European Commission - Fact Sheet

Towards a smart, efficient and sustainable heating and cooling sector

Brussels, 16 February 2016

European Commission presents today the first strategy to optimise buildings' and industries' heating and cooling, a sector accounting for 50% of the EU's annual energy consumption.

What is the first Heating and Cooling Strategy and what is its purpose?

The EU Heating and Cooling Strategy is the first EU initiative addressing the energy used for heating and cooling in buildings and industry, which accounts for 50% of the EU's annual energy consumption. By making the sector smarter, more efficient and sustainable, energy imports and dependency will fall, costs will be cut and emissions will be reduced. The Strategy is a key action of the Energy Union Framework Strategy and will contribute to improving EU's energy security and to addressing post-COP 21 climate agenda.

What is heating and cooling?

"Heating and cooling" refers to the energy needed for warming and cooling buildings, be them residential or in the service sector (for example schools, hospitals, office buildings). It also includes the energy which is necessary in almost all industrial processes to produce products we use in our everyday life as well as cooling and refrigeration in the service sector, such as the retail sector (for example to preserve food across the supply chain from production, to supermarket and to the customer).

Where does Europe stand on heating and cooling?

Currently, the whole sector **accounts for 50% of the EU's annual energy** consumption; it accounts for 13% of oil consumption and 59% of total EU gas consumption (direct use only) – which equates to **68% of all gas imports.** This is because:

  - **European buildings are old, which implies various problems, including**:
o   Almost half of the EU's buildings have boilers installed before 1992, with an efficiency rate of below 60%.

o   22% of gas boilers, 34% of direct electric heaters, 47% of oil boilers and 58% of coal boilers are older than their technical lifetime.

The renovation of existing buildings could lead to lower energy consumption; however, the refurbishment rate is currently below 1%.

  - **Renewables are not widely used in the sector**: Natural gas is the largest primary energy source for heating and cooling (46%), followed by coal (about 15%), biomass (about 11%), fuel oil (10%), nuclear energy (7%) and some renewable energy sources (wind, PV and hydro, about 5%). Other renewables like solar (thermal) energy, ambient heat and geothermal energy account for 1.5% all together, and other fossil fuels to 4%. Overall renewable energy accounts for 18% of primary energy consumption in the heating and cooling sector and there is a significant potential to increase its share.

  - **Too much energy is being wasted:** the amount of heat produced from industrial processes and wasted in the atmosphere or into water in the EU is estimated to be enough to cover the EU's entire heating needs in residential and tertiary buildings[1].

What is in the Strategy?

In order to decrease energy leakage from buildings, maximise efficiency and boost the share of renewables, the EU Heating and Cooling Strategy identifies the following actions:

1) Make renovating buildings easier

  - Development of a toolbox of measures to ease the renovation of multi-apartment buildings, e.g. through modern heating and cooling equipment (such as heat pumps) and insulation materials and advice on the steps to follow

  - Better cost-sharing to allow both tenants and owners to benefit from the investment spent to

renovate old buildings and apartments, or to change their old obsolete heating systems with new efficient ones using renewable energy sources or heating sourced from smart new generation district heating networks

- Promote **proven energy efficiency models** for public schools and hospitals to provide authorities with practices on for example how to use energy service companies, energy performance and public procurement contracts or self-consumption solutions in making these buildings more efficient, how to go about energy renovation and installing heating and cooling systems supplied by clean renewable energy sources. This will also reduce costs and boost spending power for teaching materials, computers, amenities in sport halls, libraries or in-house restaurants, for example.

- **Strengthened reliability of energy performance certificates**, which will be assessed in the upcoming review of the Energy Performance of Buildings Directive. This will allow providing clear information for consumers and investors in the use of renewable energy in buildings and create market signals for a more wide-spread use of renewable energy in the buildings.

2) Increasing the share of renewables

Today, heating and cooling is still largely dependent on fossil fuels. Renewable energy accounts for just 18% of the heating and cooling supply. The Heating and Cooling Strategy draws attention to the fact that energy efficiency and the deployment of renewable energy complement each other.

- Increasing the share of renewable energy solutions in buildings will be considered in the upcoming reviews of the Renewable Energy Directive and the Energy Performance of Buildings Directive.

- Financial support for the deployment of renewable energy technologies is made available through the European Structural and Investment Funds, the EU Horizon 2020 Programme for research and development and the Integrated Strategic Energy Technology Plan.

3) Reuse of energy waste from industry

Industrial and power generation installations produce large amounts of waste heat and waste cold which is currently dissipated unused in air and water. A number of solutions can be implemented:

- Direct feed via district heating systems: This is already practiced, e.g. in the Swedish city of Gothenburg where more than 90% of all apartment blocks are heated with waste heat from nearby industrial plants (refineries and chemical plants), waste incineration and cogeneration (*i.e.* the simultaneous production of electricity and heat, both of which are used) through a 1000 km district heating network.

- Cooling via cogeneration and absorption chillers that transform heat into cold that could be used in buildings through a district network. Absorption is a process which uses waste heat from waste incineration and refineries, for example, during the summer months to convert heating to cooling. This is already practiced in many district cooling systems such as the Vienna district cooling system which uses the heat produced by the CHP waste incineration plant during summer to supply cooling.

- Infrastructure development: National and local authorities have a key role to play in establishing their economic waste heat or cold potentials, creating the right regulations and helping to develop the infrastructures needed to use that potential.

