

中国可再生能源数据采集和统计经验

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- 国家发展和改革委员会能源研究所
 - Energy Research Institute National Development and Reform Commission

Experience of Collecting Renewable Energy Statistics in China

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- 国家发展和改革委员会能源研究所
 - Energy Research Institute National Development and Reform Commission

报告提纲

- 定义和分类
- 现有的统计体系
- 已纳入国家能源统计体系的可再生能源
- 尚未纳入国家能源统计体系的可再生能源
 - 各种技术的统计现状和问题
- 正在开展的研究工作

Outline

- **Definition and Classification**
- **Existing Statistical System**
- **Renewables included in National Energy Statistics System**
- **Renewables not included in National Energy Statistics System**
 - Status Quo and Problems of various statistical technologies
- **Ongoing Researches**



可再生能源品种和定义

我国可再生能源法

- 包括：风能、太阳能、水能、生物质能、地热能、海洋能等
- 不包括：
 - 低效率炉灶直接燃烧方式利用秸秆、新柴、粪便等
- 尚不明确的品种：
 - 空气源热泵
 - 被动太阳房
 - 温室大棚

国际可再生能源署IRENA

- 只包括主动生产的可再生能源
- 不包括：
 - 直接利用的动能：风车、水车
 - 被动产生的能源：被动太阳房、温室大棚
 - 制冷：空调
 - 不做能源用途的行动或产品：食物自然风干、植物种植

建议：与IRENA标准保持一致

Types and Definition of Renewables

China's Law on Renewable Energy

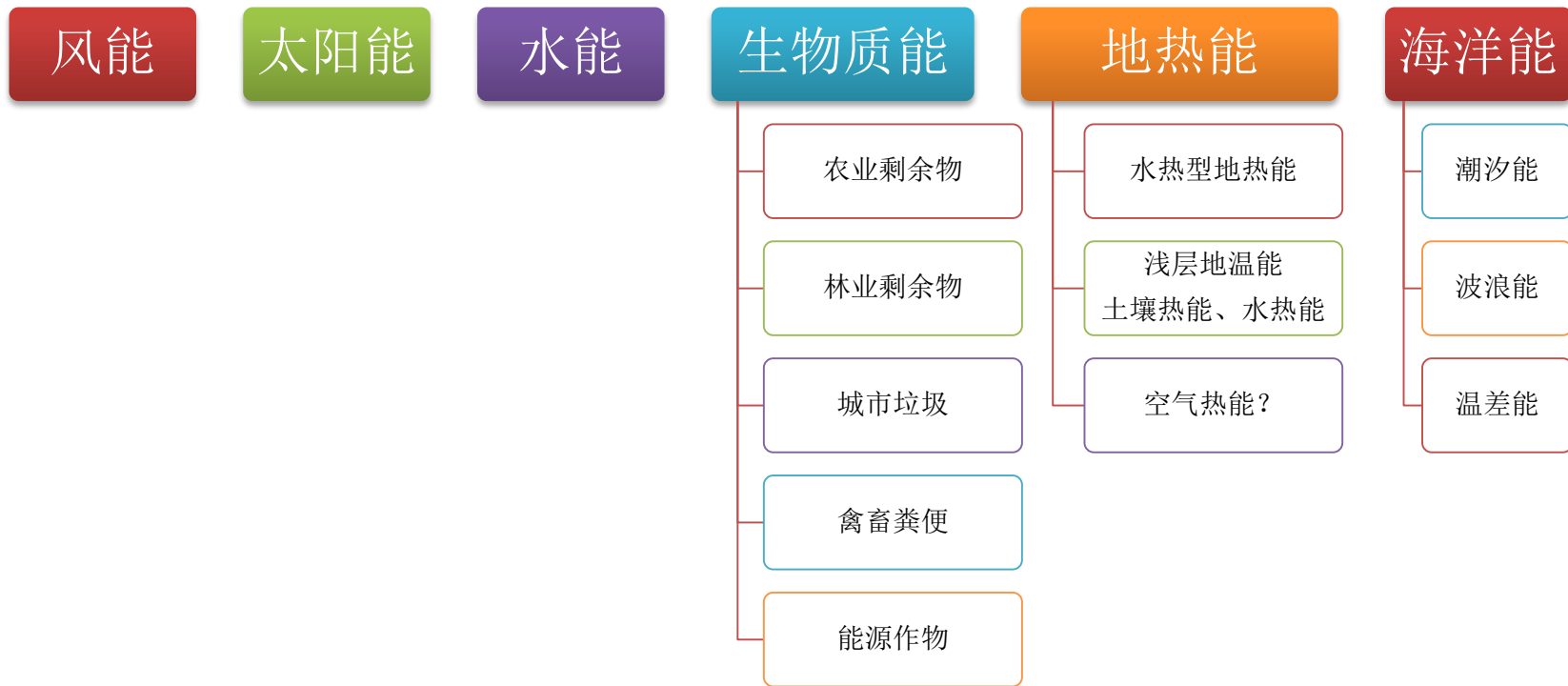
- Including: wind power, solar power, hydro energy, biomass energy, geothermal energy, ocean energy, etc.
- Excluding :
 - Cooking range with low efficiency by direct combustion of straw, new firewood, dung, etc.
- Unspecified types:
 - Air source heat pump
 - Passive solar house
 - Greenhouse

International Renewable Energy Agency (IRENA)

