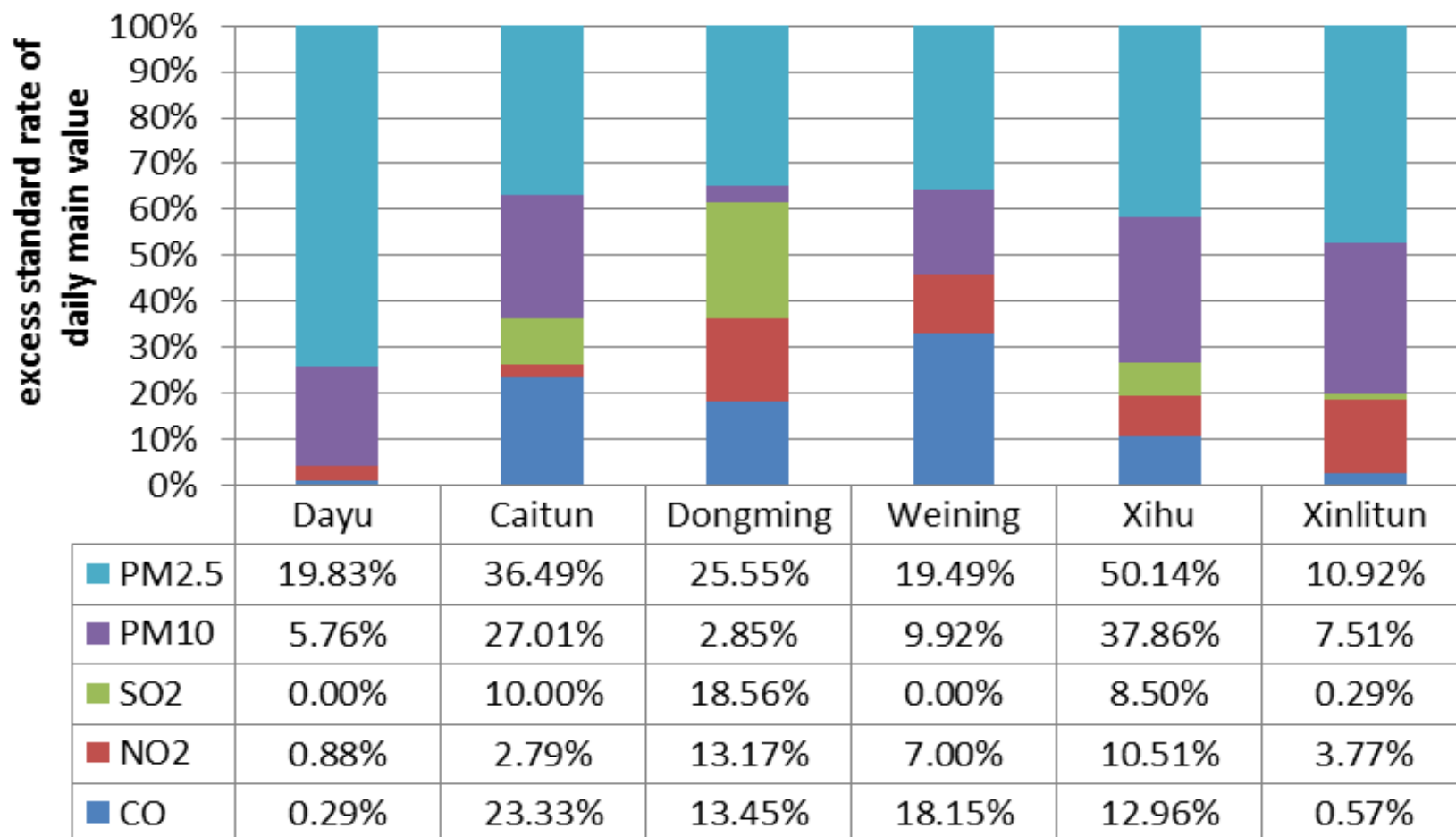
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	大欲	彩屯	东明	威宁	溪湖	新立屯
CO	0.29%	23.33%	13.54%	18.15%	12.96%	0.57%
NO2	0.88%	2.79%	13.17%	7.00%	10.51%	3.77%
SO2	0.00%	10.00%	18.56%	0.00%	8.50%	0.29%
PM10	5.76%	27.01%	2.85%	9.92%	37.86%	7.51%
PM2.5	19.83%	36.49%	25.55%	19.49%	50.14%	10.92%



