

DISTRICT ENERGY IN CITIES



A Global Initiative to Unlock the Potential of Efficiency
and Renewable Energy
城市区域能源：释放能效和可再生能源的潜力

蒋南青 Nanqing Jiang

联合国环境规划署 United Nations Environment Programme China (UNEP)



The Initiative “Sustainable Energy For All”

人人享有可持续能源

- **Launch:** September 2011 by UN Secretary-General Ban Ki-moon
- **Vision:** make sustainable energy for all a reality by 2030
- **Mobilize action** from all sectors of society in support of three interlinked objectives

The 2030 Goals:

1. Ensure universal access to modern energy services.
2. **Double the global rate of improvement in energy efficiency.**
3. Double the share of renewable energy in the global energy mix.



Sustainable Energy For All Initiative 全球能效加速器平台

Sustainable Energy for All
(SE4All) Sub-Committee's



Co-chairs:

- UNEP Executive Director
- CEO Accenture
- Minister for Trade and Development Cooperation, Denmark

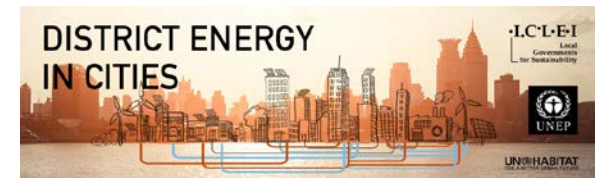
Global Energy Efficiency Accelerator Platform: to scale up efficiency gains and investments at the national, sub-national and city levels through technical assistance, support and public-private sector collaboration

Individual accelerators focus on specific energy efficiency sectors

- Buildings
- Transport
- **DISTRICT ENERGY**
- Lighting
- Appliances & Equipment

