CAN Europe position paper
Towards a 100% renewable heating and cooling sector

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KEY POLITICAL DEMANDS

The current discussion around the Energy Union represents a golden opportunity to set up and implement a true EU heating and cooling policy in line with long term climate and energy goals, and based on energy efficiency and the switch from fossil fuels to renewable energy sources.

The European Union should:

- Develop a comprehensive heating and cooling strategy/action plan, ensuring the rapid transition to renewable heating and cooling technologies;
- Ensure that demand-side measures are considered on an equal footing with supply-side resources by applying the "energy efficiency first" principle[1], so that whenever they are assessed to be less expensive or more valuable than their supply-side alternatives, the former are deployed first;
- Ensure that the solutions applied maximise the benefits and synergies of the application of both energy efficiency measures and renewable heating and cooling technologies, while also taking into account the potential synergies and benefits of integrating the heating/cooling and power sectors (additional storage capacities, use of excess power from wind and solar photovoltaic, and grid stabilisation);
- Reinforce the existing policy framework to enact tighter building standards and codes with the aim to significantly improve the energy performance of the building stock;
- Ensure that only highly efficient heating, cooling and ventilation systems are on the market. Inefficient combustion systems need to be replaced by new efficient technologies, based on renewable energy sources;
- Promote a level playing field for renewable energy sources, with effective policies and stable support mechanisms. This is needed namely to compensate for the substantial public investments - either direct or indirect - conventional energy sources have relied and still rely on, as highlighted again in a recent study for the European Commission[2];
- In order to move towards a 100% renewable heating and cooling sector, provide a policy framework that also aims at electrifying the sector, where appropriate;
- Tackle the higher upfront investment required for renewable heating and cooling, also taking into account their mostly decentralised and small-scale nature. Access to financing is indeed currently a huge barrier for the renewable heating and cooling sector, as it is also for energy-efficiency projects;

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[1] http://www.raponline.org/featured-work/efficiency-first-unlocking-the-promise-of-the-energy

[2] https://ec.europa.eu/energy/sites/ener/files/documents/ECOFYS%202014%20Subsidies%20and%20costs%20of%20EU%20energy_11_Nov.pdf. Moreover, in most EU countries there is no carbon signal, as 90% of the heat sector falls outside the scope of ETS and only a limited number of countries have a carbon tax in place.

- Encourage the deployment of available and proven technologies for space and water heating, such as aerothermal and geothermal heat pumps, as well as solar thermal and biomass[3] technologies, in order to tap their enormous potential;
- Introduce a cap to limit the use of biomass for energy to levels that can be sustainably supplied, ensure efficient and optimal use of biomass resources, in line with the principle of cascading use, include correct carbon accounting and introduce comprehensive binding sustainability criteria for biomass;
- Policy makers should also promote awareness, which means involving citizens in their energy choices and informing consumers - but also local public authorities and installers - about available options.
- Last but not least, fully implement the existing legislation on both energy efficiency and renewable energy.

Introduction

So far, EU energy policies have not sufficiently focused on the heating and cooling sector, which is still largely dominated by fossil fuels (nearly 80% of the gross heat generation in the EU was provided by gas, coal and oil in 2011[4]) – a situation that is economically, environmentally and socially unsustainable.

The current security of supply concern, mainly due to the EU's heavy dependence on natural gas from Russia, is first and foremost a heating issue. Indeed, 61% of EU imported gas is used in buildings[5].

In spite of this reality, the EU has been focusing mostly on diversifying its sources of gas instead of reducing demand and diversifying the sources of heat to cover that demand. As an example, several of the investments discussed, such as gas pipelines, will not give short term solutions but will create a long term lock-in effect for gas, without reducing our energy dependency.

It is therefore high time to develop a comprehensive EU heating and cooling strategy/action plan, based on the reduction of energy use through energy efficiency, and combined with a rapid switch to the various renewable heating and cooling technologies, also looking at the synergies offered by a systematic approach that combines the power and heating/cooling sectors.

Such a development will simultaneously allow the EU to tackle issues such as the decarbonisation of our energy system, energy security and energy poverty.