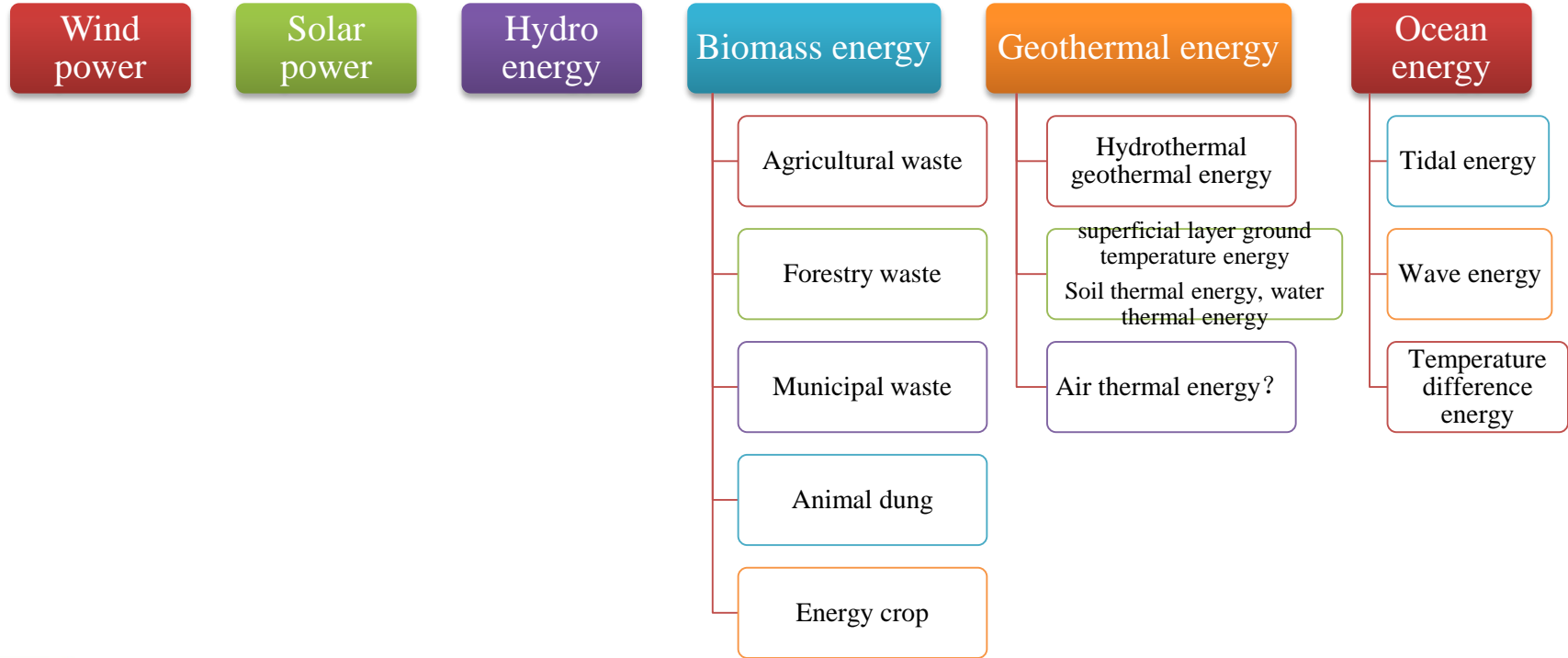
- Only including active produced renewables
- Excluding:
 - Directly-used motion energy : windmill, waterwheel
 - Passive-produced energy: passive solar house, greenhouse
 - Cooling: airconditioner
 - Activity or products cannot be used as energy : natural air drying of food, plant cultivation

Suggestion: Keeping consistent with IRENA standard

可再生能源种类，按资源种类分



Classification of Renewables, by resource type



可再生能源种类，按终端能源分

可再生能源发电

- 风力发电
- 太阳能发电
 - 光伏发电、太阳能热发电
- 水力发电
- 生物质能发电
 - 农林剩余物、城市垃圾、气体燃料
 - 生物质发电、生物质热电联产
- 地热能发电、海洋能发电

可再生能源供热

- 太阳能供热
 - 太阳能供热系统、太阳灶
- 生物质能供热
 - 农林剩余物、城市垃圾、气体燃料
 - 生物质热电联产、生物质锅炉
- 地热能供热
 - 水热型、热泵系统
- 可再生能源电力供热
 - 电锅炉、热泵系统

可再生能源交通燃料

- 生物液体燃料
 - 生物燃料乙醇、生物柴油
- 生物质气体燃料
 - 沼气、垃圾填埋气、生物天然气
 - 生物质：热解气、气化气
- 可再生能源电力
 - 电动汽车、火车



