



转型时期可再生能源政策  
供热与供冷

Renewable Energy  
Policies in a Time of  
Transition

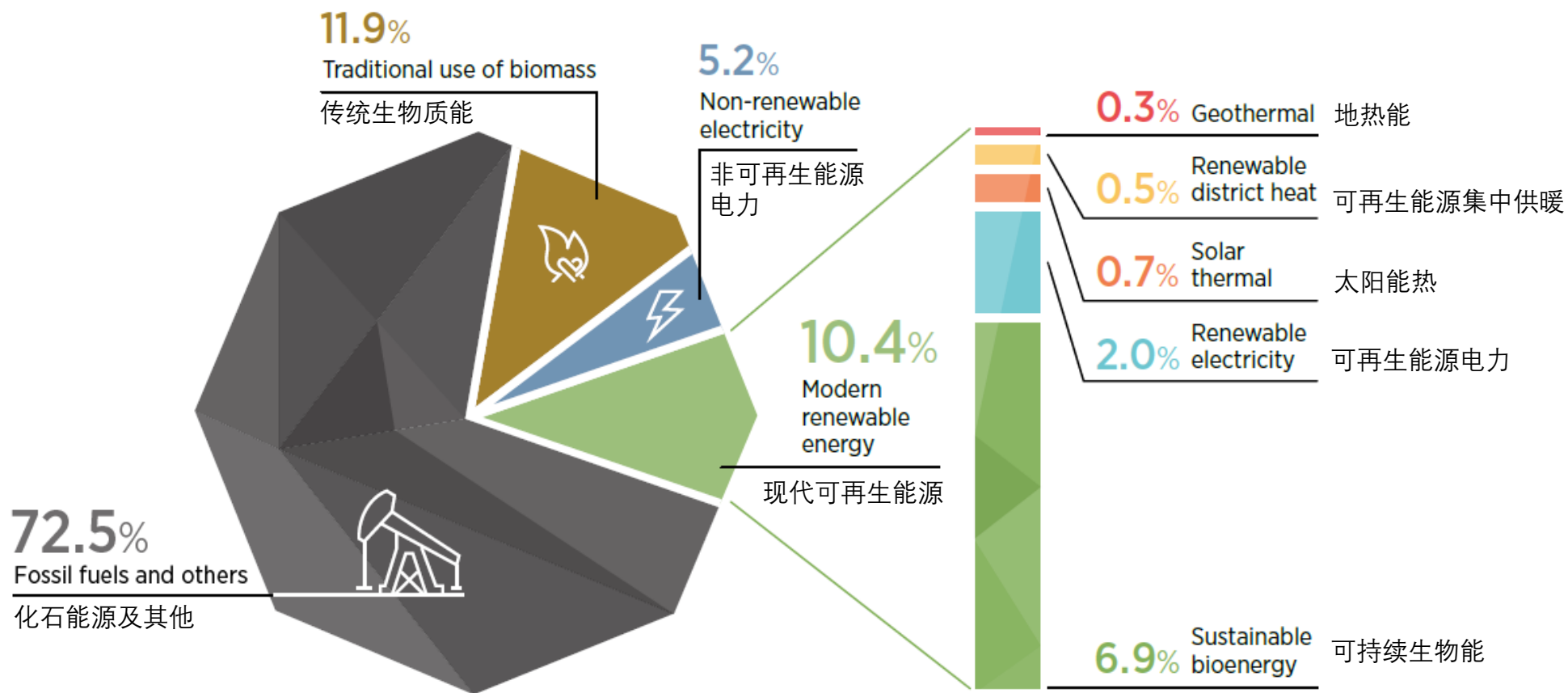
Heating and Cooling

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09 March 2021

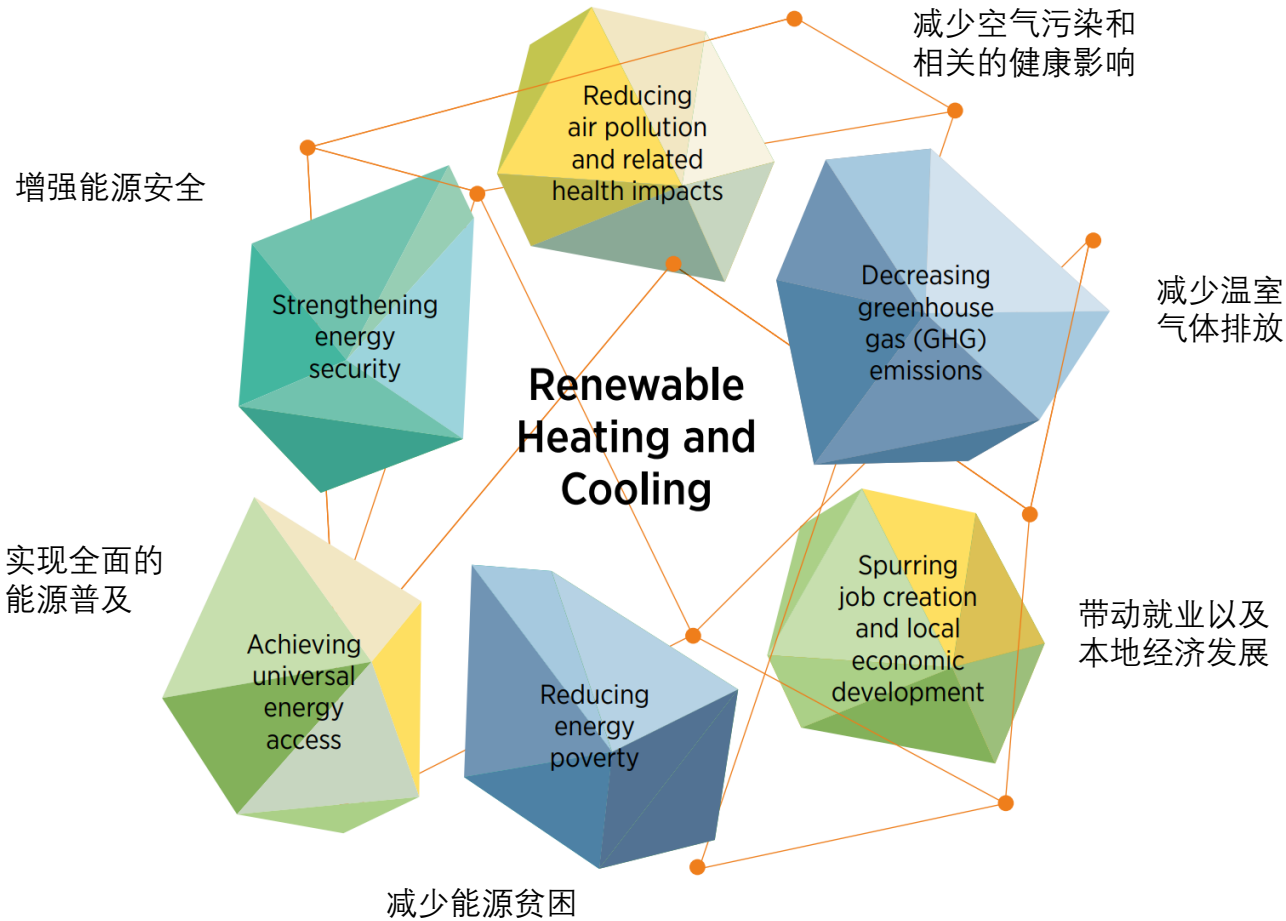
冯金磊  
项目官员-政策建议  
国际可再生能源署  
2021年3月9日

# Fossil fuels still dominate 化石能源仍占主导地位

Share of energy sources in total final energy consumption of heating and cooling, 2019  
2019年各能源类别占供热与供冷最终能耗的比例。