[3] Specific sustainability issues are related to use of bioenergy, which can over-exploit valuable natural resources at potentially non-renewable rates and can create additional carbon emissions in the short and medium terms. A truly sustainable heating and cooling strategy therefore needs to ensure biomass is sourced from sustainable sources and at sustainable quantities.

[4] EU Energy in figures, Statistical Pocketbook 2013, p. 99.

[5] http://www.ecofys.com/files/files/ecofys-eurima-2014-deep-renovation-of-buildings.pdf.

Energy efficiency – as a matter of priority

Applying energy efficiency measures to reduce energy demand needs to be the first consideration when developing plans for moving towards a 100% renewable energy system[6]. Tapping into the available energy efficiency potential will help Europe avoid locking itself in oversized fossil fuel infrastructure capacity that is not compatible with its long term climate goals. This is also the case for energy used for heating and cooling, which accounts for almost 50% of total final energy consumption in Europe[7].

As a priority, heating and cooling demand needs to be reduced through energy efficiency measures in the relevant sectors of the economy. In the buildings sector, which represents 40% of the EU's total energy consumption, most of this goes to space heating. Many existing buildings are poorly insulated. Not only does this waste energy, but also unnecessarily adds billions of Euros to already high energy bills and contributes to increased air pollution. Therefore, it is important to step up the buildings renovation rate and aim at increasing the number of renovations that will lead to buildings with a very high energy performance. The national long-term renovation strategies required by the Energy Efficiency Directive (EED) should be improved in order to become a key planning tool for the refurbishment of the whole building stock of each Member State. These plans are inevitably linked to the overall effort to transform our energy system. Therefore, they should analyse the current energy consumption profile of buildings, including their heating and cooling demand, and provide a pathway to reach a specific long-term energy consumption target in line with both Member States' and Europe's decarbonisation goals.

Energy performance standards for heating and cooling appliances are important. The energy efficiency standards for heating equipment adopted in 2013 are expected to trigger savings of around 56Mtoe per year from 2020, reducing CO_2 emissions by 136 million tonnes annually, equivalent to taking almost 65 million cars off our roads[8].

It is also essential that minimum energy performance standards are regularly tightened through the Ecodesign Directive implementing measures, that the least energy efficient heating and cooling products are pulled out of the market, and that labelling requirements are improved to ensure that consumers can make an informed choice. The upcoming revision of the energy labelling directive is a good opportunity to make this happen. The advantages are clear: lower energy bills for consumers and businesses, an innovative European market for future-proof technologies and thousands of new, quality jobs.

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[6] The move towards 100% renewable energy is already taking place in many communities and regions around the globe. See examples in: http://worldfuturecouncil.org/fileadmin/user_upload/Climate_and_Energy/Cities/Policy_Handbook_Online_Version.pdf

[7] https://setis.ec.europa.eu/technologies/heating-and-cooling-technologies

[8] http://www.coolproducts.eu/product/boilers

In the industrial sector, tapping the energy savings potential of industrial insulation could reduce current heat loss by up to 75% and industrial energy use by up to 5%[9]. Cogeneration (Combined Heat and Power or CHP) offers energy savings ranging between 15-40% when compared against the supply of electricity and heat from conventional power stations and boilers. Promoting CHP based on renewable energy sources (e.g. geothermal energy) will also make the supply of energy truly sustainable.

Energy savings should not only be achieved in the end use sectors. The losses that occur before the energy reaches the final consumers should also be looked at. The Energy Efficiency Directive includes relevant provisions that require a more systematic approach to the design of heating and cooling systems in order to further promote energy efficiency. An EU heating and cooling strategy should build on the provisions of the existing legislation, taking into account that a better understanding of the different issues that are related to the heating and cooling energy use is needed (e.g. where and how much thermal energy is wasted, where this waste of energy can be reduced and where the potential of using energy efficient supply options to recover this excess heat lies, also taking into account heat temperature needs – see below). This process will help identify the best possible solutions for how to match supply to reduced end-use energy demand and the application of renewable energy technologies.

This could also involve options such as developing CHP infrastructure and district heating networks, which can increase the full-cycle efficiency of delivered heat. However, new infrastructure should only be developed after a careful assessment of future needs, to avoid building assets that will not be used at their full potential.