Classification of Renewables, by end use

Renewables electricity

Wind power generation

Solar power generation

- PV, solar thermal power

Hydroelectric generation

Biomass power generation

Agricultural waste, municipal waste, gas fuel

- Biomass power generation, biomass combined heat and power generation

Geothermal electricity, Ocean power generation

Renewables heating

Solar heating

- Solar heating system, solar cooker

Biomass heating

Agriculture and forestry waste, municipal waste, gas fuel

- biomass combined heat and power generation, biomass boiler

Geothermal heating

- Hydrothermal type, heat pump system

Renewables electricity heating

- Electric boiler, heat pump system

Renewables transportation fuel

Bio liquid fuel

- bio fuel ethanol, biodiesel

Biomass gas fuel

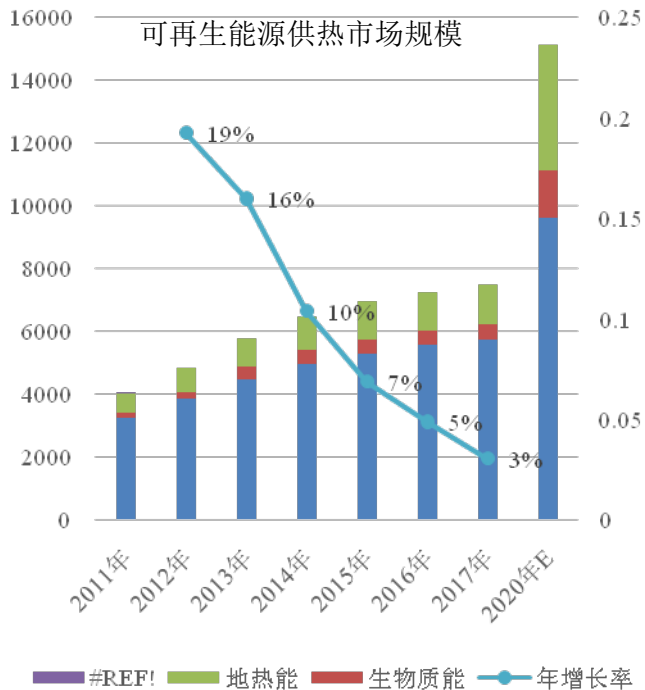
- marsh gas, landfill gas, biogas
- Biomass gas: pyrolysis gas, gasified gas

Renewables electricity

- electromobile, train

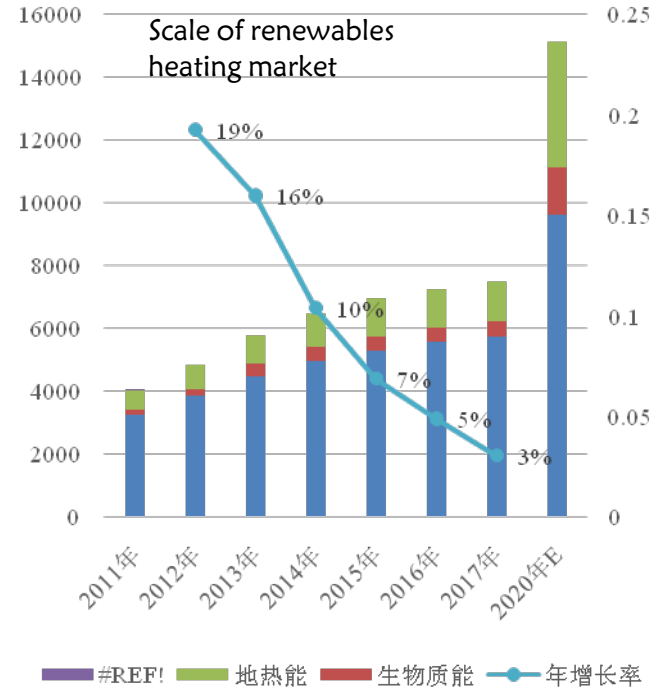
可再生能源种类，按照交易类型分

- **商品化能源：**非自用、能源市场上交易，有计量
 - 可再生能源电力
 - 可再生能源供热：大规模的
 - 生物质热电联产供热
 - 生物液体燃料
- **非商品化能源：**自用为主，分布式，总体应用规模大
 - 可再生能源发电：离网型
 - 可再生能源供热
 - 太阳能供热、生物质锅炉供热、地热水热型、热泵系统
 - 可再生能源交通用能：气体燃料
 - 未纳入国家的能源消费总量统计



Classification of Renewables, by trade type

- **Commercial energy** : no for self use, trade in energy statistics, with measurement
 - Renewables electricity
 - Renewables heating: large-scaled
 - Biomass combined heat and power generation
 - Bio liquid fuel
- **Non-commercial energy**: mainly for self use, distributed type, with large scale application
 - Renewables electricity: off-grid
 - Renewables heating
 - Solar heating, biomass boiler heating, geothermal and hydrothermal, heat pump system
 - Renewables transport energy: gas fuel
 - Aggregate of those not integrated in national energy consumption



可再生能源品种与能源生产消费品种

能源生产品种

- 国家能源统计报表制度
 - 能源生产统计品种27个，与可再生能源相关有3个
 - 发电量：水电、风电、太阳能发电、生物质发电、其他（地热发电、海洋能发电）
 - 生物燃料乙醇
 - 生物柴油
- 尚未纳入的可再生能源很多
 - 生物质气体燃料：沼气、垃圾填埋气、生物质气化气、生物质天然气
 - 可再生能源热力：太阳能、生物质能、地热能

能源消费品种

- 国家能源统计报表制度
 - 能源生产统计品种35个，与可再生能源相关有5个
 - 热力、电力、城市生活垃圾、生物燃料、其他燃料
- 尚未纳入的可再生能源
 - 太阳能
 - 地热能
 - 热力品种没有细分，外供可再生能源热力无法统计

Varieties of energy production

- National energy statistical report system
 - 27 types of energy production statistics , 3 are relevant to renewables
 - Generating capacity: hydro power, wind power, solar power, biomass power, others (geothermal power generation, ocean power generation)
 - Biofuel ethanol
 - Biodiesel
- Many not included in renewables
 - Biomass gas fuel: marsh gas, landfill gas, biomass gasification, biomass natural gas、
 - Renewables heating: solar power, biomass power, geothermal power

Varieties of energy consumption

- National energy statistical report system
 - 35 types of energy production statistics , 5 are relevant to renewables
 - Heating power, electric power, municipal solid waste, biofuel, other fuel
- Renewables not included
 - Solar power
 - Geothermal power
 - No segments of heating power types, no statistics on external-supplied renewables heating power