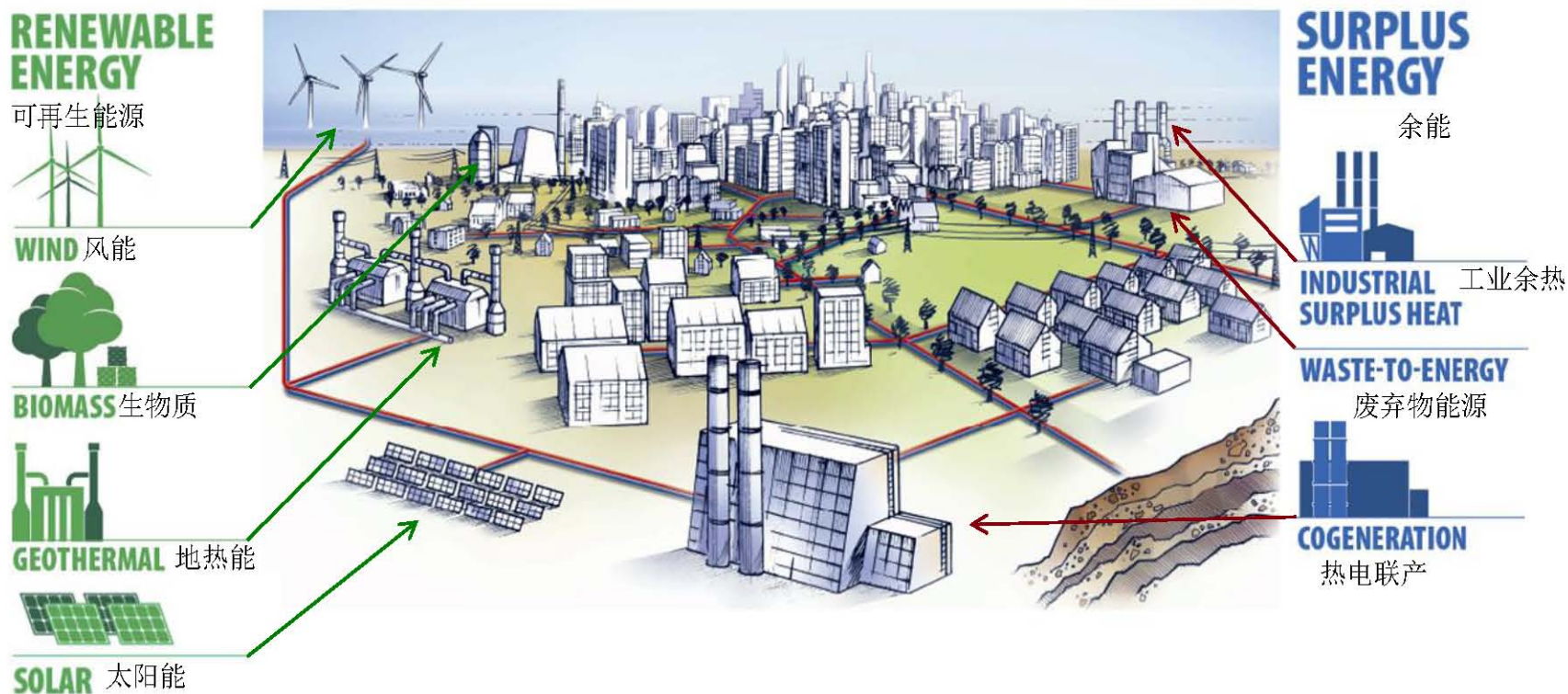


**GLOBAL ENERGY EFFICIENCY
ACCELERATOR PLATFORM**

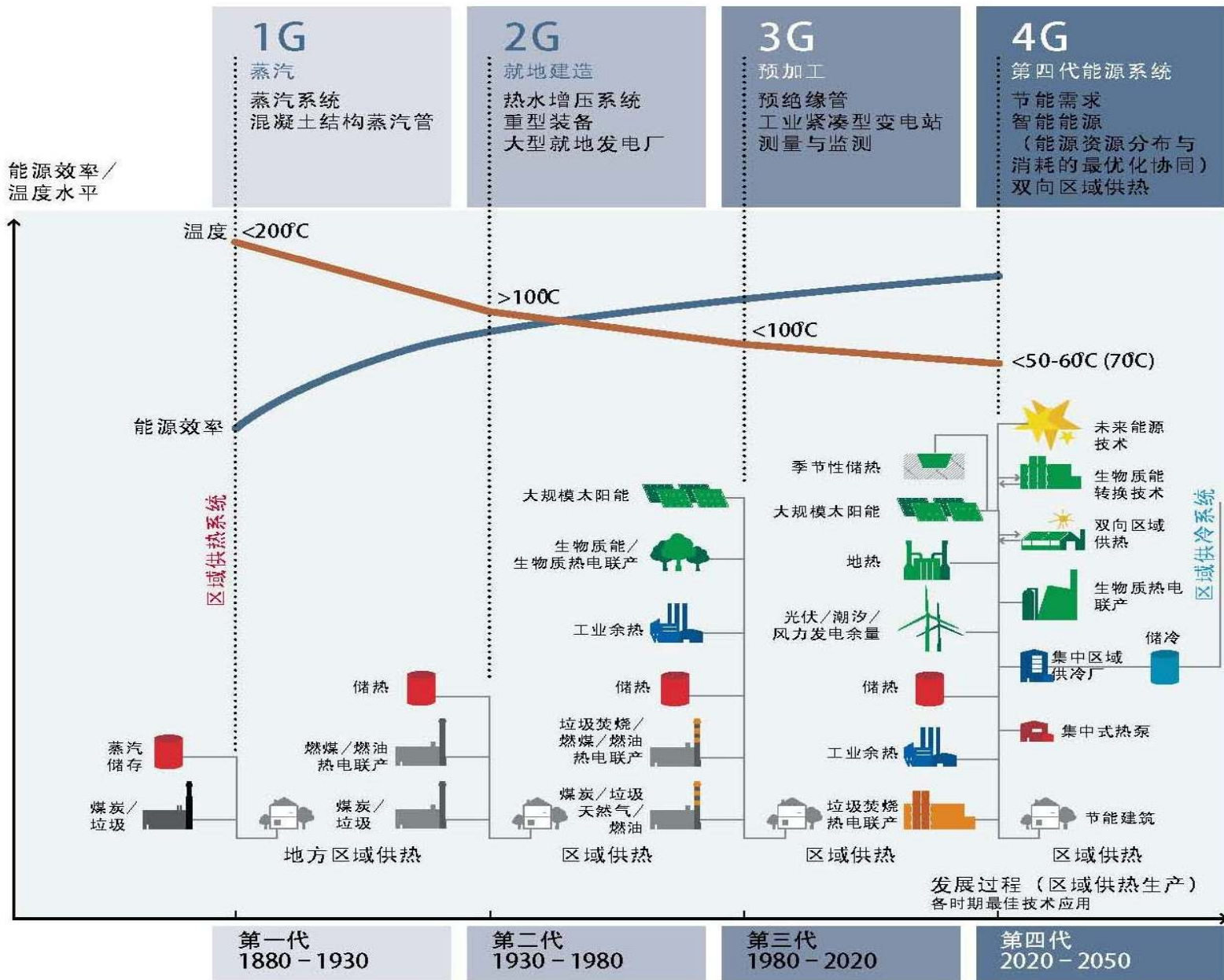


District Energy – where are we headed? 区域能源 – 未来的新热源

Urban leaders are embracing a new vision for supplying energy to their cities, one that combines local renewables, cogeneration plants and district energy in one low-carbon network. 城市领导者在城市能源供应方面勾画了一副新图景 – 将本地可再生资源、热电厂和区域能源整合为一个低碳网络。

