APUEA
Asia Pacific Urban Energy Association

Multi-energy Systems (MES) and Integrated solutions for diverse consumer demands
针对不同消费者需求的多能源系统和综合解决方案

2nd International Forum on Low Carbon Development for Cities
第二届城市低碳发展国际论坛

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DBDH
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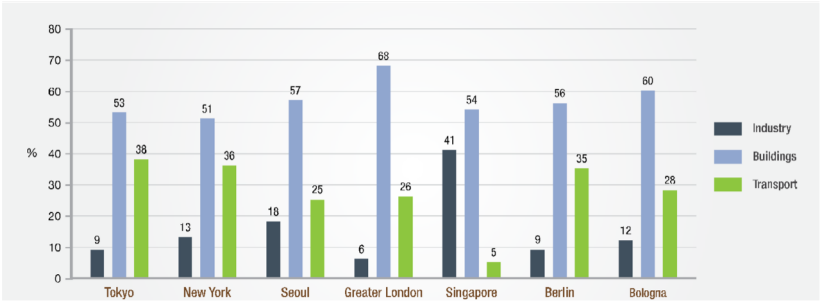
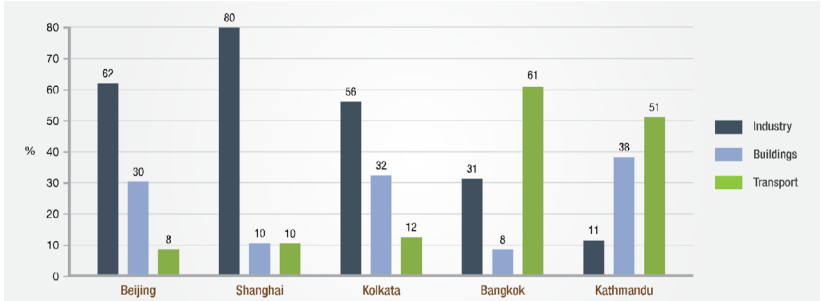
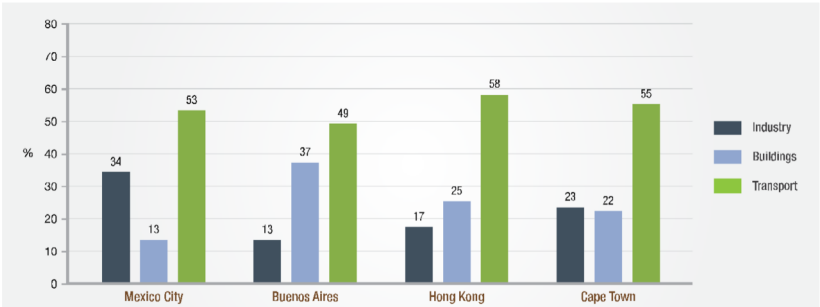
INTERNATIONAL DISTRICT ENERGY ASSOCIATION
IIEC International Institute for Energy Conservation

Current and Future Megacities (2015 – 2030)
当前和未来的大城市（2015 - 2030年）

Sectoral Energy Consumption
分行业的能源消耗量







Within cities, the proportion of energy use by various sectors differ by economy.
在城市中，各行业的能源消费比例因经济情况而异
Cities in Asia Pacific region require different urban energy solutions depending on climate and dominant sectoral consumption:
亚太地区的城市根据当地气候和能源消费主要部门的不同，需要不同的城市能源解决方案：

- Singapore – Buildings
- 新加坡 — 建筑
- Shanghai – Industry
- 上海 — 工业
- Bangkok – Transport
- 曼谷 — 交通

Indisputable trends in the energy sector
能源行业无可争议的趋势

- Urbanization 城镇化
- De-centralization 去中心化
- De-carbonization 低碳化
- Digitalization 数字化
- Electrification (and liberalization of electricity markets)

电气化（和电力市场自由化）

What is the future of energy systems?

能源系统的未来是什么样子？

“Smart Energy” characteristics
“智慧能源”的特征

Planning 规划 → Design 设计 → Procurement / Equipment Supply 采购/设备供应 → Construction & Installation 建筑安装 → Commissioning 调试 → O&M 运营和维护

Flexible 灵活

灵活性是智慧能源系统中需求响应的关键，也是应对未来推广、实施和变化的关键。

Flexibility is the key for demand responses in a Smart Energy system, and to cope with future expansion, implementation and variations.