# Widespread potential benefits 无处不在的环境和社会效益



# Existing barriers limit uptake

## 现有障碍限制了发展

### Political and institutional barriers

- Lack of political commitment, including to universal access to energy
- Weak institutional structures (heat markets are complex, fragmented and not well understood)
- Inadequate data and statistics on types and amounts of energy required to meet heating and cooling needs
- Little awareness among decision makers of impact about the effects on the climate and the environment of using fossil fuels for heating and cooling
- Policy frameworks built around a fossil fuel-based energy system



### Economic and financial barriers

#### Playing field with fossil fuels is still not level, owing to:

- Externalities not accounted for
- Persistent fossil fuel subsidies in many parts of the world

#### High upfront costs, including:

- Capital costs
- Cost of and access to finance
- Unbalanced tax burden



### Other

#### Weak supply chains, including:

- Infrastructure and renewable fuels
- Shortages of trained personnel
- Lack of economies of scale

#### Consumer inertia and behaviour, resulting from:

- Lack of awareness about potential and benefits
- Distressed purchase
- Disruption and "hassle costs"
- Split incentives

#### Technical barriers, including:

- Building suitability
- Industrial heat requirements
- Reliability of technology



### 政治和体制相关的障碍

- 缺乏政治承诺，包括实现全面的能源普及
- 相对较弱的体制结构（相对于复杂，碎片化以及难理解的供热和市场）
- 供热供冷所需的数据相对不完善（类别，数量等）
- 政策制定者对于化石能源供热供冷所带来的气候和环境效果意识不足
- 现有能源政策框架是基于化石能源构建的

### 经济和金融障碍

- 与化石能源的竞争环境不公平， - 前期投资成本较高，包括缘于
  - 资本成本
- 外部性未纳入考量
- 全球许多地区仍存在化石能源补贴
- 融资成本以及渠道障碍
- 不平衡的税负

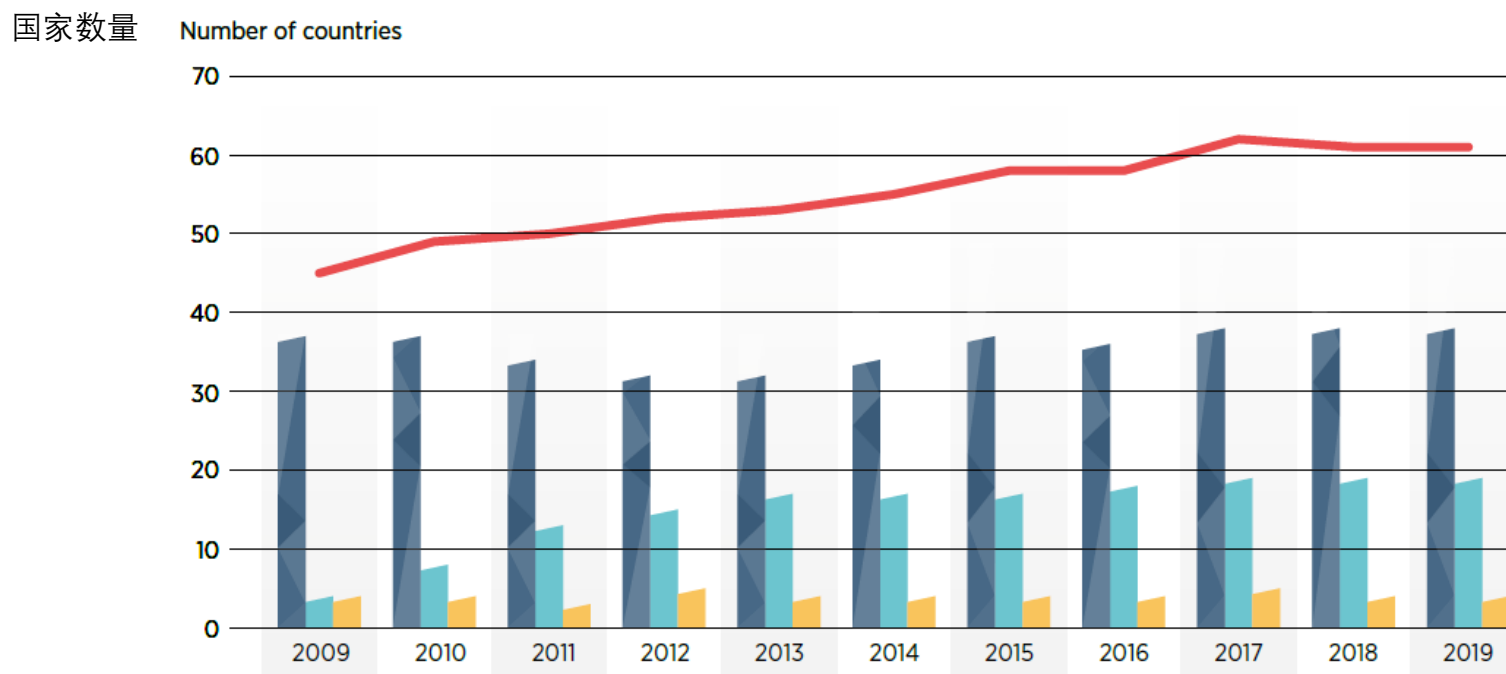
### 其他障碍

- 供应链较弱，包括
  - 可再生能源和基础设施
  - 经培训人员的短缺
  - 缺乏规模经济型
- 消费者不愿改变习惯， - 技术障碍，包括由于
  - 缺乏对于潜在好处的了解
  - 嫌麻烦
  - 激励不对等
- 建筑适用性
- 工业用热的要求
- 技术可靠性



# Policy deficit and stagnation 政策不足且停滞不前

Countries with policies for renewable heating and cooling, 2009-19  
2009至2019年，全球实施可再生供热与供冷相关政策的国家