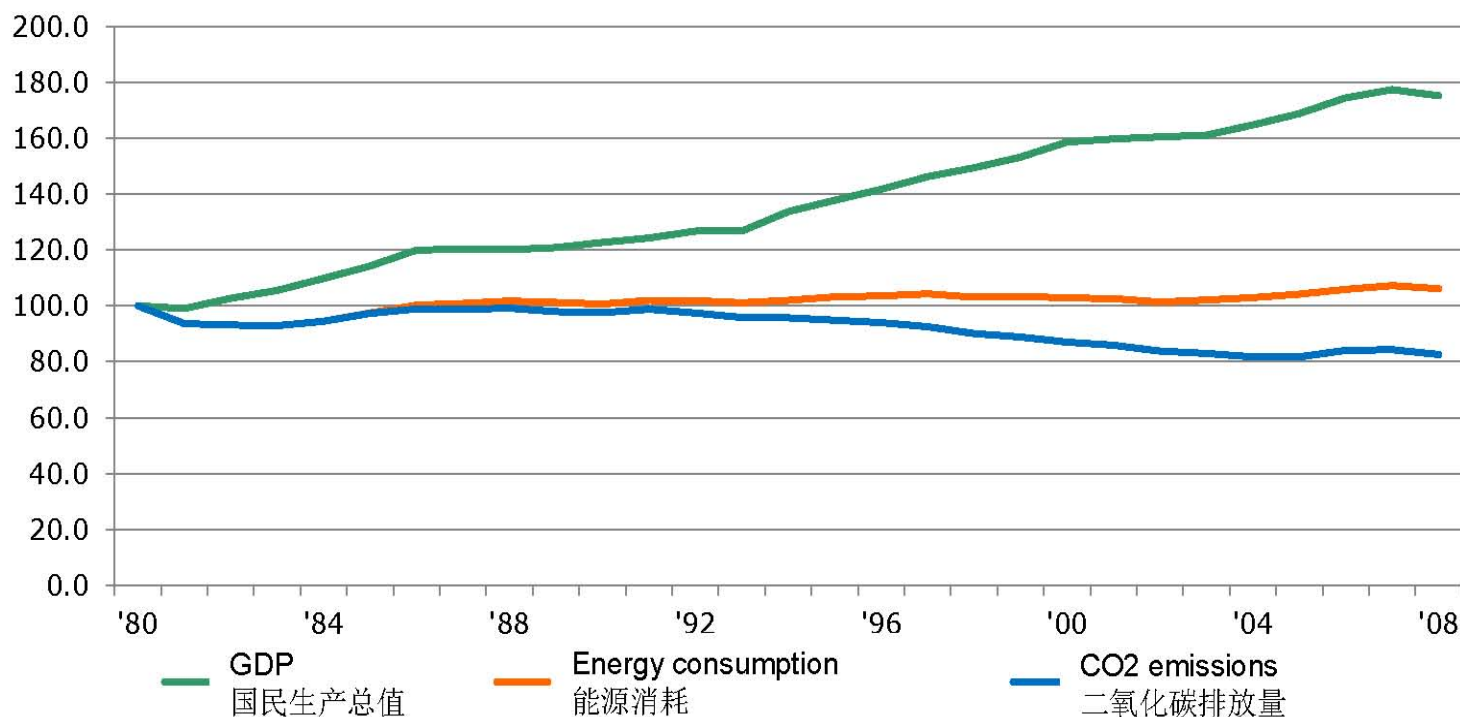


区域能源网络的发展历史、现状及趋势



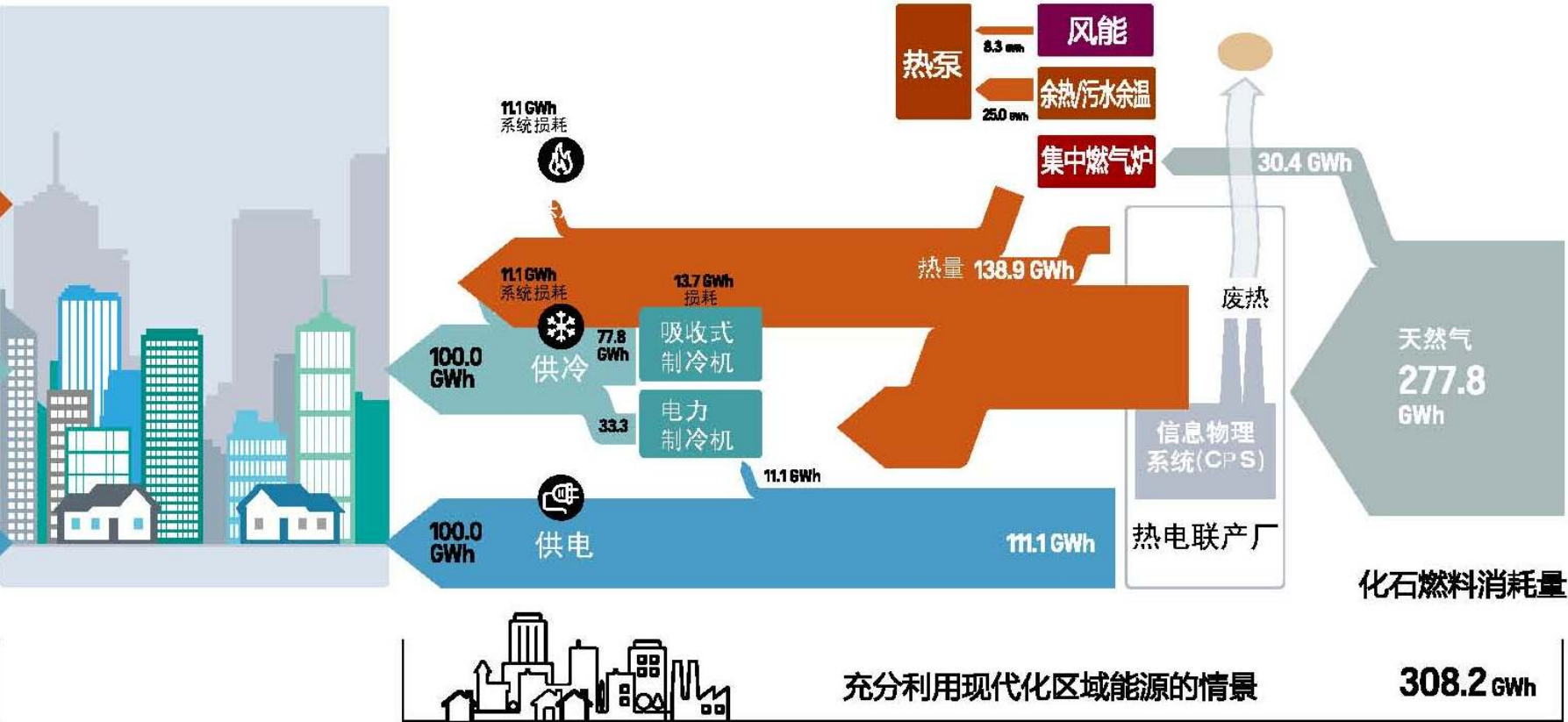
Energy consumption and carbon emission decoupled from GDP growth 丹麦的能源消耗及碳排放与GDP增长脱钩