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现有的国家统计体系

- 国家统计局、中电联：可再生能源发电已纳入国家电力统计体系
 - 可再生能源发电，包括大型电站、分布式发电系统，有统计计量、有上报途径
 - 生物液体燃料
- 国家能源局：能源行业监测数据统计报表制度，2015年3月
 - 燃料乙醇，月度产量；企业直报，月报
- 国家能源局：可再生能源发电利用统计报表制度，2016年4月
 - 生物质成型燃料生产和利用情况，年报，重点企业调查
- 农业部：全国农村可再生能源建设统计报表制度，2009年7月
 - 太阳能：太阳能热水、太阳灶、太阳房，应用量
 - 户用沼气、沼气工程：数量，总池容，年产气量，供气户数
 - 秸秆气化：数量，年新增，年末累计
 - 农村能源办逐级统计
- 住房和城乡建设部：民用建筑能耗和节能信息统计报表制度，2009年12月
 - 太阳能热利用：集热面积，应用建筑面积
 - 浅层地热能：应用建筑面积，辅助热源供热量

Existing national statistical system

- **National Bureau of Statistics of China, China Electricity Council: renewables electricity has been included in national electric power statistics system**
 - **Renewables electricity**, including large power station, and distributed power generation system, with statistical measurement and reporting channel
 - **Bio liquid fuel**
- **National Energy Administration: statistical reporting system on the monitoring data of energy industry, March 2015**
 - **Fuel ethanol**, monthly output; direct reporting of enterprises, monthly report
- **National Energy Administration: statistical reporting system on renewables electricity use, April 2016**
 - Production and use of **Biomass particles forming fuel**, annual report, survey for key enterprises
- **Ministry of Agriculture: statistical reporting system on national renewables construction in rural areas, July 2009**
 - Solar power: **solar power hot water, solar cooker, solar house, application quantity**
 - **Household biogas, methane project**: quantity, total capacity, annual output of gas, number of households with gas supply
 - **Straw gasification**: quantity, annual increase, accumulative number at the end of the year
 - Rural energy offices conduct statistics level by level
- **Ministry of Housing and Urban-Rural Development: statistical reporting system on civil housing energy consumption and energy efficiency, Dec. 2009**
 - **Solar power use**: solar collector area, applied building area
 - **Superficial layer geothermal power**: applied building are, supplementary heat source

现有的行业统计

中国农村能源行业协会 太阳能热利用专委会

- 太阳能热利用产业运行状况报告，半年报告
- 数据指标
 - 年新增集热面积，年累计集热面积
- 数据来源
 - 上下游产业、主要企业生产情况
 - 考虑了寿命期后的报废，较难掌握意外退出情况

中国节能协会热泵专委会

- 空气源热泵产业发展报告，2016年开始
- 数据指标
 - 空气源热泵新增台数、产值
 - 无装机容量、供暖面积等数据
- 数据来源
 - 从上下游产业、主要企业生产情况进行估算

Existing industrial statistics

China Rural Energy Industry Association Special Committee of Solar Thermal Utilization

- **Report on Operation of Solar Thermal Utilization**, semi-annual report
- Indicators
 - annual newly increased collector area, annual accumulative collector area
- Data source
 - upstream-downstream industries, production of main enterprises
 - Scrapping by considering life expectancy, hard to grasp unexpected quit

Special Committee of Heat Pump, China Energy Conservation Association

- **Report on Air Source Heat Pump**, start from 2016
- Indicators
 - Number of newly increased air source heat pumps, output value
 - No such data on installed capacity, heating area
- Data source
 - Estimation based on the production of upstream-downstream industries and main enterprises

• 成绩斐然

- 全国可再生能源统计领先省份，已连续三年开展可再生能源统计的试点调查
- 明确可再生能源的基本分类和折算系数
- 构建可再生能源统计方法体系：3个层次43个指标；已项目单位和行政村两个主要调查渠道；全面调查、重点调查和抽样推算相结合
- 纳入经普制度，探索改进方向
 - 对4万多家规上布置了可再生能源报表，1769家填报；2694家规下单位也核实了

• 问题和思考

- 调查渠道仍需加强整合和创新
 - 项目单位：难获得企业名单；主管部门才有；德青源没有纳入
 - 法人单位：很多是规模以下单位
- 折标准量方法有待进一步研究
 - 可再生能源电力：按发电量折算，不能完全反应所利用的能量；
 - 地源热泵：按照介质质量、温度和比热计算，过于专业
- 技术种类的确定：阳光温室？空气源热泵？

Beijing Municipal Bureau of Statistics



- **Brilliant achievements**
 - **Leading in national renewables statistics, conducting pilot survey of renewables statistics for a consecutive of 3 years**
 - **Specifying the basic classification and converting coefficient of renewables**
 - **Constructing renewables statistics method system: 3 layers and 43 indicators; **project units and administrative villages** are two main survey channels; complete survey, key survey and sampling estimated are combined**
 - **Integrated in economic census system, exploring reform orientations**
 - **Renewables questionnaires were developed for over 40000 enterprises above designated size, 1769 such enterprises had fill in and submitted the questionnaire; and 2694 enterprises below designated sized had been verified**
- **Problems and thinking**
 - **Survey channel still needs to be integrated and innovated**
 - **Project units: list of enterprises are hard to be obtained; only available for competent departments; DQY Ecological Company is not included**
 - **Legal entities: many are below designated size**
 - **Standard quantity method needs to be further studied**
 - **Renewables electricity: converted with generating capacity, cannot fully reflect the utilized energy;**
 - **Ground source heat pump: calculation based on medium quality, temperature and specific heat, which are too professional**
 - **Determining technological type: greenhouse? Air source heat pump?**