仅有财政政策的国家  
同时有财政和监管政策的国家  
仅有监管政策的国家

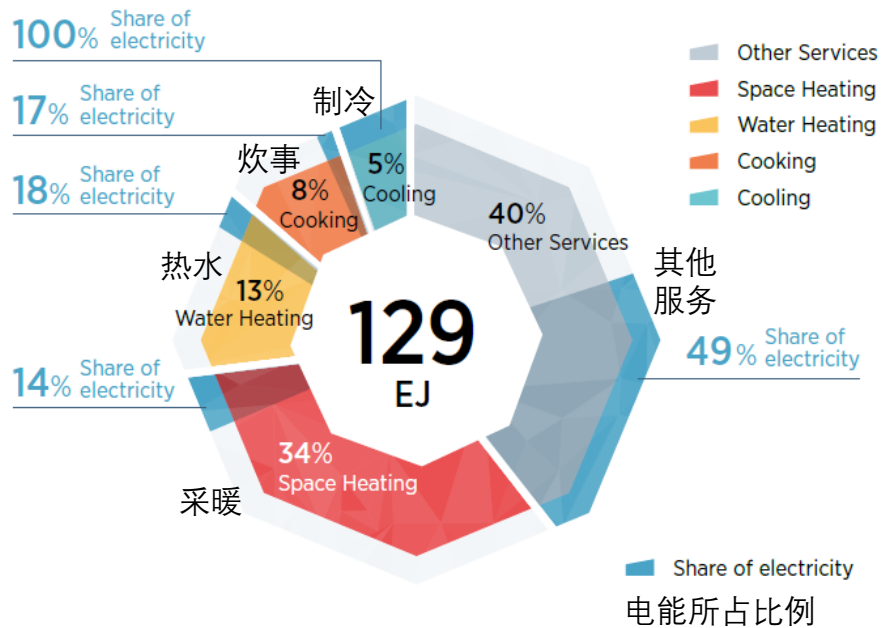
- Countries with only financial policies
- Countries with both financial and regulatory policies
- Countries with only regulatory policies

— Total countries with financial or regulatory policies for renewable heating and cooling  
已有可再生供热与供冷财政或监管政策的国家总数



# Renewables-based electrification 可再生能源为基础的电气化

Global share of electricity in the buildings sector by service, 2019  
2019年全球电力在建筑部门各用能类别中所占比例



Overcoming high upfront cost of appliances (HP)  
解决设备(热泵)的高前期投入

Capital grants, subsidies, loans, rebates  
补助, 补贴, 贷款, 退税等

Addressing high operational costs  
解决高运营成本障碍

Electric heating tariffs, energy efficiency in building codes  
电供热热价, 建筑节能标准

Addressing network constraints  
解决电网限制

ToU tariffs, digitalization, market design  
分时电价, 数字化应用, 市场设计

Increasing consumer confidence  
增强消费者信心

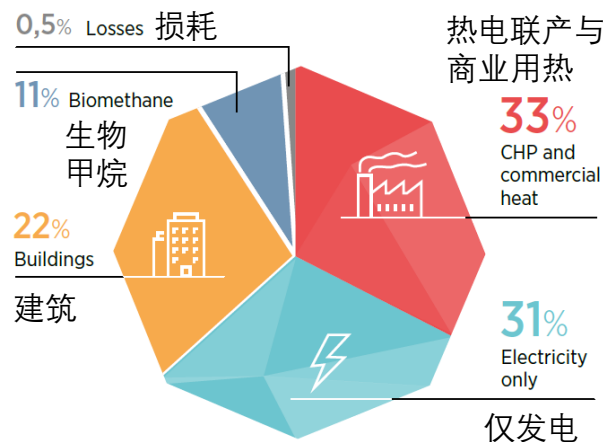
Quality standards, labels, MEPS  
质量标准, 标识, 最低能效标准

Ex: 政策案例

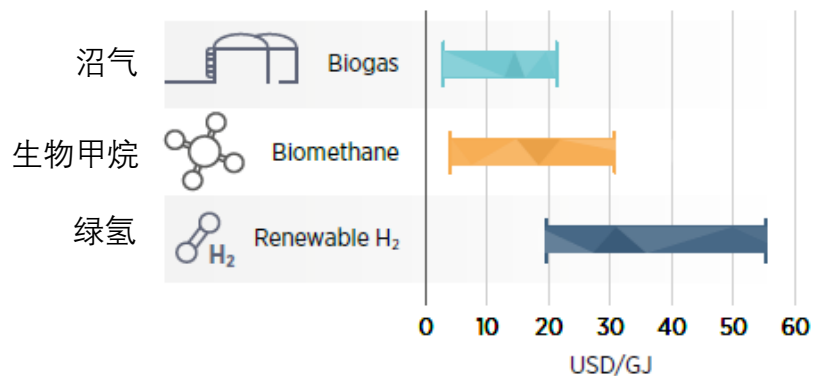
- **China's** Clean Winter Heating in Northern Regions pilot program 中国北方地区冬季供暖项目
- **UK's** Renewable Heat Incentive 英国可再生能源供热激励
- **Illinois'** ToU tariffs (US) 美国伊利诺斯州分时电价政策

# Renewable gases 可再生气体燃料

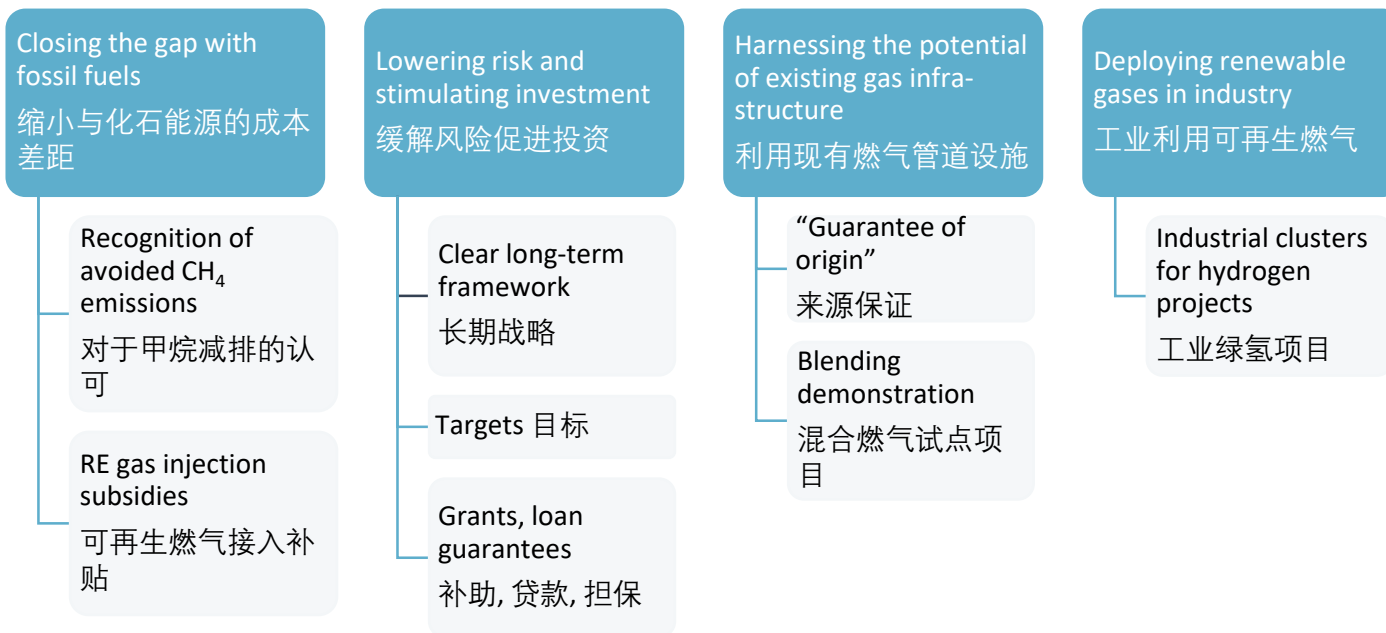
Biogas use by end use, 2017  
2017年全球沼气用途比例