# Air quality conditions of Benxi city in 2014



# 本溪市煤炭减量用户分类

## Classification of coal reduction user in Benxi



### 研究区域 Research Area:

#### 主城区 Main urban district including:

平山区、明山区、溪湖区、高新区

Pingshan, Mingshan, Xihu and

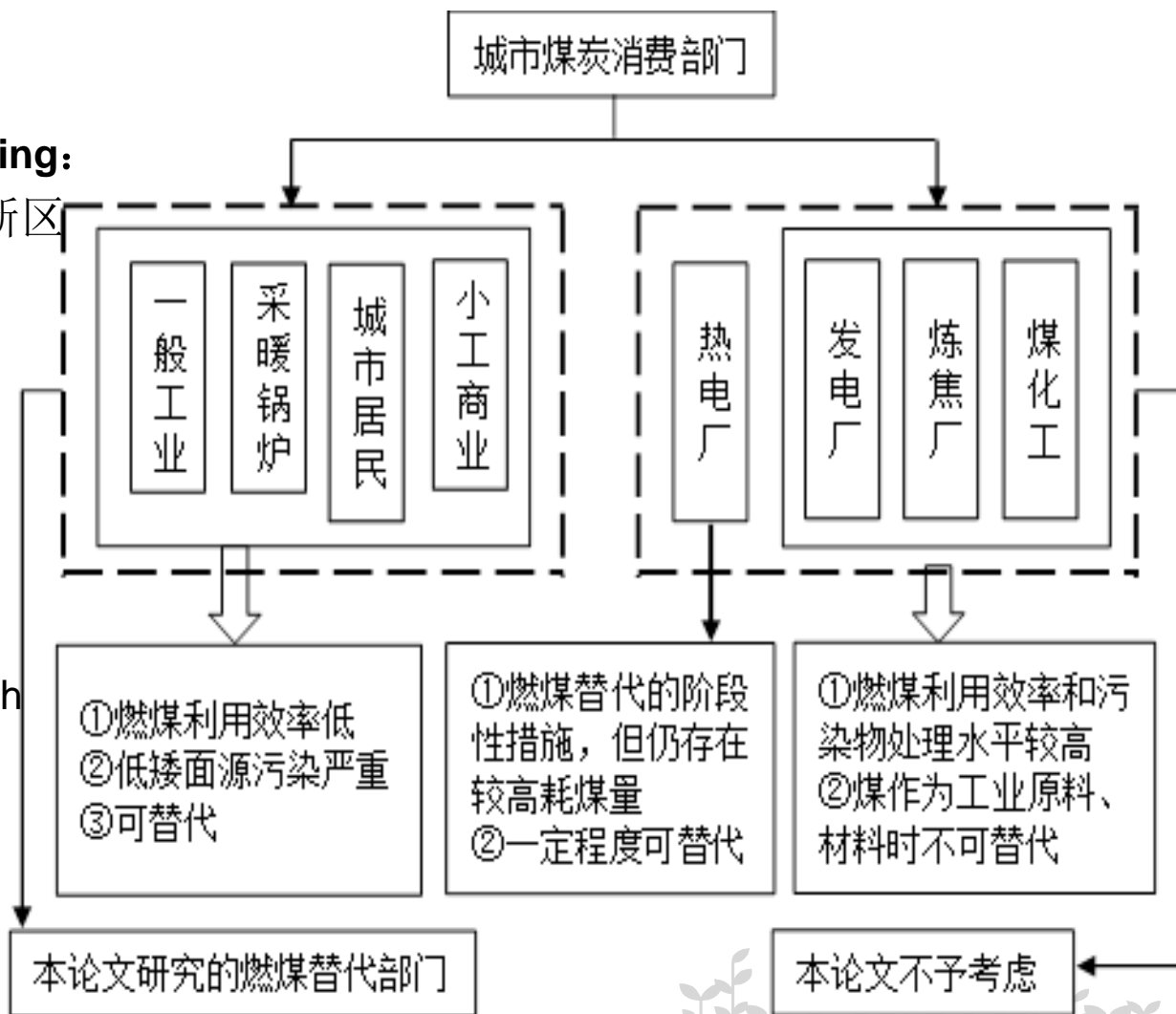
Hi-tech development zone