可再生能源数据手册

- 国家能源局新能源和可再生能源司，国家可再生能源中心（CNREC）
- 可再生能源利用量
 - 一. 可再生能源发电
 - 二. 可再生能源燃气
 - 沼气利用量；沼气用户、沼气工程，应用规模；数量来源：农业部
 - 三. 可再生能源供热
 - 太阳能热水器，集热器面积万平方米，太阳能专委会
 - 地热能：浅层地温能，多年未更新，住建部过去数据
 - 四. 生物质燃料
 - 生物质成型燃料、生物柴油：能源局新能源司，重点企业调查
 - 燃料乙醇：能源局规划司

Manual of Renewables

- **Department of New Energy and Renewables, National Energy Administration; China National Renewable Energy Center (CNREC)**
- **Renewables utilization amount**
 1. **Renewables electricity**
 2. **Renewables fuel gas**
 - **Marsh gas utilization ; marsh gas users, marsh gas project, application scale, data source, Ministry of Agriculture**
 3. **Renewables heating**
 - **Solar water heater, 10000 square meters of solar collector area , Special Committee on Solar Energy**
 - **Geothermal power: superficial layer geothermal energy, not upgraded for many years, previous data of Ministry of Housing and Urban-Rural Development**
 4. **Biomass fuel**
 - **Biomass particles forming fuels, biodiesel; New Energy Department of National Energy Administration, surveys of key enterprises**
 - **Fuel ethanol: Department of planning, National Energy Administration**

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已纳入国家能源统计体系的可再生能源



- 可再生能源电力
- 生物质热电联产机组的供热量
- 生物液体燃料
 - 生物燃料乙醇
 - 生物柴油



Renewables included in National Energy Statistics System



- Renewables electricity
- Heat supply of biomass cogeneration units
- Bio liquid fuel
 - Bio fuel ethanol
 - Biodiesel



可再生能源发电：已纳入统计体系

统计指标

- 装机容量：新增、累计
- 年发电量
- 弃风弃光量、弃风弃光率
- 年均满负荷发电小时数

核算方法

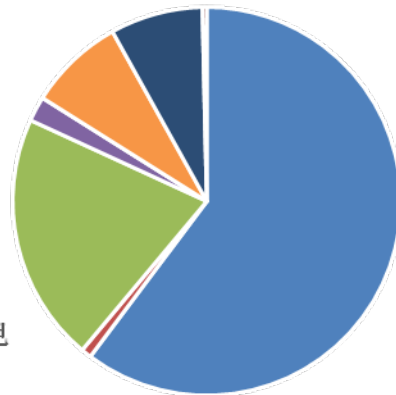
- 煤耗法
- 电当量法

统计品种的细分

水电

2017年非水可再生能源发电量

- 陆上风电
- 海上风电
- 光伏电站
- 分布式光伏
- 光热发电
- 农林生物质发电
- 垃圾发电
- 沼气发电



Renewables electricity: already in statistical system

Statistical indicators

- Installed capacity: newly added, accumulative
- Annual electrical generation
- Quantity and rate of wind curtailment and light curtailment
- Annual full load electric generation hours

Accounting methods

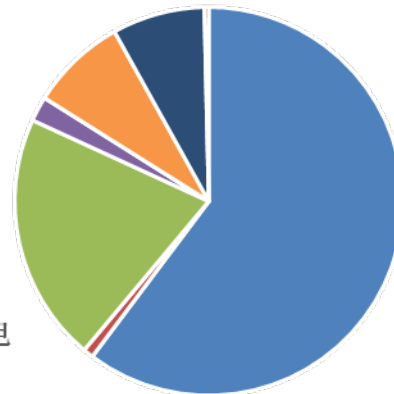
- Coal consumption method
- Equivalent method

Segments of statistical types

Hydropower

2017年非水可再生能源发电量

- 陆上风电
- 海上风电
- 光伏电站
- 分布式光伏
- 光热发电
- 农林生物质发电
- 垃圾发电
- 沼气发电



可再生能源热电联产

- 主要是生物质热电联产：农林剩余物、城市生活垃圾等
- 数据来源
 - 多为规模以上能源企业，已纳入国家能源统计体系，每月上报能源报表；
 - 上报数据包括：消耗生物质原料量，发电量、供热量；
- 存在的问题
 - 可再生能源利用量中只统计了发电量，未统计供热量；
 - 热力品种没有细分，虽然供热量数据已上报，尚未汇总

Renewables combined heat and power generation

- **Mainly biomass combined heat and power generation: agriculture and forestry waste, municipal solid waste, etc.**
- **Data source**
 - Mostly are energy enterprises above designated size, and are included in national energy statistics system, the Energy Report is submitted every month;
 - The submitted data include: consumption of biomass raw material, amount of electrical generation, amount of heat supply
- **Existing problems**
 - The amount of renewables utilization only calculated the amount of electric generation, not calculated heat supply amount
 - No segment for thermal varieties, although the heat supply data has been submitted, it hasn't been aggregated

生物质液体燃料

- 包括生物燃料乙醇和生物柴油，燃料乙醇多与汽油掺混后使用，是车用燃料；生物柴油可作原料、可作能源，有一部分出口国外
- 目前的计算方法：按照燃料热值计算
- 数据来源：可获得可靠的数据，2017年已纳入能源消费品种，纳入国家能源统计体系
- 存在的问题
 - 能源利用量的核算基准问题：终端能源？一次能源？
 - 燃料乙醇的可持续性问题
 - 统计范畴问题：用作原料的是否计入？出口量是否计入？

Biomass liquid fuel

- Including bio fuel ethanol and biodiesel. Fuel ethanol and gasoline are mixed as vehicle fuel; biodiesel can be taken as raw material and energy, and some are exported
- Current calculation method: calculated based on fuel value
- Data source : can obtain reliable data, included in energy consumption type and national energy statistics system in 2017
- Existing problems
 - Benchmarking of energy utilization accounting: end use energy? Primary energy?
 - Sustainability of fuel ethanol
 - Statistical scope: whether included as raw material ? Whether export volume included?

