Heating and Cooling Solutions for Metropolitan Areas

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Global Status of Heating and Cooling Markets

IEA World Energy Outlook 2016

- World’s energy consumption for heating: >50%
- Share of heat production on energy related CO₂ emissions: 39%
- Heat remains widely under-served by renewable sources of energy (RES).
  **Forecast 2021: RES for heating: 8% ⇨ RES for electricity generation: 28%.**
- Share of heat on energy demand in buildings: almost 80%
- Share of RES on heat demand in buildings: 9%
- Modern **bioenergy** is mostly used RES in buildings.
  Challenges to further deployment: local pollution and high upfront costs
- **Solar water heating (SWH):** highest demand growth in coming decades expected.
  SWH growth rate since 2000: 17% a year,
  SWH share on hot water production in buildings: only 6% (2014)
- Targets are important, but their implementation depend on **effective policies**.
- Global landscape for **renewable heat policy measures** is significantly less extensive than for electricity. The joint IEA/IRENA renewable policy database lists 582 policy instruments in force for renewable electricity, yet only 158 for heating and cooling across 75 countries.
Strategy to Decarbonize the Heating Sector

Combination of energy efficiency and use of renewable energy sources

General concept of the German government:

- Heat demand reduction target: 50%
- Remaining 50% by RES
- Distribution between direct heat generation and heat generated by RES electricity is not defined

Heat demand today: 100%

- Heat by fossil fuels 2015: 87%
- Heat by RES electricity
- 13% direct heat by RES in 2015

2015

2050
Complexity and Challenges of the Heating (and Cooling) Market

**Heating and cooling system: Today → 2050**

**Energy sources**
- Solar thermal
- Geo thermal
- Bio energy
- Fossil fuels
- Electricity

**Conversion**
- Boiler
- CHP
- Power to heat
- Heat pumps

**Infrastructure**
- District heating
- Gas network
- Electric grid

**Demand**
- Space heating
- Space cooling
- Domestic hot water
- Process heat

**Technology improvements?**

**Which?**

**Decentral**

**How much?**

**Sufficient knowledge?**

**Adequate stimulation?**

**Market actors**
- National policy maker
- City administration
- Project developer
- Commercial heat consumers
- Private heat consumers
- Building owners
- Dealer and craftsmen
- Equipment manufacturers

**Framework conditions**
- Price of fossil fuels
- Local climate
- Subsidy programs
- Emission certificates
- Renewables obligations
- Energy efficiency standards
Why is Heating and Cooling not higher on the Agenda? How to accelerate transformation?

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Thank you for your attention