#### 纳入城市煤炭减量的用户:

#### The users brought into coal reduction

低效燃煤用户，污染影响大

Inefficient coal users, causing much of the pollution



# Classification of coal reduction user in Benxi



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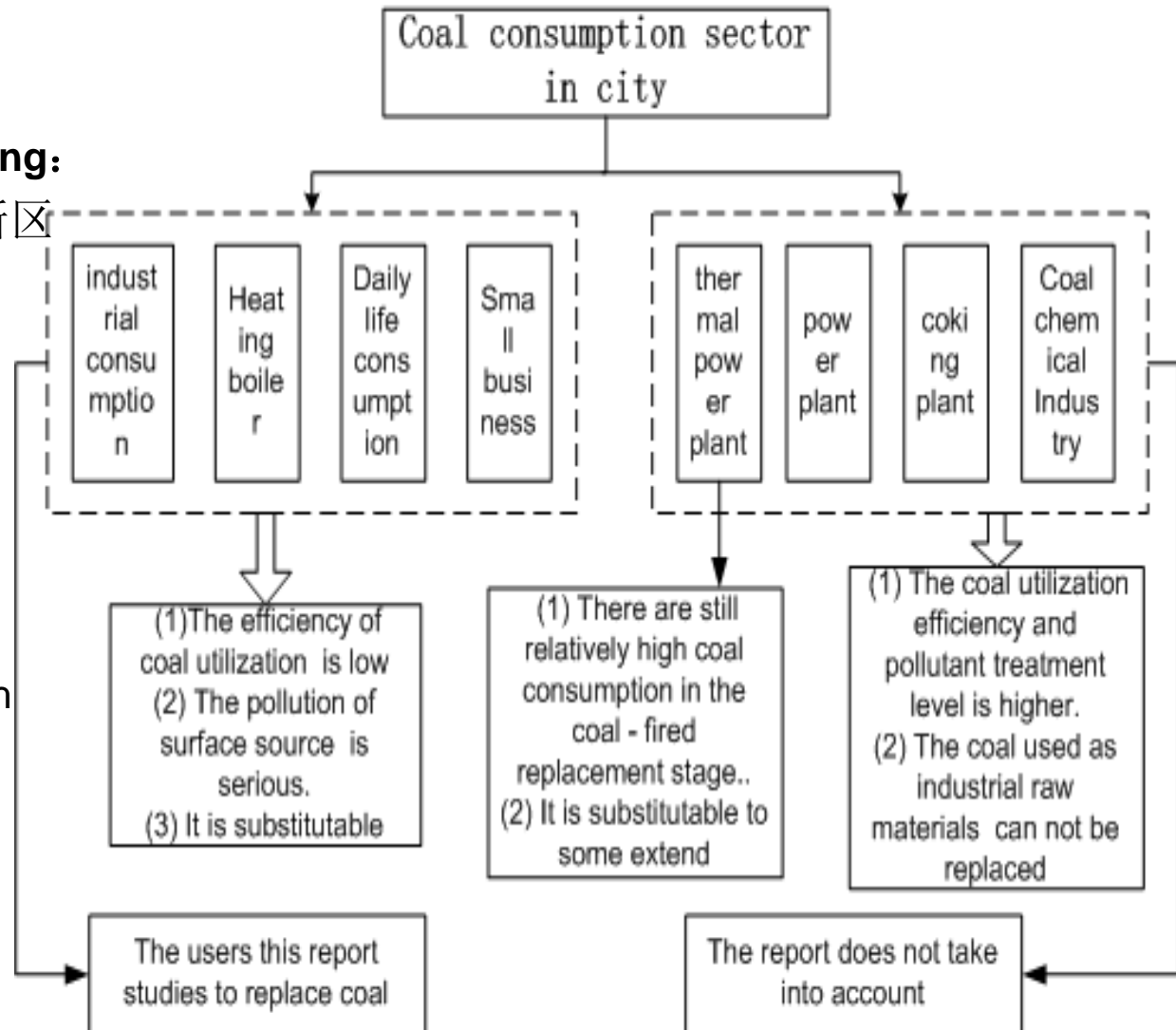
平山区、明山区、溪湖区、高新区

