



秸秆成型燃料-困境与出路

Solid biofuels-Predicament and solution

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一、发展历史 **Developing history**

上世纪80年代开始技术的研究，主要以引进、消化吸收为主，机型是螺杆挤压机；

The beginning of technical research in the 1980s, mainly in the introduction, digestion and absorption. The main model is screw extruder;

上世纪90年代，在国家科技攻关计划项目《秸秆的能源转化与利用综合系统》的支持下，研发成功用于生产棒状燃料和木炭的成套设备；

In the 1990s, with the support of national scientific and technological project, “the straw energy conversion and integrated system”, the rod biofuels and charcoal complete plants have been successful developed.

一、发展历史 **Developing history**

进入21世纪，生物质成型燃料进入新的发展阶段，颗粒状、小方块状成型燃料也引起高度关注。

Entering the 21st century, the straw briquette fuel into a new stage of development. Granular, block molding fuels also cause high attention.

2006年，在国家支撑计划《农林生物质工程》中设课题进行成型燃料关键技术和工程示范。

In 2006, in the national support plan, “Agriculture and Forestry Biomass Project”, the solid biofuels densifying technology equipment and demonstration project was established.

二、技术和产业现状

Technology and industry current situation

1、基本理论和工艺技术研究成果

Basic theory and technology research

- 原料自身的生化特性、压缩条件、模具类型、压缩方式、成型工艺都直接造成成型块物理品质的差异

Raw materials Biochemical characteristics、densifying conditions、mold type、compression、molding forming process are the direct result of differences in the quality of the physical block

- 明确了成型物内部粘结力类型和粘结方式

Clear the material forming the type of internal bond strength and bonding mode

1、基本理论和工艺技术研究成果

Basic theory and technology research

- 压力、含水率及粒径是影响粒子在压缩过程中发生变化的主要因素

Densifying pressure、materials moisture and size are the main change factor in the densifying process

- 初步确定了压力与燃料密度的数学关系

Initially set the mathematical relationship between fuel density and densifying pressure

1、基本理论和工艺技术研究成果

Basic theory and technology research

- 生物质内纤维素、木质素的含量决定了成型的难易程度
The cellulose and lignin content in biomass determines the ease of forming
- 发现了原料成型前后物质组成的某些变化
Found the material composition changes of raw materials before and after forming
- 初步研究了成型燃料的燃烧特性
Preliminary study on the combustion characteristics of solid biofuels
- 正在制定相关标准
Relevant standards are being developed

2、设备研发**Equipment R & D**

经过30年的发展，我国的秸秆成型设备走过的是从仿制到自主研发道路，研发单位也由开始的饲料机械厂、粮食机械厂到现在大专院校、科研院所和各类企业。目前我国有各种不同工艺类型的秸秆成型燃料设备。主要设备类型如下。

After 30 years of development, our country through the densifying equipment from imitation to independent research and development of roads, and research and development units from the start of the feed plant machinery, food machinery factory to the present institutions, research institutes and enterprises of all types. At present, China has a variety of different types of straw briquette equipment. Following are the main equipment types.

螺旋连续挤压成型机

Spiral continuous extrusion solid biofuels densifying equipment



颗粒成型机

Pellet densifying equipment



机械驱动活塞式成型机

Mechanical drive piston densifying equipment



液压驱动活塞式成型机

The piston hydraulic densifying equipment





不同类型成型机主要技术性能

Different types of machine main technical performances

	Spiral continuous extrusion	The pellet	Mechanical drive piston	Hydraulic piston-driven
productivity (kg/h)	120~500	200~1500	~100	100~500
energy consumption per ton solid biofuels(kWh/t)	100~150	~100	80~100	80~100
Material moisture(%)	≤10	12~18	≤ 15	≤ 15
solid biofuels density(g/cm3)	1100-1300	≥ 1100	≥ 1100	≥ 1100

3、产业规模 **Industry scale**

➤ 我国的成型燃料年产量约为10万-20万吨;

Our country's solid biofuels production is about 100,000 to 200,000 tons per year;

➤ 目前，我国年生产能力在3000吨-5000吨的企业大约有20-30家。

At present, our country has about 20 to 30 enterprises whose annual production capacity is 3000 to 5000 tons.