Renewable gas production cost range, 2018  
2018年可再生气体燃料生产成本范围



Biogas production by region and by feedstock and end use, 2017

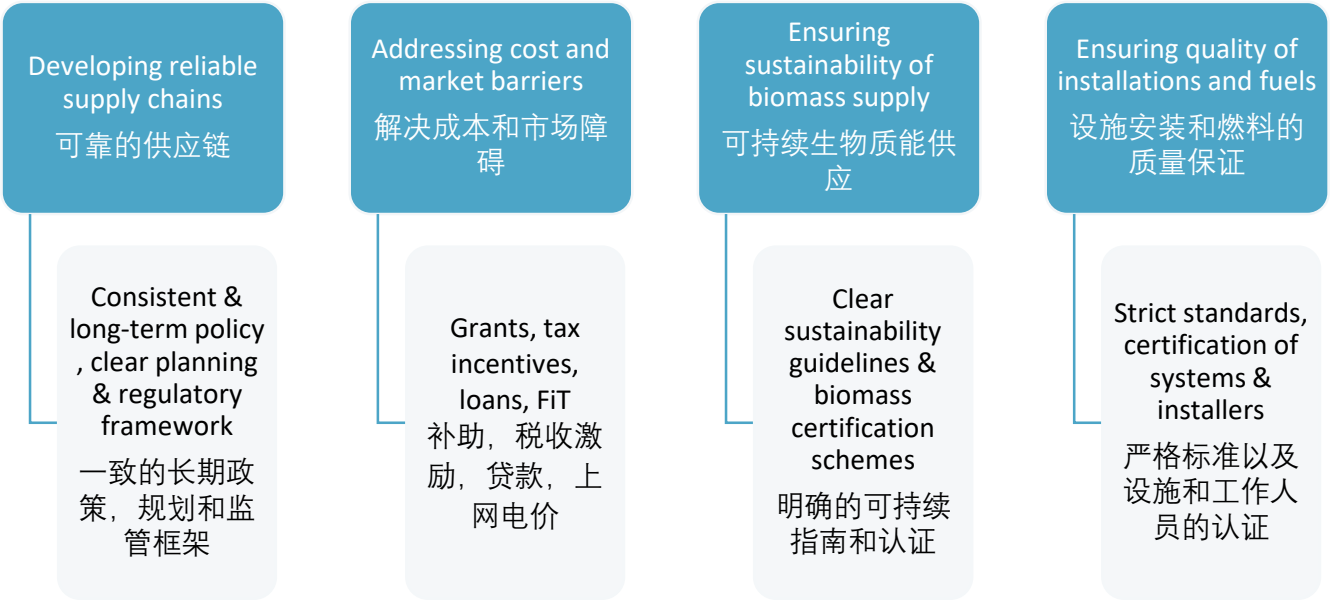
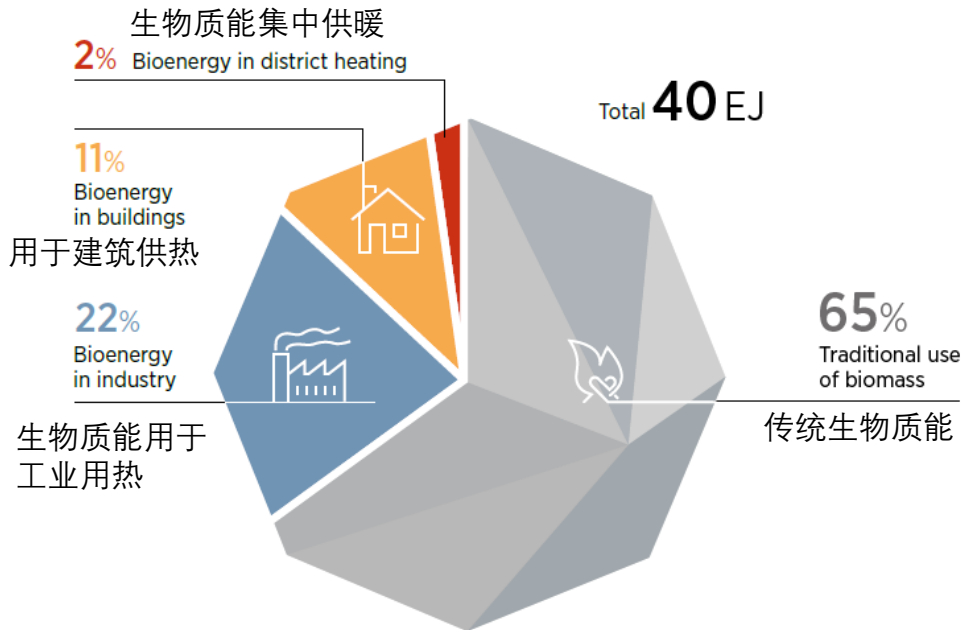


**Ex:** 政策案例

- **Denmark's target** : 100% of gas injected into its grid renewable by 2035; 丹麦的目标: 2035年管道燃气全部为可再生能源
- **France's target** : 10% of renewable gas consumption by 2030; 法国的目标: 2030年可再生燃气占消费量的10%
- **California's low carbon fuel standard**; 加州的低碳燃料标准
- Port of **Rotterdam's** hydrogen hub project; 鹿特丹港的氢能枢纽战略