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## 纳入城市煤炭减量的用户:

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Inefficient coal users, causing much  
of the pollution



# 本溪市燃煤用户煤炭使用状况2014

## The coal usage of Benxi in 2014



燃煤用户类型 Coal User	数量 (家) Number	占比 Ratio (%)	煤炭消 耗量 (吨) Coal consum ption (t)	占比 Ratio (%)	燃料煤消 耗量(吨) Coal used as fuel (t)	占比 Ratio (%)	燃料煤消 耗量合计 (万吨) Total Coal used as fuel (*10 <sup>4</sup> t)	占比 Ratio (%)	
剔除的用户 Users not included	火力发电厂 Coal-fired power plant	1	0.61	308102	2.03	308102	5.80	297.29	55.94
	炼焦厂 Coking plant	2	1.21	9796911	64.55	0	0		
	炼铁厂 Ironmaking plant	3	1.82	2664752	17.56	2664752	50.14		
纳入燃煤减 量用户 Users brought into coal reduction	采暖锅炉 Heating boiler	86	52.12	797077.4	5.25	797077.4	15.00	234.13	44.06
	工业锅炉 Coal consumption in industrial	73	44.24	630167.4	4.15	564206.4	10.62		
	城镇生活燃煤合计 (包括小工商业) Coal consumption for daily life	-	-	874300	5.76	874300	16.45		
	非重点企业燃煤合计 Coal consumption for non-key enterprises	-	-	105700	0.70	105700	1.99		
合计 Total	165	100	1517700 9.8	100	5314137.8	100	531.41	100	

# 本溪市燃煤减量措施及成本核算

## The measures and cost of coal reduction in Benxi



煤炭减量用户 Coal reduction user	减量措施 Reduction measures		成本有效性 Cost effectiveness		单位标煤减量成本（元/tce） Cost of Unit coal equivalent（yuan/tce）	备注		
采暖锅炉 Heating boiler	分散采暖锅炉 Decentralized heating boilers	加入集中供暖 Join the central heating boilers		单位面积供暖成本（元/m <sup>2</sup> ） Cost of heating (Yuan/m <sup>2</sup> )	39.5	1185.63	优先选用	
		清洁能源替代 Clean energy substitution	天然气锅炉 Natural gas boiler		64.73	2157.63	作为集中供暖的补充措施，在热力网延伸不到区域采用	
			学校改电锅炉 Electric boiler in school		76.88	2562.5		
			其他改电锅炉 Electric boiler in other units		120.66	4022.12		
			电热锅炉 Electric heating boilers		80.78	2692.83	燃煤茶炉的减量	
	集中供暖锅炉 Central heating boilers	本钢余热供热Waste heat of Benxi Steel			17.8	593.4	阶段性减量措施，耗煤量仍较大	
		热电联产供热Combined heat and power			29.6	-359.65		
一般工业 Industrial boiler	球团生产企业 Pellets Enterprise	天然气Natural gas		单位工业总产值成本（元） Cost of each industrial output(Yuan)	0.76-0.9	1890-2790	结合所在地能源供应情况，优先选用低成本的减量能源	
		焦炉煤气Coke oven gas		0.59-0.7	750-1650			
	制药企业 Pharmaceutical company	生物质燃料Biomass fuels		单位工业总产值的燃料成本（元） Fuel cost of each industrial output(Yuan)	0.029	1221.43		
小工商业 Small business boiler	洗浴中心 Bath center	本钢余热送热水 Hot water from Waste heat of Benxi Steel		单位热水生产成本（元/吨） Cost of hot water(Yuan/t)	21.53	341	结合所在地能源供应情况，优先选用低成本的减量能源	
		改电锅炉Electric boiler			24.58	849.24		
		改燃气锅炉Natural gas boiler			22.00	270.00		