4、成型燃料的应用 **Application of Briquette**

- 企业自用：以企业生产过程的废弃物为原料生产成型燃料代替部分煤炭

Enterprises for their own use: Use the production process waste as raw materials to produce solid biofuels instead of coal

- 锅炉燃料：热或蒸汽用户购买成型燃料烧锅炉

Boiler fuel: Heat or steam consumer by solid biofuels for boiler

- 出口：成型燃料生产企业通过中间商将其出口至欧洲、韩国和日本等国家和地区

Exports: solid biofuels enterprise can through middlemen export to Europe, South Korea, Japan and other countries or regions

- 民用：生产机制木炭

For civil use : Product machine-made charcoal



三、主要问题分析 Main problem

1、理论研究薄弱

Theoretical study is weak

对成型理论、工艺技术和燃烧特性还缺乏系统研究，所取得的部分成果对成型设备设计、燃料生产和燃烧设备设计还缺乏指导价值。

Lack of systematic research about molding theory, technology and combustion characteristics. And the achieved results also lack of guidance value for design of molding equipment, fuel production and combustion equipment design.

2、设备连续运行能力不强

Continuous operation of equipment is not strong

关键部件易磨损，整体质量粗糙，自动化程度过低，工人生产环境极差。

Key components are easy to wear and tear; whole quality is rough; low degree of automation; poor production environment.

3、公众对成型燃料缺乏认识

The public's lack of realize solid biofuels

➤ 社会公众对成型燃料还不了解;

The public do not know the solid biofuels;

➤ 决策层还容易简单地将成型燃料和煤炭的价格比较

The management is also easier to simply compare solid biofuels and coal prices

4、投融资困难

Investment and financing difficulties

- 成型燃料生产都是小项目，大集团和大投资商投资兴趣不高；

Briquette production are all small projects, big corporations and investors interest in investment is not high;

- 该类项目的投资大都在几百万元左右，这样的资金规模对目前大部分中小企业来说仍然有相当大的压力；

Most of these projects' investment around in a few million dollars, so the size of the funds for most SMEs still have a lot of stress;

5、缺乏可操作的支持政策

Lack of operational policy support

- 国家制定了可再生能源发展规划，其中包括成型燃料内容，但如何快速发展该产业，还缺乏具体的支持政策。

Our country has developed renewable energy development planning, which including the molding fuel. But how to rapid the development of this industry is still lack of specific policies support.

- 原料来源于农民，价格波动较大，成型燃料的价格相对较高，在现阶段没有国家的支持，这个产业还不可能形成。

The raw materials is from farmers, the price is volatile, and solid biofuels price is high. If there is no state support, the industry can not be formed.

四、几点建议

Some suggestions

1、加强对秸秆成型技术设备研发的支持

Strengthen the support for R & D of straw molding technology and equipment

设立专项，开展原料收储运模式、成型技术与设备、燃烧设备、示范工程建设、销售模式等全过程的研究

Set up special project, carry out the research of raw materials storage and transport process, molding technology and equipment, combustion equipment, demonstration projects development, and sales model of the entire process etc.

2、建立灵活的支持政策

Support the establishment of flexible policy

- 建立程序化的立项手续：在国家立法支持的大环境下，针对项目特点制定操作性较强的立项管理办法，让投资者清楚项目立项申请的手续和要求。

Establish the procedures for project approval: under support of the national legislation environment. Develop strong project management to fit the project features, so that investors can clear the application procedures and requirements.