(1980 = index 100)



Since 1980, Denmark's GDP kept steady growth, while its energy consumption remained almost unchanged and carbon emission even dropped due to the development of energy in replacement of traditional fossil fuels. 从1980年以来，丹麦在GDP保持稳步增长的同时，能耗基本持平，再加上发展新能源取代传统能源，二氧化碳排放量未升反降。

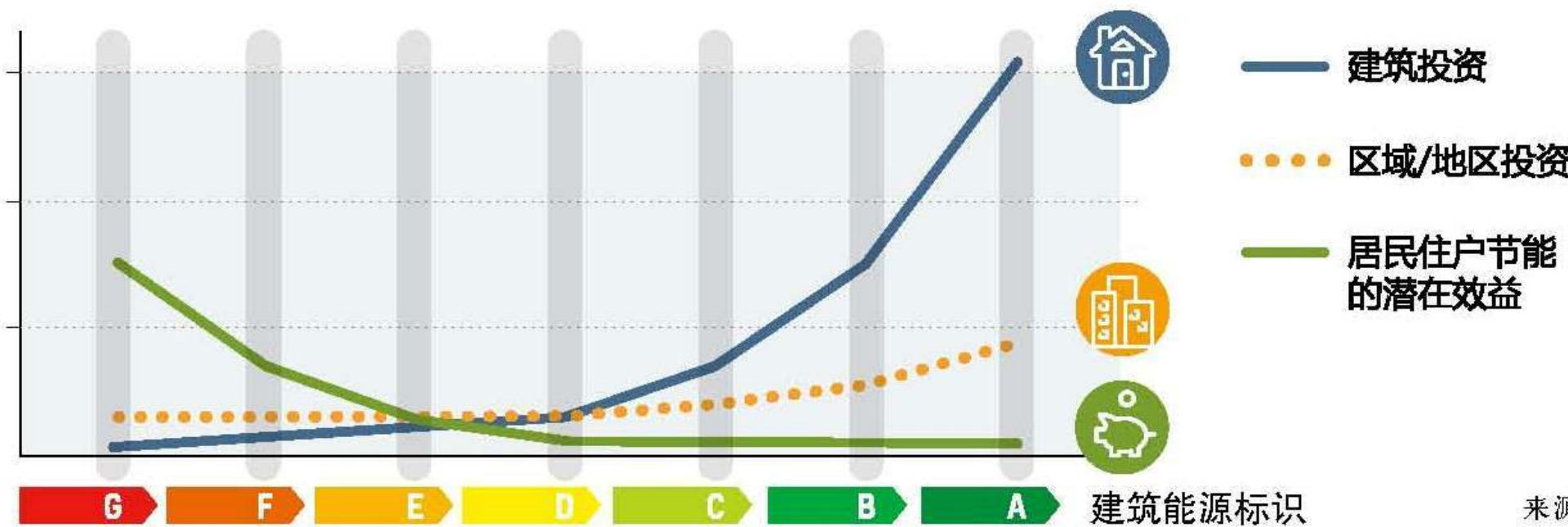
电力需求方



充分利用现代化区域能源的情景

308.2 GWh

图 1.5 鹿特丹建筑节能改造投资回报与区域能源投资回报对比



来源



Key Findings: Multiple Benefits and Policy Objectives 多赢和政策目标

**Energy Efficiency
and Access**



**Local and Renewable
Sources**



Meet Tomorrow's Energy Needs
by
Leapfrogging to Modern District
Energy Systems Today!