Intelligent 智能

创新的工程解决方案与智能规划和控制工具相结合，是收集、分析、可视化和优化智慧能源系统的基础。

Innovative engineering solutions, in combination with intelligent planning and control tools is the foundation to collect, analyze, visualize and optimize the Smart Energy system.

Integrated 综合

通过跨部门规划，不同能源基础设施之间的整合为智慧能源系统铺平了道路。

Integration between different energy infrastructure, through cross-sectoral planning paves the way for Smart Energy systems.

Efficient 高效

By utilizing local resources and efficient solutions, along the entire energy system value chain, remarkable global efficiency can be achieved.

通过利用当地资源和有效的解决方案，可以在整个能源系统价值链中，实现卓越的全球效率。

Competitive 有竞争力

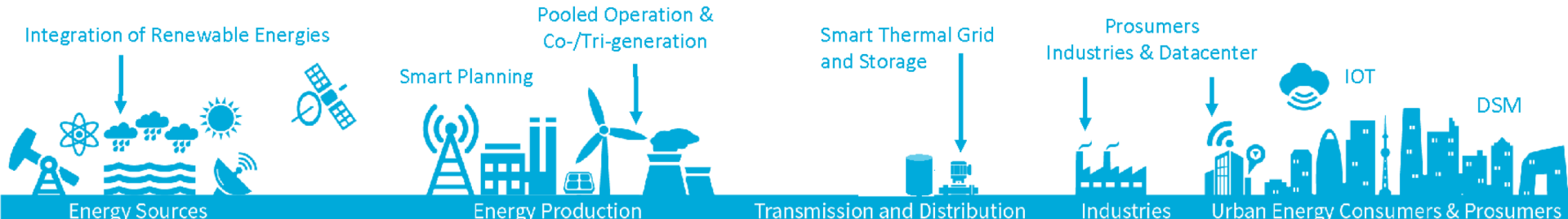
A smart energy system must be financial viable and competitive with alternative technologies, often through OPEX/CAPEX advantages and increased life-span.

智慧能源系统必须具有财务可行性，并能以OPEX / CAPEX的优势和更长的使用周期与替代技术竞争。

Reliable and Safe 可靠安全

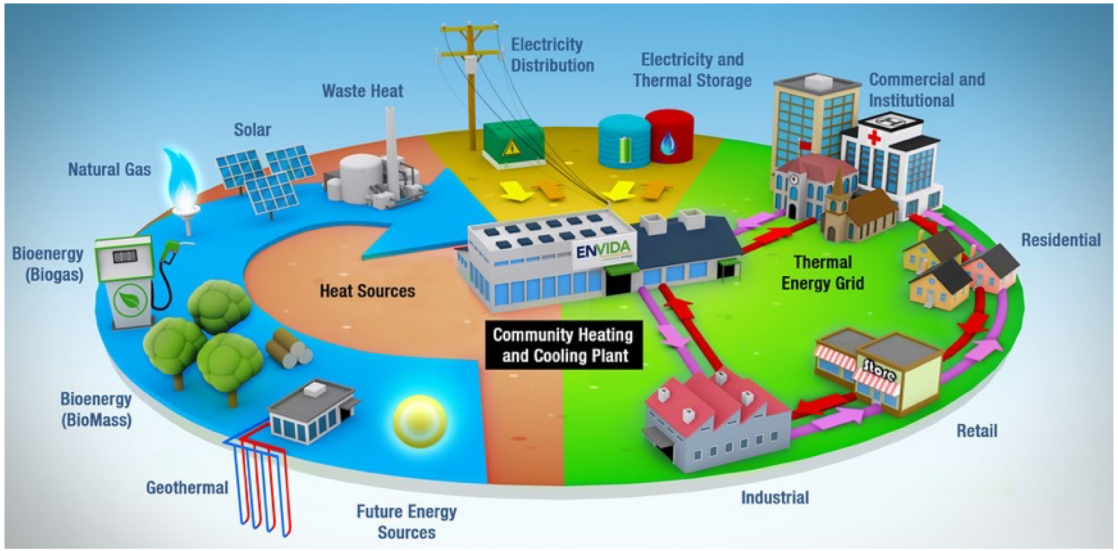
Reliability and Safety are fundamental requirements to satisfy customers and earn the confidence and trust for a sustainable energy system.