# Sustainable use of biomass 可持续生物质能

Bioenergy used for heating, 2018  
2018年用于供热的生物燃料



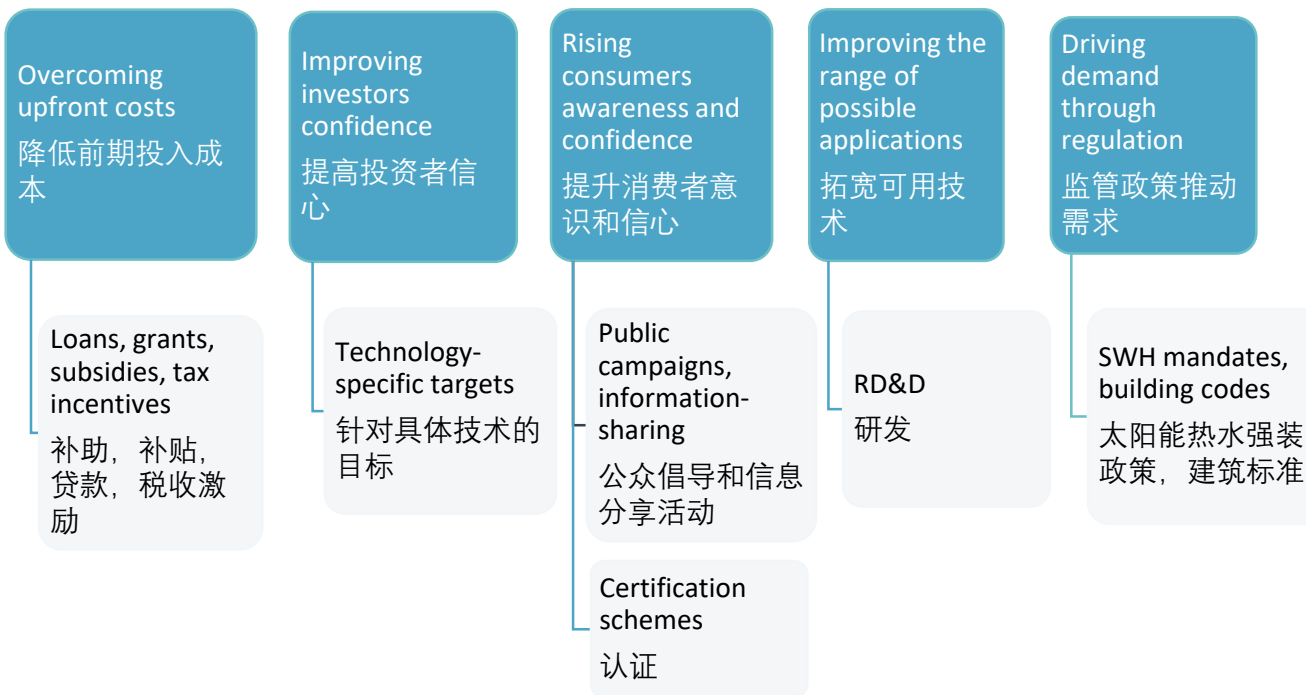
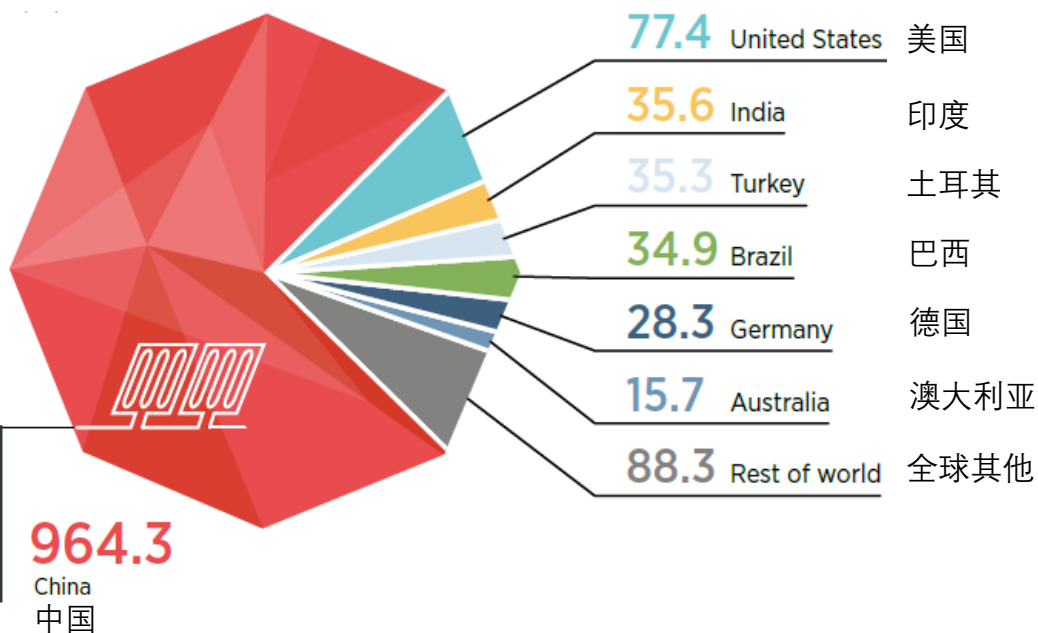
Ex: 政策案例

- Italy's « Conto termico » (grants) & France's « Fonds Chaleur » (subsidies) 意大利供热补助和法国的供热补贴项目
- Loan support for biomass CHP from Brazil's development bank 巴西发展银行对于生物质能热电联产项目的贷款支持
- India's grant scheme for industrial-scale biomass co-generation 印度对工业规模生物质热电联产的补助政策
- Sustainability criteria in the EU RED II Directive 欧盟可再生能源指令对于可持续生物质能的标准



# Direct use of solar thermal heat 太阳能热利用

Solar thermal heat use by country, 2017 (PJ)  
2017年各国太阳能热利用规模

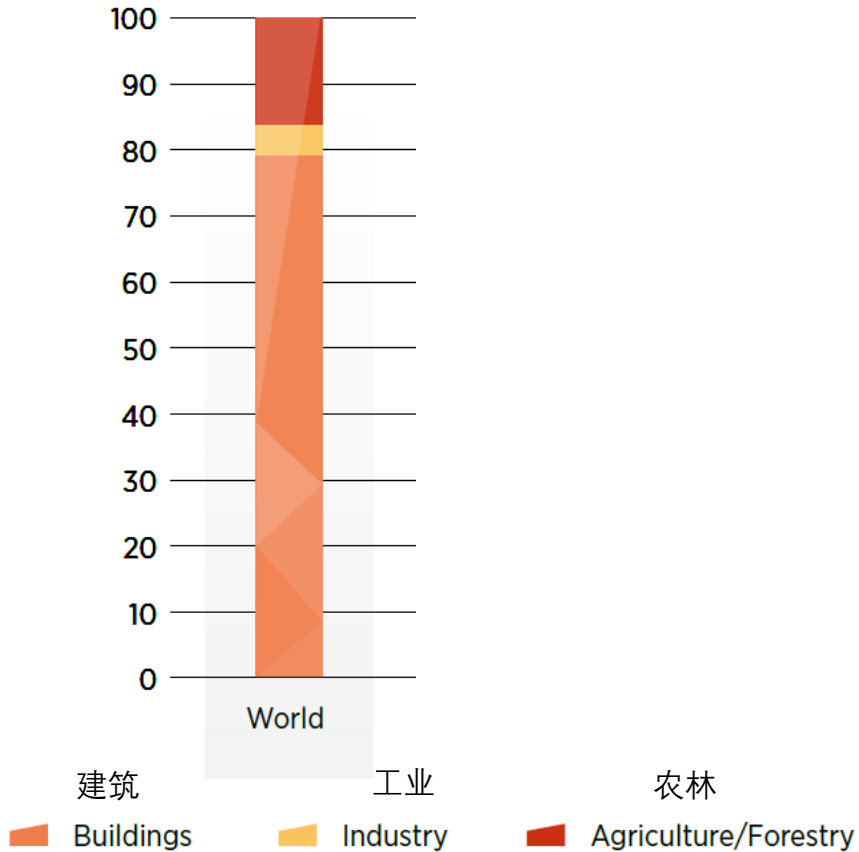


Ex: 政策案例

- **China's** SWH deployment was supported by a mix of **targets, subsidies** and **mandates** 中国的太阳能热水系列政策包括目标, 补贴以及强制安装政策等
- Combination of **grants, tax exemptions** and preferential **loans** in **Tunisia (PROSOL), Rwanda (SolaRwanda) & Lebanon** 突尼斯, 卢旺达, 黎巴嫩等国对于太阳热利用的补贴, 贷款优惠等项目
- Solar thermal District Heating in **Denmark** developed thanks to **high fossil fuel taxes** 丹麦的高化石能源税推动了太阳热集中供暖项目的发展