- 建立公平竞争的市场条件：政府在制定可再生能源项目的鼓励政策时，应把环境效益和社会效益全部考虑进去，使成型燃料与煤炭等常规能源有比较公平的竞争条件。

Establish fair competitive market conditions: government should take into account social and environmental benefits in the development of renewable energy policy, so that the coal, briquette fuels and more conventional energy sources can be in the fair competition conditions.

3、明确秸秆成型燃料的主要应用方向

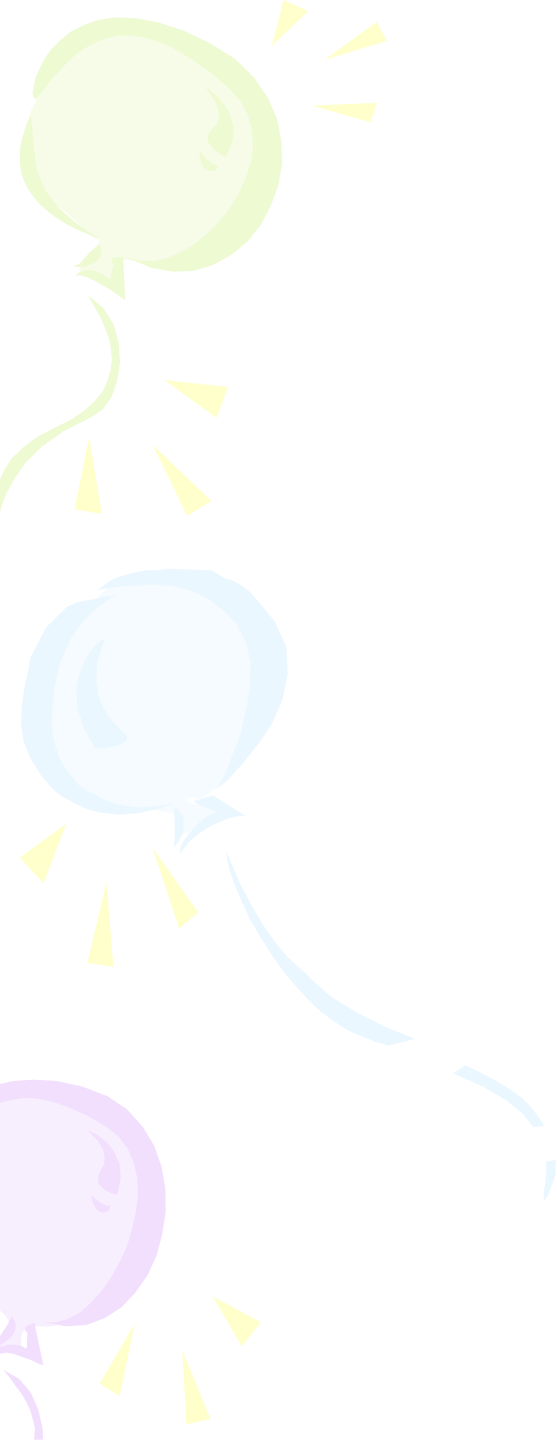
Clear and definite main apply direction of straw molding fuel

- 成型燃料主要是企业自用和出口，企业自用的前提是自己有废弃物为原料并有燃烧锅炉，出口总量不大，质量要求苛刻，而且从长远来说不能以出口来提高我国成型燃料的生产规模。

Molding fuel is main used for enterprises own use and export. Enterprises for their own use on the premise that their waste as raw materials and have fired boiler, exports is not much, stringent quality requirements. And in the long term, can not improve the production scale of molding fuel from the export.

- 对电力生产企业、工业锅炉用户给予适当的优惠政策，鼓励并强制其每年必须消费一定量的成型燃料，强化国有企业的社会责任意识。

Give appropriate preferential policies to electrical enterprise, encourage and enforce them annual consumption of a certain amount of molding fuel, strengthen the awareness of social responsibility of state-owned enterprises.



Thanks!