可靠安全是满足客户需求并赢得其对可持续能源系统信心和信任的基本要求。



Development of Energy Systems and Services
能源系统和服务的发展

Distributed 分布式 → Centralized 集中式 → Centralized+Distributed 集中+分布式 → **Integrated 综合**



Generation driven 发电驱动 → Demand driven 需求驱动 → **End-consumer driven 终端消费者驱动**

ICT – the new "Energy Grid"
信息通信技术 –新的 "能源网"

ICT
信息通信技术

GENERATION
发电

CONSUMER
消费者

STORAGE
存储

Smart Grids
智能电网

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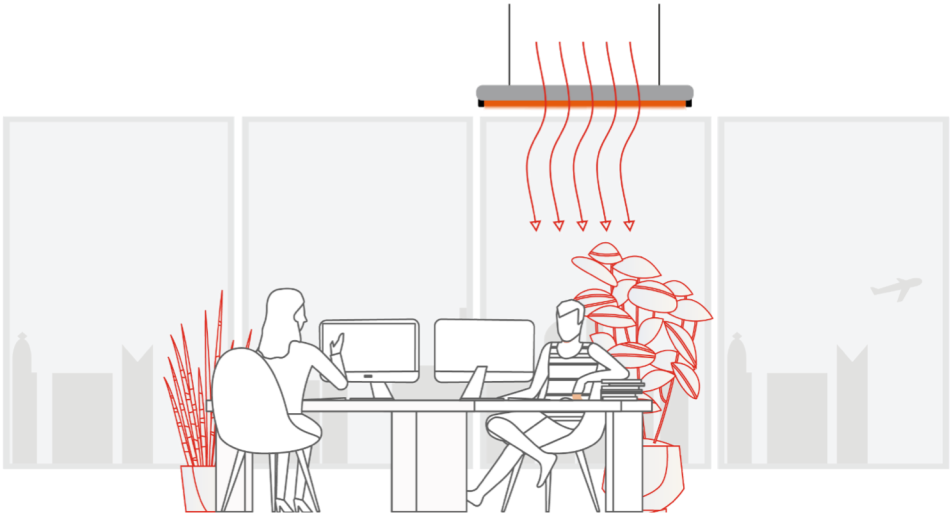
DBDH EUROHEAT & POWER INTERNATIONAL DISTRICT ENERGY ASSOCIATION IIEC

Digital transformation has put users at the center, and their demands are changing

数字化转型以客户为中心，且客户的需求正在发生变化

Customer demands
客户需求

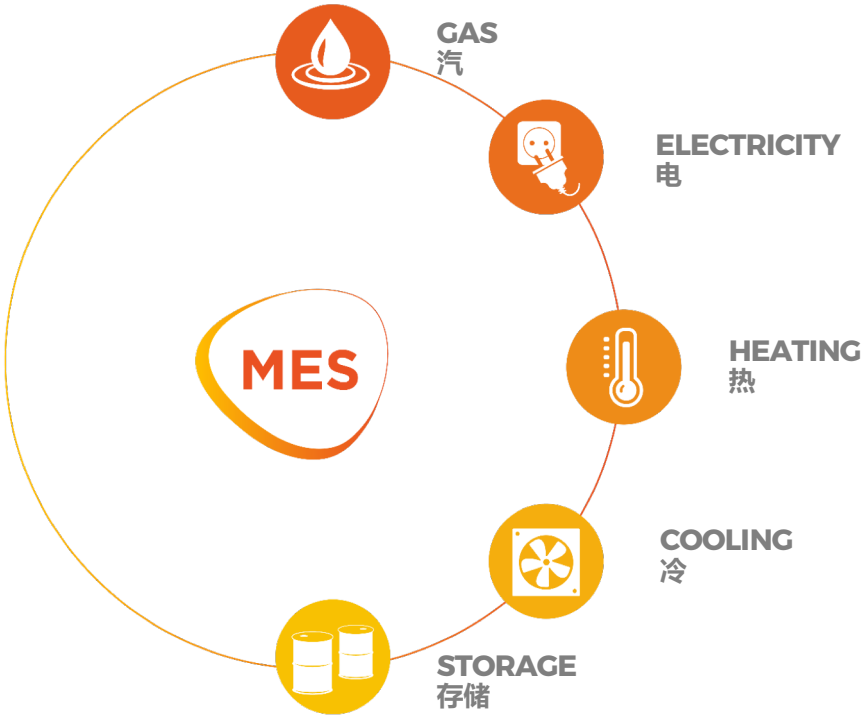
- Affordability 便宜
- Simplicity 简单
- Flexibility 灵活
- Reliability 可靠
- Safety 安全
- Low-carbon foot print 低碳