# 本溪市燃煤减量措施及成本核算

## The measures and cost of coal reduction in Benxi



### 本溪市燃煤用户煤炭减量平均成本及排序2014 Average cost of coal reduction in Benxi2014

煤炭减量用户 Coal reduction user	单位标煤减量平均成本 (元/tce) Average cost of each coal equivalent (Yuan/tce)	成本排序 Cost sorting	燃煤量 (万吨/年) Coal consumption (tyr)	标煤量 (万吨/年) coal equivalent (tyr)	占可替代燃煤总量的比例 (%) Ratio (%)
集中供暖锅炉 Central heating boilers	116.88	较低	68.93	46.53	29.44
小工商业 Small business boiler	723.23		56.77	40.55	24.25
一般工业 Industrial boiler	1660.29	较高	56.42	40.3	24.10
分散采暖锅炉 Decentralized heating boilers	2524.14		10.78	6.93	4.60
合计Total	2149.02		192.9	134.31	82.39

### 北京市燃煤锅炉改造减煤量及单位标煤减量补贴成本2014

#### coal-fired boiler reform and subsidy cost of Beijing in2014

燃煤锅炉改造蒸吨数 (蒸吨) Scale of boiler reform (steam ton)	每蒸吨补贴金额 (万元) Subsidy for each steam ton (yuan)	补贴总成本 (万元) Subsidy cost (million yuan)	减标煤量 (万吨) Coal equivalent reduction (tyr)	单位标煤减量补贴(元) Subsidy for each coal equivalent (yuan)
6595	13	85735	117.9	727.45

# 北京和石家庄减煤政策总结

## Summary of coal reduction policy in Beijing and Shijiazhuang



### 北京 Beijing

强制关停国华、京能、高井电厂燃煤机组；划定禁燃区，在禁燃区内，禁止新建、扩建燃煤设施，已有燃煤设施，应在规定期限内停止使用或者改用清洁能源；禁止销售不符合标准的散煤及制品；小工商业禁止燃煤。

Force to shut down coal-fired units in Guohua, Jingneng and Gaojing Power plant; delineate ban combustion zone; prohibit the sale coal and bulk products without meeting the standard ; ban coal-fired of small business.

减煤规划主要依赖于政府补贴，郊区减煤资金至少1/3来自政府补贴；平房煤改电居民享受峰谷电价优惠政策、进行电价补贴；**燃煤锅炉改造按照原燃煤锅炉每蒸吨13万元予以补助。市属差额预算拨款单位实施燃煤锅炉清洁能源改造的按照每蒸吨22万元给予补助。**

Coal reducing mainly depends on government subsidies, at least 1 / 3 outskirts of coal capital in subtract from government subsidies; cottage residents changing from coal to electricity enjoy the peak and valley price preferential policies and subsidies for electricity; the transformed coal-fired boiler subsidized 13 million Yuan per steam ton in accordance with the original coal-fired boiler.

强制关停热电二厂南厂和热电三厂；划定并逐步扩大禁燃区，禁燃区内的单位和个人禁止燃用高污染燃料；淘汰市区建成区35蒸吨 / 小时以下燃煤锅炉，城镇建成区淘汰10蒸吨 / 小时以下燃煤锅炉，工业园区和企业聚集区淘汰自备燃煤锅炉。

Force to shut down coal-fired units in Power plant; delineate ban combustion zone; eliminate coal-fired boilers under 35 tons / hour in urban, boilers under 10 tons / hour in town, and all coal-fired boilers in industrial parks and enterprises gathered district.

每拆除1吨采暖燃煤锅炉、生产燃煤锅炉、茶浴锅炉市财政补贴3万元；纯居民采暖燃煤锅炉改天然气锅炉的，每置换1吨市财政补贴10万元；使用天然气锅炉为居民小区供热的，每采暖季市财政补贴5元/平方米；燃煤锅炉拆除接入集中供热的和区域集中供热的居民小区管网建设费按照40元/平方米(含热交换站建设)标准由市财政支付。

The government finance will subsidy 30000 Yuan for removing every one ton of coal-fired heating boilers, coal-fired industrial boilers, tea bath boiler .it will be subsidized 100000 Yuan for transforming one ton of coal-fired boilers to gas-fired boilers only used by residential hating ;it will be subsidized 5 yuan per square meter for heating by natural gas boiler.

### 石家庄 Shijiazhuang

# 北京和石家庄减煤政策评估

## Coal reduction policy assessment in Beijing and Shijiazhuang



### 命令控制型政策评估 Command and Control Policies

- 仅适用于紧急环境事件的处理，**运动式做法不可持续，减煤成本高**，不适宜作为长期政策手段。

Only apply to emergency environmental incidents. **The Campaign - style approach with high cost is not sustainable**, and it is not suitable for long-term policy.