**GHG Mitigation
Improved Air Quality**

**Green Economy
Resilience**



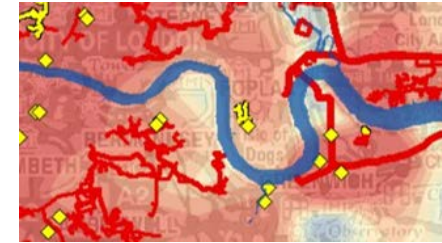


Key Findings: The importance of local governments 地方政府的重要性



**Strategy and
Targets**

**Integrated energy planning
and mapping**

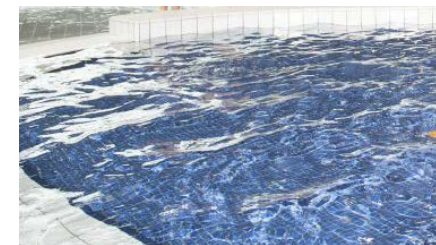


**Local governments
地方政府**

\$ € £ ¥

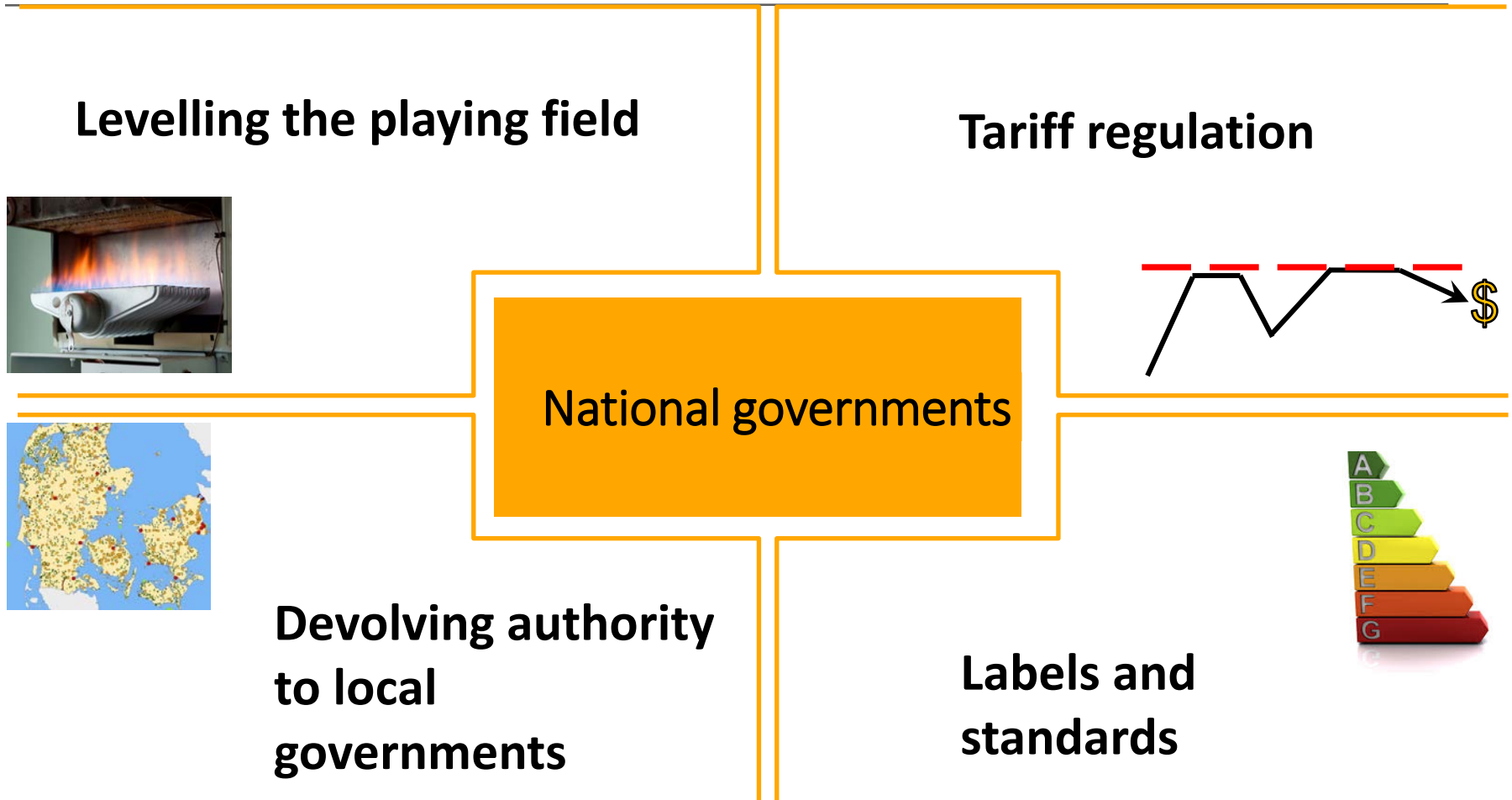
**Facilitating
Finance**

**Consumers and
Providers**





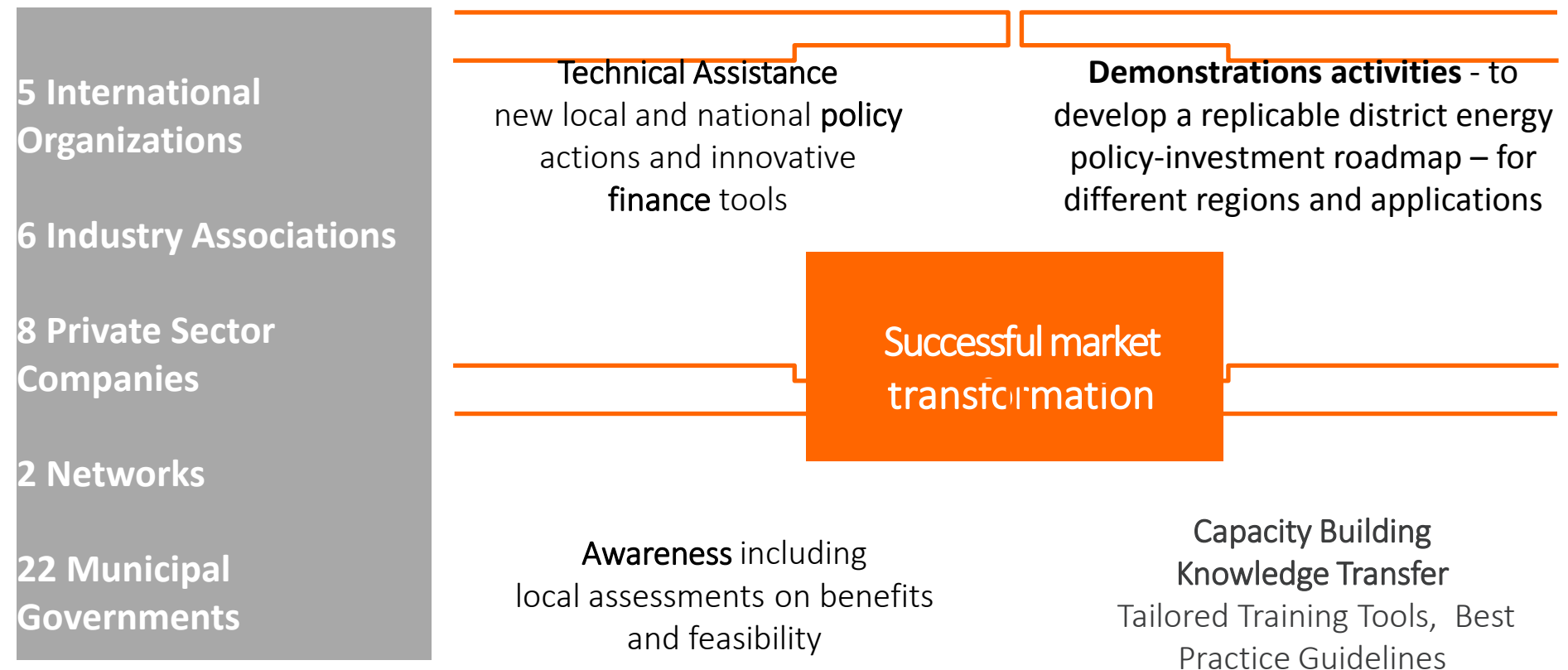
Key Findings: The importance of national governments 中央政府的重要性