# Direct use of geothermal heat 地热能直接供热

Geothermal heat use by sector, 2020 (%)  
2020年全球地热直接供热各部门利用比例



De-risking geothermal exploration  
降低地热开发风险

**Data collection and sharing on geothermal resources**  
地热资源数据的收集和分享

**Dedicated loan guarantees and grants**  
针对性贷款担保和补助

**Risk insurance funds**  
风险保险基金

Improving investors confidence  
提升投资者信心

**Road maps and action plans**  
路线图和行动方案

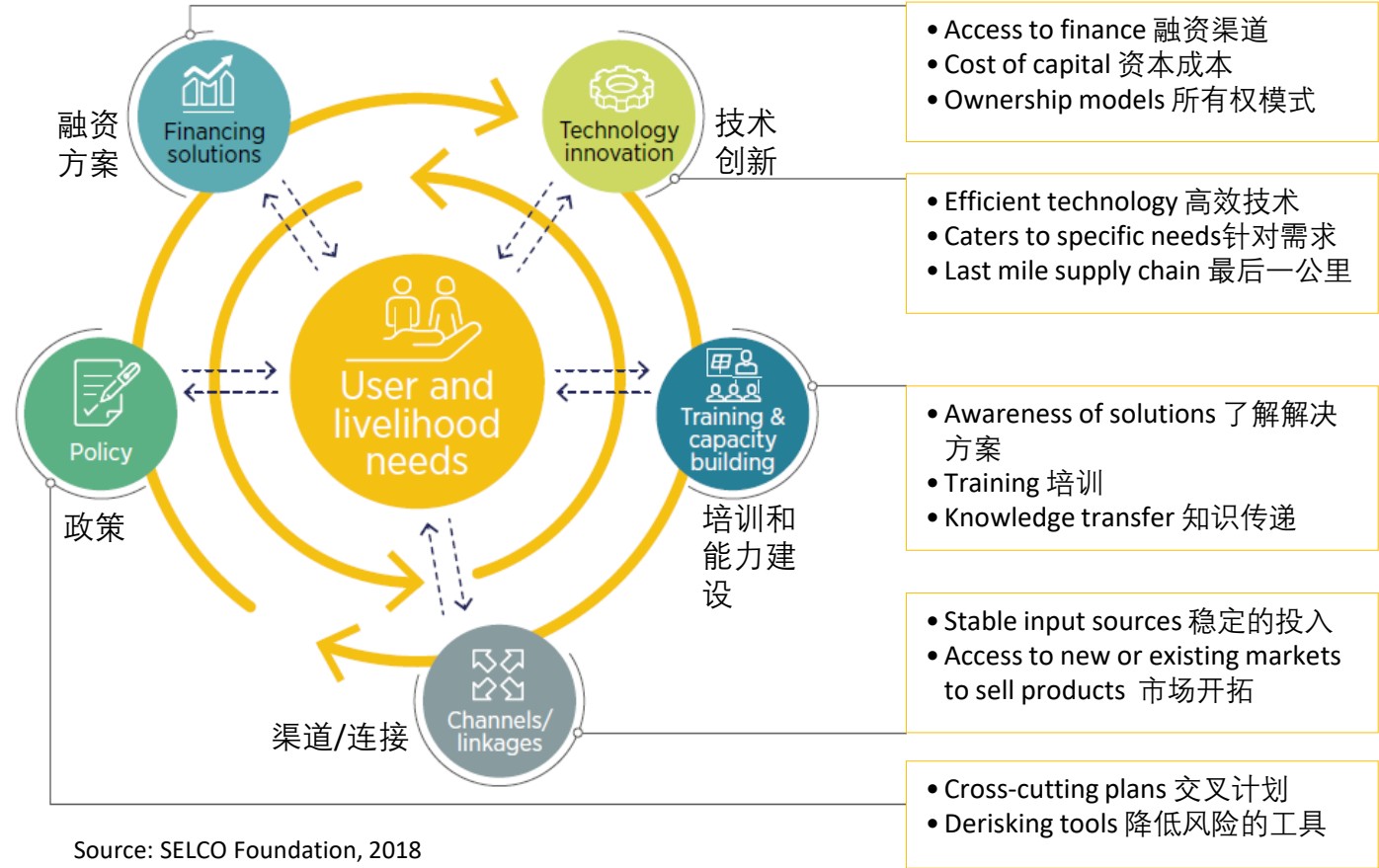
Overcoming high upfront costs  
解决高前期投入问题

**Tax incentives, loans**  
税收激励和贷款

Ex: The Netherlands 政策案例：荷兰

- *Geothermal Action Plan (2011) & Acceleration Plan for Geothermal Energy in Horticulture (2014)*
- 2011年地热行动方案和2014年园艺行业利用地热促进方案
- SDE+ feed-in-premium for renewable heat 可持续能源生产激励项目中的可再生供热补贴
- Public geological database 公共的地质数据库
- Post-damage guarantee scheme 损坏后担保
- Collaborative venture programme between government and industry for information sharing 政府与行业合作投资的信息共享项目

# Universal access to clean, affordable, reliable energy 全面普及清洁,可负担和可靠的能源



# Raise ambition 提升雄心



## Xi Jinping: China will aim for carbon neutrality by 2060

South Korea formally commits to cutting emissions to net zero by 2050

Published on 28/10/2020, 3:01pm

President Moon Jae-in's announcement follows a three-day visit by Cop26 president-designate Alok Sharma to South Korea

Japan net zero emissions pledge puts coal in the spotlight

Published on 26/10/2020, 2:35pm

Prime minister Yoshihide Suga has promised to "fundamentally shift" Japan's coal policy to achieve carbon neutrality by 2050

Denmark adopts climate law to cut emissions 70% by 2030

Published on 06/12/2019, 11:15pm

New law binds Denmark to international climate process, including climate finance to developing countries