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尚未纳入的可再生能源

未纳入的品种

- 可再生能源供热
 - 太阳能供热
 - 生物质锅炉供热
 - 地热能供热：水热型、热泵
- 生物质气体燃料
 - 沼气，生物质天然气、生物质气

未纳入的原因

- 分布式，项目小，规模以下企业
- 数据来源
 - 多为自用，无计量
 - 无权威的统计机构，缺乏校核途径
- 行业类型，非工业企业
 - 沼气企业：农业？供暖企业：服务业？

Renewables not included

Varieties haven't been included

- Renewables heating
 - solar heating
 - Biomass boiler heating
 - Geothermal power heating: hydrothermal type, heat pump
- Biomass gas fuel
 - Marsh gas, biomass natural gas, biomass gas

Reasons for non-inclusion

- Distributed, small items, enterprises below designated size
- Data source
 - Mostly for self use, no calculation
 - No authoritative statistical agencies, short of verification channel
- Type of industry, non industrial enterprises
 - Marsh gas enterprises: agriculture?
 - Enterprises of Heat supply: service sector?

太阳能供热现状

- 已实现规模化应用，可提供民用热水、工业热力（预热）、建筑供暖
- 数据来源
 - 全国数据：产业协会提供，新增数据较准确，保有数据需校核，无分地区数据
 - 大型项目：为规模以上工业企业供热，多为自用，无计量；未纳入能源品种，无法填报
 - 中小型项目：多为自用，无计量，难以从项目层面上报数据

Status Quo of Solar Heating

- Having realized scaled application, can provide domestic hot water, industrial engineering (pre-heating), and building heating
- Data source
 - National data: provided by industrial association, newly added data are more accurate , the inventory of data need to be verified, no data by region
 - Large scaled projects: heat supply for industrial enterprises above designated size, mostly for self use, no calculation; not yet included in energy varieties, unable to be filled in and submitted
 - Small and medium projects: mostly for self use, no calculation, hard to submit data from project aspect

太阳能热利用计算方法和问题

- 现有的计算方法

太阳能供热量 = 累计太阳能集热器面积 x 单位集热面积能量核算系数
保有太阳能集热面积

= 上年保有集热面积 + 本年新增集热面积 - 当年退役集热面积 (10年前的新增集热面积)

单位面积供热量：目前全国基本统一，取值110-120kgce/m²

- 存在的问题

- 未纳入能源品种，无法填报
- 保有太阳能集热面积的计算方法：没有考虑提前退役的系统
- 能量量的核算标准问题：终端能源消费量，还是一次能源消费量？
- 不同资源条件下的能量核算系数：资源条件差别大，反映不出来
- 数据来源和校核问题：尚无途径

Calculation of heat utilization of solar power

- Current calculation method

Heat supplied by solar power = accumulative area of solar thermal collector x accounting coefficient of energy amount per unit thermal collector area

Inventory of solar power collector area

= collector area of last year+ newly added collector area of the year – retired collector area of the year (newly added collector area 10 years ago)

Heat supply of unit area: currently consistent throughout the country, taking the value of 110-120kgce/m²

- Existing problems
 - The non-included energy varieties cannot be submitted
 - Calculation of inventory of solar power collector: not considering the pre-retired system
 - Accounting standard of energy amount : end use energy consumption, or primary energy consumption ?
 - Accounting coefficient of energy amount under different resources: large difference in resource conditions, cannot be reflected
 - Data source and verification: no channel available

生物质能供热

- 技术成熟，应用广泛
- 生物质热电联产供热
 - 国家能源局鼓励生物质直燃发电机组改造为热电联产机组
 - 应用规模尚无数据，供热数据可通国家统计平台获得
- 生物质锅炉：**2015年颗粒燃料生产/消费量约800万吨**
 - 是替代燃煤锅炉的有效手段，可提供民用热水、工业热水
 - 中国主要燃用生物质颗粒燃料，颗粒燃料主要用于锅炉
 - 北方清洁供暖工作的大力推动，市场规模有所增长

Biomass heating

- **Matured technology, wide application**
- **Biomass combined heat and power generation**
 - National Energy Administration encourages to reform the biomass direct combustion generator set into cogeneration unit
 - No data for the scale, heat supply data can be obtained from national statistical platform
- **Biomass boiler: granular fuel production/ consumption was around 8 million tons in 2015**
 - Effective means to replace coal-fired boiler, can provide civil-use water and industrial-use water
 - In China, the biomass granular fuel is mainly used, and granular fuel is mainly used for boiler
 - Clean heating in northern area is forcefully promoted, and the market scale is increased

生物质锅炉供热

- 目前的计算方法

$$\text{生物质锅炉供热量} = \text{颗粒燃料量} * \text{燃料热值}$$

- 数据来源和计算方法：很困难

- 颗粒燃料量：有补贴时有渠道；补贴取消后，缺乏有效的数据来源
- 锅炉保有运行规模：国家市场监督管理总局有数据，但仍需协调才能获得数据；计算参数需研究设定
- 供热量：自用的通常没有计量；外供的有计量，但热力没有分类