Energy Solutions
能源解决方案

- Smart Energy / Multi-Energy Systems 智慧能源/多能源系统
- Energy IoT 能源物联网
- Energy Management 能源管理
- …

What is Multi Energy System (MES)?
什么是多能源系统？



Examples of Multi Energy Systems
多能源系统的例子

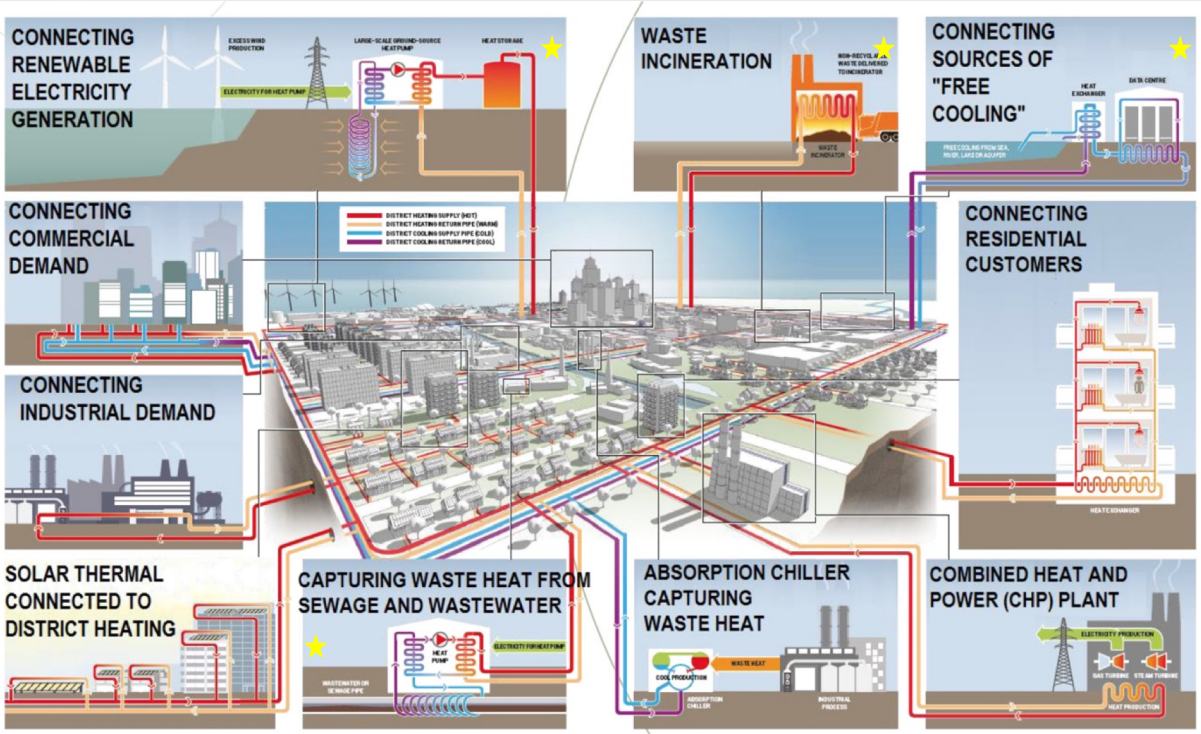


Illustration: UNEP – District Energy in Cities Initiative (DES)
图：联合国环境规划署—城市区域能源倡议