France sets 2050 carbon-neutral target with new law

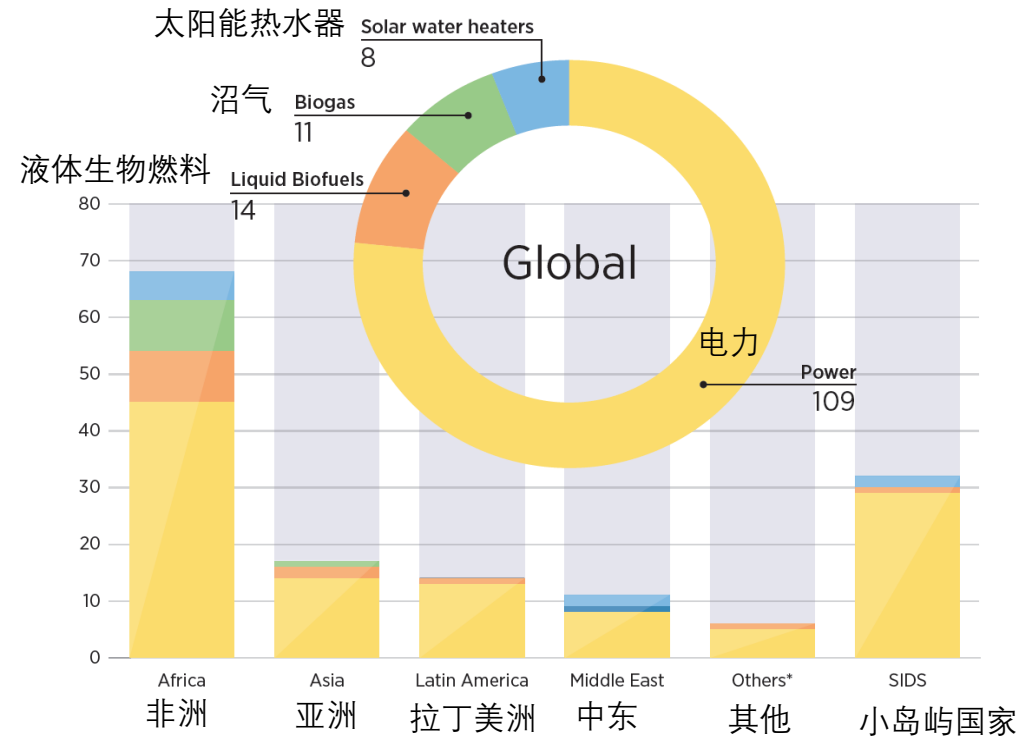
By Bate Felix

3 MIN READ



Sweden Plans to Be Carbon Neutral by 2045

## Renewable energy targets in the NDCs, 2020 2020年各国国家自主贡献中的可再生能源目标

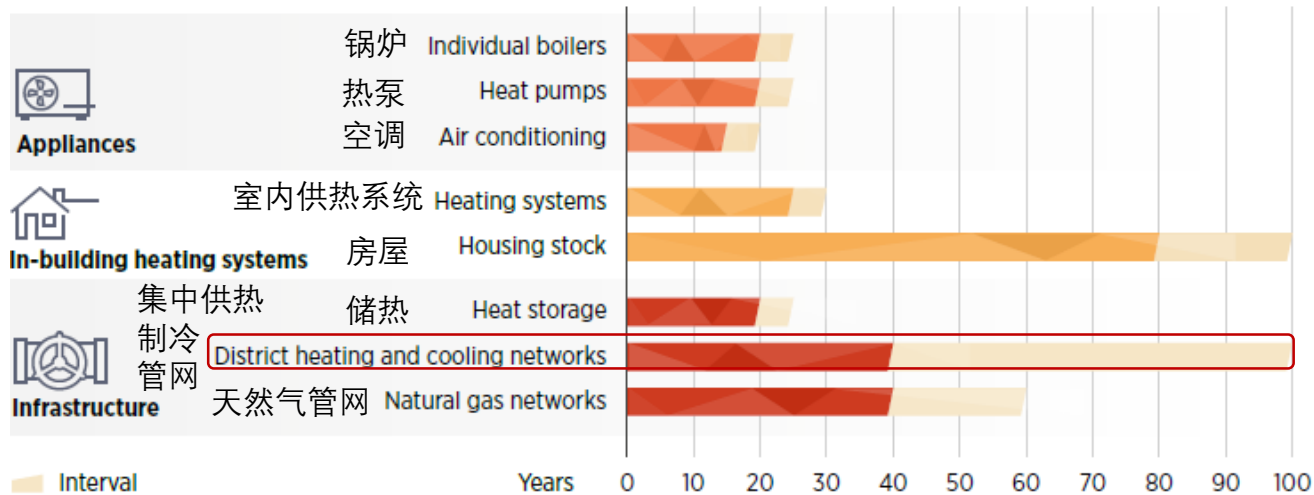


太阳能热水器 Solar water heaters  
 沼气 Biogas  
 液体生物燃料 Liquid biofuels  
 电力 Power

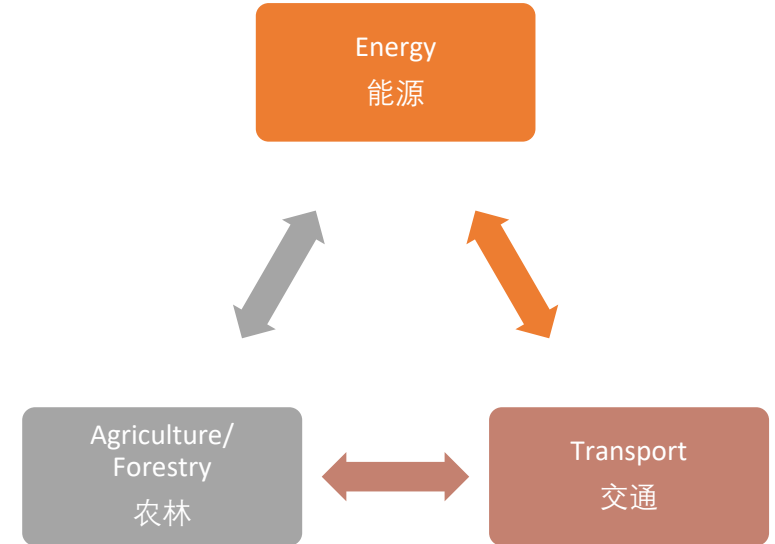


# A coordinated and integrated long-term plan 协调与整合的长期规划

Operating lifetime of heating and cooling infrastructure, systems and appliances  
供热供冷相关基础设施，系统和设备的使用期限