- **强制关停、禁煤区政策缺乏法律依据。**

**The way of forcing shut down plants and prohibition of coal lacks of legal basis.**

- 政府直接对燃煤用户强制减煤，**监管成本和社会成本高。**

The government directly forces the coal users to reduce coal, which results in **high regulatory costs and social costs.**

### 经济刺激型政策评估 Economic stimulus policies

- **违背污染者付费原则**，燃煤工业锅炉改造靠政府财政补贴推动，实质将大量环境成本转嫁给了纳税人，公众为工业锅炉的排放治理买单，不符合公平性原则。

**Violating the principle of paying for pollution.** The coal-fired industrial boiler transformation was promoted by government financial subsidies, which passes on the large number of environmental cost to the taxpayer, as a result, the public pay for the industrial boiler emission control, it does not comply with the principle of fairness.

- **补贴政策缺少成本效益分析**，补贴金额没有经过详细论证，政府难以详细了解每个用户的真实减煤成本，制定统一补贴标准，既不公平也缺乏效率。

**The subsidy policies lack of cost-benefit analysis**, the amount of subsidy has not been demonstrated in detail, so the government is difficult to understand the real coal reduction cost of per user. it is both unfair and inefficient to develop a unified subsidy standard.

- **缺乏信息公开**，以燃煤锅炉补贴为例，只公布了补贴原则，没有对补贴对象信息、补贴金额、改造结果等信息进行公开，不利于各利益主体的监督，可能导致补贴资金的浪费。

**It lacks of information disclosure**, take the coal boiler subsidies for an example, it only announced the principle of subsidies, there's no information disclosure about the subsidies object, the amount of subsidies, reform result and so on, which is not conducive to the supervision of stakeholders, and may lead to the waste of subsidies.

# 城市煤炭总量配额交易制度的可行性

## The feasibility of coal quota allocation and trading system in city



### 目标的确定性 Determination of goal

- 直接服务于煤炭消费总量控制目标

it directly serves to the objectives of total amount of coal consumption control

- 减量目标用配额分配到每个燃煤用户，用户的减量自行决定。

the reduction targets are allocated to each coal user, and the reduction is determined by themselves.

### 降低社会成本 Reduce social cost

- 灵活减量，降低燃煤用户的减量成本，实现边际减排

Flexible reduction will reduce the cost of coal users to achieve marginal reduction

- 充分利用市场，降低政府燃煤减量的信息收集成本

it will make full use of the market and reduce the government's cost of collecting coal - fired information

### 制度的核心内容是配额核查和信息公开

The core content of the system is quota verification and information disclosure.

- 燃煤配额的核查成本，比二氧化碳、空气污染物低

The verification cost of coal quota is lower than that of carbon dioxide and air pollutants

- 核查可以委托第三方核查，市场的高效率

Verification can be entrusted to the third party with the market's high efficiency

- 信息公开，利于改进城市燃煤减量和其他政策（节能、污染物减排）

Information disclosure will help improve the city coal reduction and other policies (energy saving, pollutant reduction)

# 正在进行的研究

## Ongoing research



### ✚ 本溪市煤炭减量的成本效益分析

#### **Cost-benefit analysis of coal reduction in Benxi**

- 根据煤炭减量目标，计算减少的污染物排放量，估计其空气质量改善的健康效益，与减煤的成本比较。为确定煤炭减量目标提供依据。

According to the coal reduction targets to calculate the reduction of pollutant emission, and to estimate the health benefit of the air quality improvement, compared with the cost of reducing coal. To provide the basis for determining the coal reduction target.

### ✚ 本溪市煤炭总量配额交易制度试验研究

#### **Case and policy of coal quota allocation and trading system in Benxi**

- 建立数据库 Establish database
- 按照总量配额交易制度的框架,全面细化和完善制度设计,包括配额、基线、目标、配额核查方法和技术、燃煤清单编制方法和模板、交易制度建议等。

In accordance with the framework of the coal quota allocation and trading system, refine and improve the system design, including quota, baseline, objectives, quota verification method and technology, coal inventory system and template, trading system, etc..

- 与本溪市研讨

Conduct Research in Benxi city.





谢谢！

Thank You!