Biomass boiler heating

- Current calculation method

Biomass boiler heat supply = granular fuel quantity * fuel value

- Data source and calculation method : very difficult
 - Granular fuel quantity: channel available when there is subsidy; after cancelling the subsidy it's lack of effective data source
 - Operation scale of retained boiler : State Market Regulatory Administration has the data, yet still need to coordinate to obtain data; calculation parameter needs to be set upon research
 - Heat supply quantity: no calculation for the self-used; calculation for external supply, yet no classification for heating power

地热能供热：水热型

- 技术成熟，应用广泛，应用规模灵活
- 地热资源丰富地区，可成为县级供热网的主要能源来源，例如雄县
- 需要有地下热水的开采许可
- 目前的计算方法
 - 供热量 = 供暖建筑面积 * 单位建筑面积能耗
 - 单位建筑面积能耗的取值：多为25kgce/m²。是否太高？
- 数据来源：暂无有效的数据收集渠道和上报途径
 - 无地热品种，无填报渠道
 - 大型项目：供暖按照建筑面积收费，通常无热力计量
 - 中小型项目，多为自用，无计量
 - 地下热水开采量，无计量
 - 是否有辅助能源？

Geothermal power heating: hydrothermal

- Matured technology, wide application, and flexible application scale
- The area with abundant of geothermal resources can become main energy source of county-level heat supply network , e.g. Xiongxin County
- Need to have exploration permission of geothermal water
- Current calculation method
 - **Heat supply quantity = heating floor area* energy consumption of unit floor area**
 - Energy consumption value of unit floor area: mostly 25kgce/m². Whether too high?
- Data source: no effective data collection channel and reporting channel
 - No geothermal variety, no reporting channel
 - Large project: heating is charged based on floor area, normally no heating power calculation
 - Medium and small projects area mostly for self use, no calculation
 - Geothermal water exploration quantity, no calculation
 - Whether have auxiliary energy?

热泵供热制冷

- 地源、水源热泵的应用较为广泛，空气源热泵爆发式增长，已成农村清洁供暖的主要技术
- 定义问题：地源水源热泵是浅层地温能，空气源热泵是可再生能源吗？
- 目前的计算方法
 - 供热量 = 供暖建筑面积 * 单位建筑面积能耗
 - 单位建筑面积能耗的取值：多为25kgce/m²。是否太高？
 - 未考虑热泵系统自耗能，未考虑气候区、不同技术的影响
 - 欧盟的计算方法：缺数据来源和参数取值
- 数据来源：暂无有效的数据收集途径
 - 供暖建筑面积：原来提供初始投资补贴，可获得。现在补贴已停止，无路径
 - 热泵机组：多为中小型设备，自购自用；行业协会刚刚建立，有销售台套数据，缺校核路径
- 核算基准：终端能源？一次能源？
 - 一次能源怎么算：替代电？替代热？将终端能源量计入一次能源？

Heat pump heating and cooling

- Wide application of ground source and water source heat pump, air source heat pumps have witnessed explosive growth and become main technology of clean heating in rural area
- Definition: ground source and water source heat pump are superficial ground temperature energy, does air source heat pump belong to renewables?
- Current calculation method
 - **Heat supply quantity = floor area of heat supply * energy consumption per unit floor area**
 - Value of energy consumption per unit floor area: mostly 25kgce/m². Whether too high?
 - Not considering self-consumed energy of heat pump system, not considering the influence of climatic region and different technologies
 - EU calculation method: lack of data source and parameter choice
- Data source: no effective data collection channel for the moment
 - Floor area of heating: originally it can be obtained for initial subsidy. Now the subsidy has been canceled, no channel available
 - Heat pump unit: mostly small and medium sized equipment and self purchased for self use; the industrial association is just established, with sold number, lack of verification多
- Accounting benchmark: end use energy? Primary energy?
 - How to calculate primary energy: replacing electricity? Replacing heat? Including end use energy into primary energy?

生物质气体燃料

- 均为二次能源产品，可发电、供热、炊事、交通燃料
 - 沼气、垃圾填埋气，提纯后成为生物天然气，可并入燃气网
 - 生物质热解气、气化气
- 目前的计算方法：按照气体燃料的热值计算
生物质气体燃料的能源利用量 = 气体燃料量 * 燃料热值
- 数据来源和校核问题
 - 沼气：因有国家初始投资补贴，新增数据清晰；但保有量数据缺乏校核途径
 - 行业类别：大中型沼气项目可纳入规上企业；但多为农业企业
- 重复计算问题

Biomass gas fuel

- All are secondary energy products, can generate electricity, providing heating, for cooking, and for transportation fuel
 - Marsh gas, landfill gas, generating biomass natural gas after purification, and can be incorporated in fuel gas network
 - Biomass pyrolysis gas and gasified gas
- Current calculation method: calculated by the heat value of gas fuel
 - Energy utilization quantity of biomass gas fuel = gas fuel quantity * heat value of fuel**
- Data source and verification
 - Marsh gas: newly added data is clear because of national initial investment subsidy; yet the inventory data is short of verification
 - Industrial category: large and medium marsh gas projects can be included in enterprises above designated size; but mostly are agricultural enterprises
- Repeated calculation

总体问题和难点-管理层面

- 统计管理的问题
 - 非电缺乏统一的领导和协调，统计工作基础薄弱
 - 尚未全面纳入国家能源统计调查制度：1) 未纳入规模以上企业名单，2) 企业分类为非工业，3) 外购可再生热力无法填报
 - 现有的统计调查体系难以应对分布式应用，需统计体系创新
- 能源品种和统计范畴问题
 - 能源品种的细化和完善：热力、生物燃料的细化，太阳能、地热能的品种