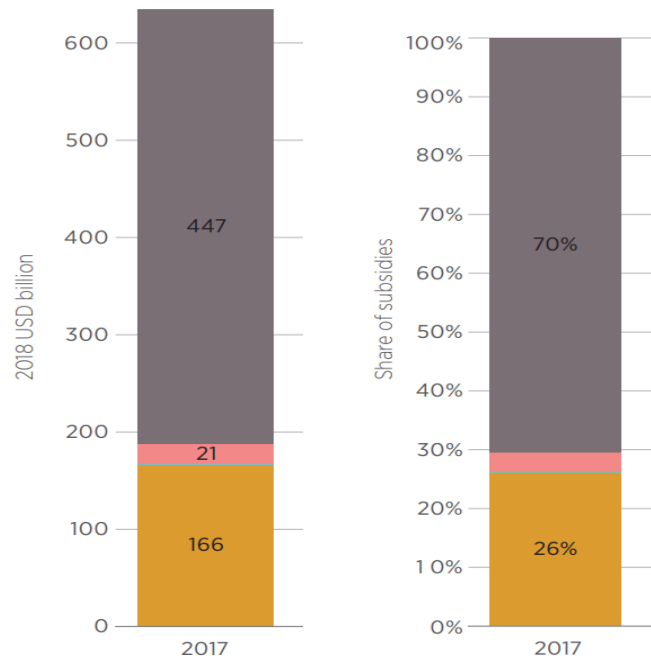
Intersectoral coordination  
跨部门协调



# Level the playing field 创造公平竞争环境

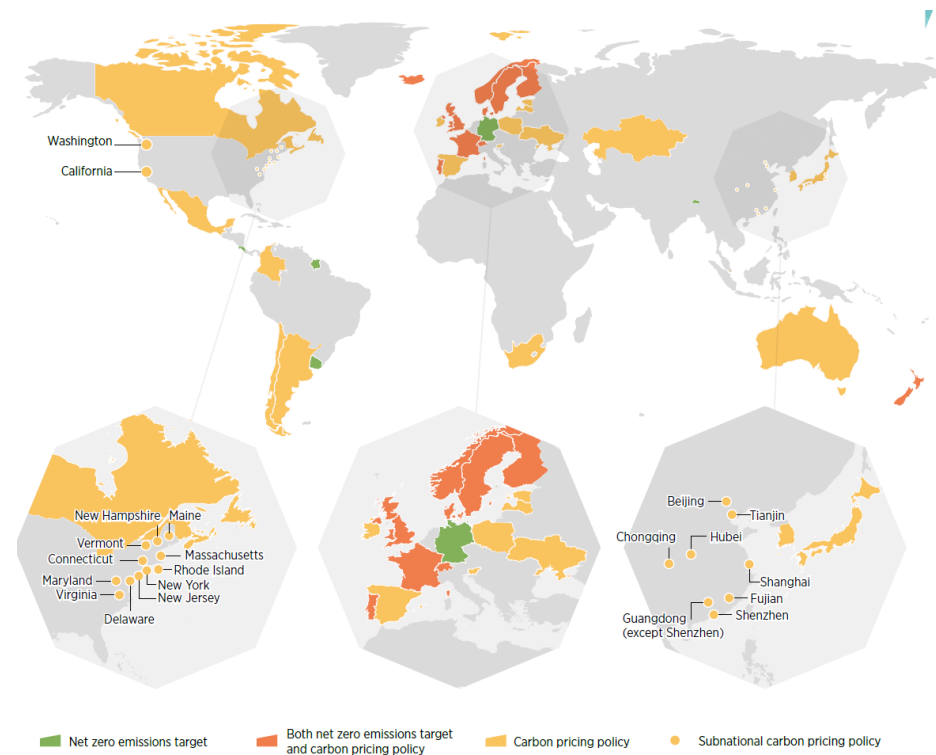
Energy sector subsidies by source excluding climate and health costs, 2017

2017年全球不同品类能源补贴，未考虑气候及健康成本



化石能源 Fossil fuels    核能 Nuclear    可再生能源 Renewables  
 电动汽车 Electric vehicles    能效 Efficiency

Jurisdictions with selected climate change policies, early 2020  
2020年初全球实施气候变化政策的国家和地区

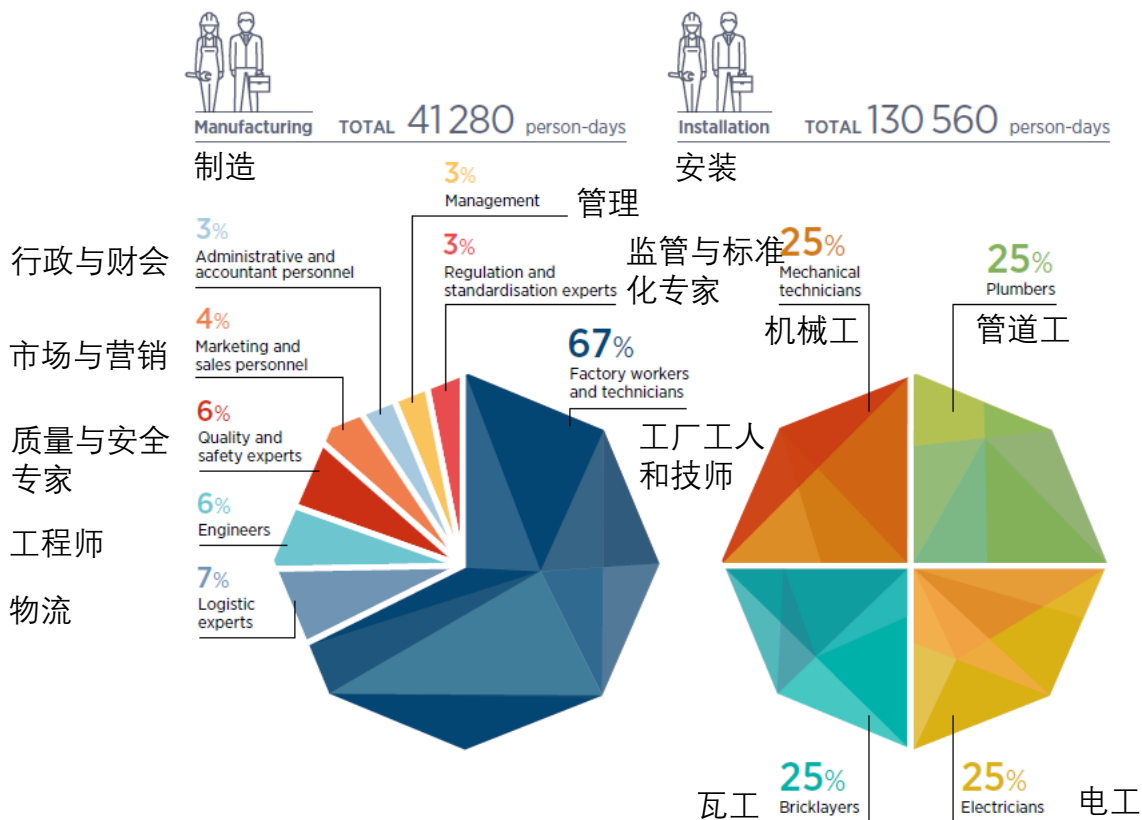


■ Net zero emissions target    ■ Both net zero emissions target and carbon pricing policy    ■ Carbon pricing policy    ● Subnational carbon pricing policy  
 净零排放目标    净零排放目标及碳定价政策    碳定价政策    省市级碳定价政策

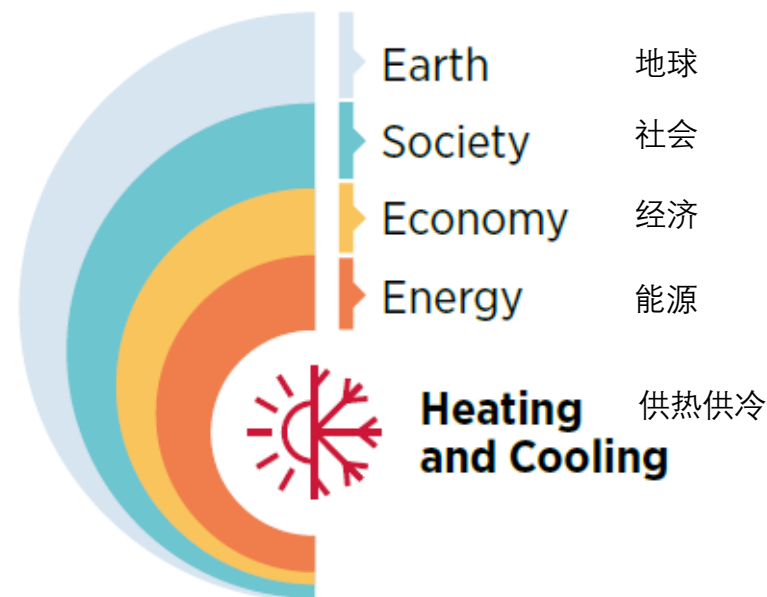
# Ensure a just inclusive transition 确保包容和公正转型



Human resources required for the manufacturing and installation of SWHs for 10 000 single-family households, by occupation  
为一万户家庭生产和安装太阳能热水器所需人力资源投入



The broad dimension of renewable energy policy making  
可再生能源政策制定中更宽泛的维度



# Thank you!



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