The Global District Energy in Cities Initiative: Scope of Activities

全球区域能源城市倡议

Leveraging the Partnership and Pool of Expertise to Provide





District Energy in Cities Publication: Decision Tree and Training Tool-kit

45 CITIES AROUND THE WORLD



Why?

Why choose district energy?

When?

When to develop district energy?

What?

What initial steps should cities take?

How?

How to accelerate district energy?

Types of city engaged in district energy

城市类型

Consolidation

- Very mature market for district energy with above 50 per cent of the market share for heating or cooling of buildings.

Refurbishment

- Very high market share of district energy
- However systems need some refurbishment in order to increase customer confidence, energy efficiency and profitability.

Expansion

- District heating and cooling systems appear in some areas, but the total market share remains low (15–50 per cent).
- Genuine interest in increasing the market share.

New

- District energy has a very low market share (0–15 per cent).
- The city is in the process of stimulating district energy, with small starter networks or demonstration projects envisioned.

Example cities 案例城市

Consolidation

- Many cities in Nordic countries particularly Denmark
- Frankfurt
- Gothenburg
- Seoul

Refranchisement

- Many cities in China, Russia, Mongolia, and Eastern and South-eastern Europe

Reinvention

- Rotterdam
- Dubai
- Vancouver
- Paris
- Tokyo
- Cyberjaya
- Toronto
- Milan

- London
- GIFT City
- Port Louis
- Kuwait City
- Sydney
- Christchurch

3.

Integrated energy planning by city type

'New' cities:

- focus on high energy density '**priority zones**' and **new developments**
- prioritise maximising load certainty and diversity
- **test and demonstrate new connection policies**, capacity building between different departments
- areas with significant municipal control such as social housing and **publicly owned buildings** should be considered.

'Expansion' cities

- focus on **long-term planning policies** such as mixed-use zoning, compact land-use and building codes to ensure city is being designed to be compatible with district energy
- tried and tested connection policies can be expanded city wide
- city's role should be focused on interconnection, expansion to lower energy density areas and increasing the renewable share in the network

'Refurbishment' cities

- **combine network upgrades with other infrastructure developments** to lower cost of improving efficiency.
- consider shift to time of use tariffs and consumption based billing to make load smoother and maximise load factors
- ensure building efficiency programmes are not counterproductive by, for example, accounting for district energy in efficiency labelling.

Facilitating finance: Examples of demonstration projects

Demonstration projects are one of the most important tools available to a city for attracting finance. By demonstrating new technologies, new policies and demonstrating institutional capacity, cities lower the perceived risks to private investors, local governments and other funding sources and prove the commercial viability of district energy.



城市区域能源

充分激发能源效率和可再生能源潜力

United Nations Environment Programme

联合国环境署合作机构



Thank you!

联系人：
融融

Rong.rong@unep.org