Accelerate the uptake of renewables in heating and cooling

Together with energy efficiency, the only secure way to reduce import dependency in the heating sector is to further accelerate the deployment of renewable energy. Renewable-based heating and cooling also provides the best solution against volatile prices and increasingly costly 'alternatives'. The further deployment of renewables in the heating and cooling sector would substantially increase the number of local and sustainable jobs. Furthermore, renewable heating and cooling technologies allow citizens and communities to be engaged in the design of our future energy system. It encourages self-consumption by 'prosumers' - households that simultaneously produce and consume energy– who can participate actively in the needed energy transition towards 100% renewable energy in Europe.

There exists a significant number of renewable heating and cooling technologies, from low-tech biomass stoves, aerothermal and geothermal heat pumps and unglazed solar collectors to more sophisticated, direct-use geothermal systems and solar thermal district heating plants with seasonal storage. Given the variety of renewable energy sources that can be used for heating/cooling purposes (biomass, geothermal, solar thermal and aerothermal), the EU will further benefit from an increased security of supply by a diversification of energy sources.

[9] http://www.eiif.org/?Extra/50/14

Some renewable-based technologies are already mature and compete with fossil fuel based technologies – especially simple renewable heating systems in the domestic sector. Other emerging technologies, which can provide higher shares of heat demand from renewable sources, are still under development. Certain renewable heating and cooling technologies like ground source heat pumps (GHSP) can produce cold in summer and heat in winter, significantly improving their competitiveness.

In order to address the heat sector it is of crucial importance to understand its characteristics. Heat users quite often have specific demand profiles comprising issues of temperature, capacity, and timing. Therefore, a variety of applications and sources are required to cover this demand[10].

One of the main challenges for a broader deployment of these technologies is the upfront investment needed. Support mechanisms should help to alleviate this barrier. It should, in particular, be considered to facilitate the investment from a large number of consumers, with soft loans, making use of resources available at European level. In this regard, bringing more EU level investment to the decentralised level, in order to promote consumers' investment, is a great challenge that can be tackled, for instance, by demand aggregation initiatives lead by local authorities and supported by the EU (including the EIB).

Recent EU progress in terms of renewable energy sources for heating and cooling has been far from impressive. Over the past five years, the renewables' share in the total energy consumption for heating and cooling did increase from 12% to 15.6%[11] and is currently 'above target'. However, projections based on current and planned policy initiatives[12] indicate that heating and cooling from renewable energy sources will be 19.5%[13] (in relative terms) below the NREAPs target for 2020[14]. In its Communication on Energy Security, the European Commission calls on Member States to "accelerate fuel switch in the heating sector to renewable heating technologies".

However, policies to promote renewable heating and cooling, continue to be enacted less intensively than those in other sectors. Moreover, renewable heating and cooling is currently dominated by a single source, biomass (88.9% of the renewable heat[15]).

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[10] Renewable heating and cooling technologies are available to cover temperature up to 300°C. For temperatures above 300°C, further R&D is needed. Electric heating, in particular, is needed for very high temperatures (1,000°C).

[11] European bioenergy outlook 2014, Aebiom.

[12] As witnessed in the March 2013 "Renewable Energy Progress Report". In this report, the Commission states that: *"The heating and cooling sector … has experienced slow growth since 2005. Moreover the analysis undertaken for the Commission suggests that the share of renewable energy in the heating and cooling sector may actually decline in the coming years."*

[13] Commission Staff Working Document for Renewable energy progress report - SWD (2013) 102 final - European Commission 2013.

[14] According to the National Renewable Energy Action Plans (NREAP), by 2020 21% of the heating and cooling demand should be met by renewable heating and cooling (RHC) technologies

[15] European bioenergy outlook 2014, Aebiom.

Up to 2020, biomass will remain the main contributor of the growing market share. After 2020, the continuing growth of solar thermal collectors and a growing share of geothermal energy and heat pumps should further reduce the dependence on fossil fuels. Large upscaling in installations is therefore needed to fully seize the potential of solar and geothermal technologies, and heat pumps. Dedicated support instruments, including by ensuring an easy access to financing for small-scale, local installations, are required to ensure the dynamic development of these technologies.

By 2050, renewable energy technologies should satisfy 100% of heating and cooling demand.

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