- Biomass 生物质能
- Wind power 风能
- Solar power and heat
  太阳能和热能
- Geothermal heat 地热
- Excess heat from industries
  工业余热
- Thermal storages 热存储
- Free cooling 自然冷却

- District Heating 区域供热
- District Cooling 区域供冷
- Distributed Energy CHP/CCHP
  分布式能源热电联产/冷热电联产
- Smart Grids 智能电网

Challenges and Opportunities
挑战与机遇

Challenges / Lessons learned 挑战/经验教训

- Terminologies and buzzwords 术语和流行语
- Regulatory differences 法规差异
  - Market regulations 市场规则
  - Economic regulations 经济法规
  - Social regulations 社会规范
- Geographic diversity 地理多样性
- Need for cross-sectoral planning 需要跨部门规划
- High initial costs (front-loaded investments)
  初始成本高（前期投资）
- Lack of incentives and regulations 缺乏激励和规范
- Customer protection in terms of pricing and quality of services
  对客户在定价和服务质量方面的保护
- Experience gaps along the project value chain
  项目价值链中的经验差距
- Delayed load ramp-up and occupation ratio
  负载上升延迟和占用率

Opportunities 机遇

- Increased energy efficiency by 25%–50%
  能效提高25%—50%
- Not-in-kind solutions 非实物解决方案
- Long lifespan of up to 50 years (low maintenance cost and improved management) 使用寿命长达50年（低维护成本和管理优化）
- Increased public and governmental awareness – Global initiatives (inc. APUEA and UNEP DES) 公众和政府意识增加—全球倡议（包括亚太城市能源协会和联合国环境规划署）
- A wide range of suitable technologies for projects with different pre-conditions
  适用于具有不同前提条件的项目的各种技术
- Huge market potential 巨大的潜在市场
  (Not least for CBD/TOD areas, Industries and Industry zones, Airports, Hospitals and Data Centers)（尤其是CBD/TOD地区、工厂和工业区、机场、医院和数据中心）
- Recognized energy supply concept globally
  全球公认的能源供应理念
- Financing and Business models are available
  提供融资和商业模式

Asia Pacific Urban Energy Association (APUEA)
亚太城市能源协会（APUEA）

The Asia Pacific Urban Energy Association (APUEA) is an initiative of International Institute for Energy Conservation (IIEC), supported by Euroheat & Power and Danish Board of District Heating (DBDH).

亚太城市能源协会（APUEA）由国际能源保护研究院（IIEC）发起，支持单位为欧洲区域供热协会和丹麦区域供热协会（DBDH）。

Rationale 成立原因:

- Similar Associations in North America and Europe but none in Asia Pacific region

  北美和欧洲有类似的协会，但亚太地区没有

- IIEC approached by development agencies and industry stakeholders to host an Association

  一些发展机构和行业利益相关者呼吁IIEC成立该协会

IIEC is a not-for-profit organization established in 1984 with a mission to promote sustainable energy in developing and emerging economies. The APUEA fits with IIEC's mission and propose to host the Association at its Asia Regional Office in Bangkok

IIEC是一个非营利组织，成立于1984年，其使命是促进发展中国家和新兴经济体的可持续能源发展。APUEA符合IIEC的使命，建议在IIEC亚洲区域办事处曼谷成立。

Supp

Mission 使命

To actively promote the development of sustainable urban energy systems in the Asia Pacific region.

积极推动亚太地区可持续城市能源系统的发展

Objectives 目标

To be a platform that:

成为推广可持续城市能源的平台：

- Convenes cross-sectoral stakeholders focusing on sustainable urban energy;
  召集跨部门利益相关者，关注可持续城市能源；
- Promotes market development for sustainable urban energy systems;
  促进可持续城市能源系统的市场开发；
- Shares global and regional experiences and best practices
  分享全球和区域经验和最佳实践；
- Support sustainable urban energy project alliances.
  支持可持续城市能源项目联盟

THANK YOU

Asia Pacific Urban Energy Association

www.apuea.org