General problems and difficulties- management aspect

- Statistical management
 - The non-electric lacks unified leadership and coordination, with weak foundation of statistical work
 - Haven't been included in national energy statistical survey system: 1) haven't been included in the name list of enterprises above designated size, 2) the classification of enterprises is non-industrial, 3) Outsourced renewables thermal power cannot be submitted
 - The existing statistical survey system can hardly deal with the distributed application, and needs to innovate statistical system
- Energy varieties and statistical scope
 - The refinement and optimization of energy varieties: the refinement of thermal power and bio fuel, and the varieties of solar power and geothermal energy

总体问题和难点-技术层面

技术层面

- 技术方法和核算问题
 - 能源利用量的核算基准：终端能源？一次能源？
 - 分品种的按照规模计算能源量计算方法尚需研究：生物质锅炉、热泵系统、太阳能热利用
 - 能源综合报表中尚无相应类别，无法汇总：可再生能源热力等
- 数据来源和校核问题
 - 行业协会估算数据，缺乏校核途径；太阳能集热面积，热泵系统
 - 年新增数据到保有量数据的计算方法和校核：太阳能集热面积，热泵系统、沼气系统

现行计算方法的核算基准 低估供热和燃料

	一次能源量	终端能源量
可再生能源电力		
太阳能供热		
地热水热型		
热泵系统		
生物质锅炉		
生物气体燃料		
生物液体燃料		

Technical aspect

- **Technological and accounting problems**
 - Accounting benchmark of energy utilization quantity: end use energy? Primary energy?
 - The calculation of energy quantity by varieties based on the scale needs to be studied: biomass boiler, heat pump system, solar heat utilization
 - There is no corresponding category in comprehensive energy report, unable to aggregate: renewables heating power, etc.
- **Data source and verification**
 - The industrial association estimates data, lack of verification channel, solar power collector area, heat pump system
 - The calculation and verification of annual newly increased data and inventory data: solar heat collector area, heat pump system, marsh gas system

The benchmark of current calculation method underestimates heating and fuel

	Primary energy	End use energy
Renewables electricity	Green	White
Solar heating	White	Orange
Geothermal thermal	White	Orange
Heat pump system	White	Orange
Biomass boiler	Green	White
Biomass gas fuel	White	Orange
Biomass liquid fuel	White	Orange

报告提纲

- 定义和分类
- 现有的统计体系
- 已纳入国家能源统计体系的可再生能源
- 尚未纳入国家能源统计体系的可再生能源
 - 各种技术的统计现状和问题
- 正在开展的研究工作

Outline

- **Definition and Classification**
- **Existing Statistical System**
- **Renewables included in National Energy Statistics System**
- **Renewables not included in National Energy Statistics System**
 - Status Quo and Problems of various statistical technologies
- **Ongoing Researches**



正在开展的工作

- 国家统计局、国家能源局、世界银行联合支持“非电可再生能源统计工作方案研究与设计”课题
- 国家发改委能源所负责，联合国国际可再生能源署等国内机构
- 可再生能源专家和统计专家联合开展工作
 - 开展统计现状的调研：管理层面、项目层面、技术层面等
 - 研究分析存在的问题：总体问题，各技术的问题
 - 研究设计各种技术应用的计算和核算方法
 - 研究设计非电可再生能源统计的工作方案
 - 研究设计可再生能源统计制度

Ongoing work

- **National Bureau of Statistics, National Energy Administration, and the World Bank jointly support the research on “research and design of the scheme of non-electrical renewables statistics”**
- **Undertaken by Energy Research Institute of National Development and Reform Commission, jointly with IREAN**
- **Collaboration between experts in renewables and statistics**
 - Conducting surveys on status quo of statistics: management aspect, project aspect, technical aspect, etc.
 - Studying and analyzing existing problems : general problems, various technical problems
 - Studying and designing the calculation and accounting methods of various technical applications
 - Studying and designing the scheme of non-electrical renewables statistics
 - Studying and designing the renewables statistical system

统计工作已有良好的开端和进展

- 一些可再生能源技术已纳入国家能源统计体系
 - 可再生能源电力，统计体系已建立
 - 生物质液体燃料，已纳入制度
 - 热电联产的供热，已有数
- 非电可再生能源统计已起步，但缺乏统一协调
 - 各政府主管部门
 - 地方政府
 - 行业协会
- 跨部门的合作研究已经起步

问题和挑战

- 未纳入的可再生能源技术还有很多
 - 供热：太阳能供热、生物质锅炉供热、地热水热型供热、热泵供热
 - 生物质气体燃料
- 统计管理问题
- 能源品种和统计范畴问题
- 计算方法和核算问题
- 数据来源和校核问题

非化石能源占比是政府重要的评价指标，统计工作很重要

现有的统计调查体系难以应对分布式可再生能源，需统计体系创新

Conclusion

Statistical work has sound start and progress

- Some renewables technologies have been included in national energy statistical system
 - Renewables electricity, statistical system has been established
 - Biomass liquid fuel has been included in the system
 - Data available for heat supply by combined heat and power generation
- Non-electrical renewables statistics has been initiated , but lack of unified coordination
 - Various competent departments of government
 - Local government
 - Industrial association
- Researches on trans-departmental cooperation has been initiated

Problems and challenges

- There are many renewables technologies not included
 - Heat supply: solar heating, biomass boiler heating, geothermal and hydrothermal heating, heat pump heating
 - Biomass gas fuel
- Statistical management
- Energy varieties and statistical scope
- Calculation method and accounting
- Data source and verification

The percentage of non-fossil energy is an important evaluation indicator of the government, and statistical work is very important. The current statistical survey system can hardly deal with the distributed renewables, and needs statistical system innovation.

谢谢!

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THANKS!

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