4) Getting consumers and industries involved

- **Consumers**: Owners, tenants, building operators and public authorities should be able to make informed decisions on building renovation, efficient and renewable heating/cooling supply options and on saving energy through advanced metering, billing, real-time control of heating and cooling and automation, capacity-building to understand what they can do, how to structure their projects and secure access to financing.

- **Industry**: In 2012, industry accounted for one fourth of the EU's total final energy consumption, of which the majority (73%) was used for heating and cooling.

Energy efficiency improvements for heating and cooling in energy-intensive industries can be achieved in three main ways: (1) in-industrial process improvements, (2) inter-plant heat integration (and other energy and resource integration) between processes on-site to recover excess heat within their own sites, often through industrial symbiosis in industrial parks, and (3) transferring unused low temperature heat outside of the industrial site to nearby heat consumers, such as municipalities, through heat networks.

What will the benefits be?

The implementation of the strategy will bring benefits to all, and more specifically:

- **Citizens:** EU citizens would benefit from better living conditions, comfort and health, a better

environment which they know is sustainable for future generations, and reduced monthly and yearly expenditures for heating. For example, if your home is equipped with a conventional gas boiler using 20 MWh of energy per year, a new condensing gas boiler can save you €275 per year. Efficient heating appliances based on renewable energy, such as heat pumps combined with solar water heaters can **reduce household yearly expenditure on energy from €1500-2000 to €300-500**. On top, current passive consumers may become less dependent on energy prices fluctuations and even 'prosumers', i.e. small renewable energy producers that can sell their excess energy on a liberalised energy market.

- **Workers**: The manufacture and installation of energy efficient and renewable energy based equipment and materials are labour-intensive activities, which, on average, can **create twice as many jobs** than the manufacture and installation of conventional energy generation equipment. Energy efficient goods and services sold in 2010 created approximately 0.9 million direct jobs and **2.4 million indirect new jobs in Europe**.

- **Industry**: energy **costs could be reduced by 4-10**% with investments that pay for themselves in less than 5 years.

Moreover, it will **reduce CO2 emissions and air pollution:**

Given the EU's climate goals, the demand for heating and cooling is expected to fall by 42% to 56% by 2050, with commensurate reduction in CO2 reduction. The sector is expected to play a crucial role in emissions reduction.

For example, the new EU Energy Label and Ecodesign Regulation for boilers, showing efficiency ratings for the first time, is estimated to save 600 TWh of energy and cut **CO2 emissions by 135 Million tonnes by 2030**.

Moreover, the new Ecodesign Regulation on air heating products, cooling products, high temperature process chillers and fan coil units completes the set of Ecodesign requirements on heating and cooling. These measures could save 5 Mtoe per year in 2030, corresponding to **9 Million tonnes of CO2.**

Reducing the energy consumption and increasing renewable share in the supply of heating and cooling will also contribute significantly to the reduction of air-pollution especially in urban areas.

What is the role of heating and cooling in reaching the EU's energy efficiency and renewable energy targets?

The EU is on track to reach its 20% renewable energy target by 2020. However, the 20% energy efficiency target will be reached only if the current EU legislation on energy efficiency is fully implemented. Heating and cooling therefore has a key role in ensuring that the EU's energy efficiency and renewable energy targets are met.

Where does Europe stand compared to other parts of the world?

Europe is a global leader in both energy efficiency and renewable energy:

- More than 90% of the efficient, renewable boilers sold to and used by Europeans have been developed and are produced by European companies.

- Europe has the highest share of cogeneration in electricity and heat production globally, ahead of the US and Japan.

- Moreover, Europe is also the cradle of emerging new technologies such as fuel cell cogeneration and geothermal heating and cooling. Its innovative district heating and cooling companies have no competitors capable of substituting their products and expertise, and are invited in China, South Korea, Russia and the Middle East to install and operate their unique systems.

What is the long-term vision?

Europe wants to decarbonise its building stock by 2050: This means that Europe would save around €40 billion on gas imports and €4.7 billion on oil imports per year. The EU's **CO2 emissions would be reduced by 30%** and citizens' expenditures for heating and cooling their homes and buildings **would be lowered by 70%.** Air pollution from heating and cooling would be reduced by more than 90%, eliminating related health problems.

Industry can move in the same direction bytaking advantage of the economic case for efficiency and new technical solutions**.** It is estimated that **industry could reduce its energy consumption by 4-5% in 2030 and 8-10% in 2050** just by implementing commercially viable and available solutions. The share of **renewable energies would reach 30%** and breakthrough technologies would help industries to decarbonise while making **production processes 30-50% less energy intensive.**

What are the next steps?

The transition towards a low-carbon heating and cooling system requires action from all actors

involved. This will be ensured by the EU 2030 governance framework, while the actions will be brought forward

1. By the **legislative reviews** of:

   - The Energy Efficiency Directive, the Energy Performance of Buildings Directive and the Smart Financing for Smart Buildings Initiative in 2016;

   - The New Electricity Market Design and the proposal for a Renewable Energy Framework in 2016.

2. By a series of **non-legislative actions** including:

   - Developing a toolbox of measures to facilitate renovation in multi-apartment buildings;

   - Promoting proven energy efficiency models for publicly owned educational buildings and hospitals;

   - Extend the work of the BUILD UP skills campaign to improve training for building professionals, in particular through a new module for energy experts and architects.

More information:

Website DG Energy: https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-gas-and-heating-and-cooling-strategy

Press release: Towards Energy Union: the Commission presents sustainable energy security package

[1]Fraunhofer et al. (2015 - ongoing), "Study on Mapping and analyses of the current and future (2020 - 2030) heating/cooling fuel deployment (fossil/renewables)", ENER/C2/2014-641

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