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Public support measures to heating and cooling in Cyprus

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Abstract
Public support measures to heating and cooling in Cyprus
This report includes the results of the results from D I.4.1 (Report on "Cost-benefit analysis for the potential of high-efficiency cogeneration in Cyprus") and makes recommendations on public support measures to heating and cooling and its annual budget.

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1 Public support measures to efficient heating and cooling in Cyprus

1.1 Strategies

The Comprehensive Assessment (CA) of efficient heating and cooling potentials in Cyprus show that the following heating and cooling technologies have a positive Economic Net Present Value (ENPV)[1]:

1. Heat pumps split units without water based heating system for all sub-sectors of the residential and service sectors**;**
2. Heat pumps with water based heating system for row and single houses as well as for healthcare, hotels and schools**;**
3. Heat recovery with district heating and cooling in Larnaca and Limassol**;**
4. Solar thermal solutions in the industrial sector and some residential row and single houses and for healthcare and schools**;**
5. Municipal waste use with efficient CHP and boilers for all industry sub-sectors**;**
6. Livestock and industrial waste use with efficient CHP and boilers for greenhouses.

The heat pump split units without water based heating system have always the highest ENPV in the residential and service sectors. In other sectors the Economic Net Present Values (ENPVs) of technology solutions were often similar, but with different fossil primary energy savings. For example, in some industrial sectors, solar thermal and municipal waste CHP and municipal waste boilers have similar ENPVs, but the fossil primary energy savings are significantly greater for solar thermal. In these situations, and also given the uncertainties that are inherent in any long term CA, authorities can choose to support technology solutions that are more beneficial for their overall energy policy goals, e.g. primary energy savings and/or increasing the share of renewables in the energy mix.

1.2 Economic potential identified and primary energy savings potential

The economic potential for the above mentioned technologies can be seen in Figure 1.

[1] See Tables 3.1-3.9 of D I.4.1 for more detailed information.

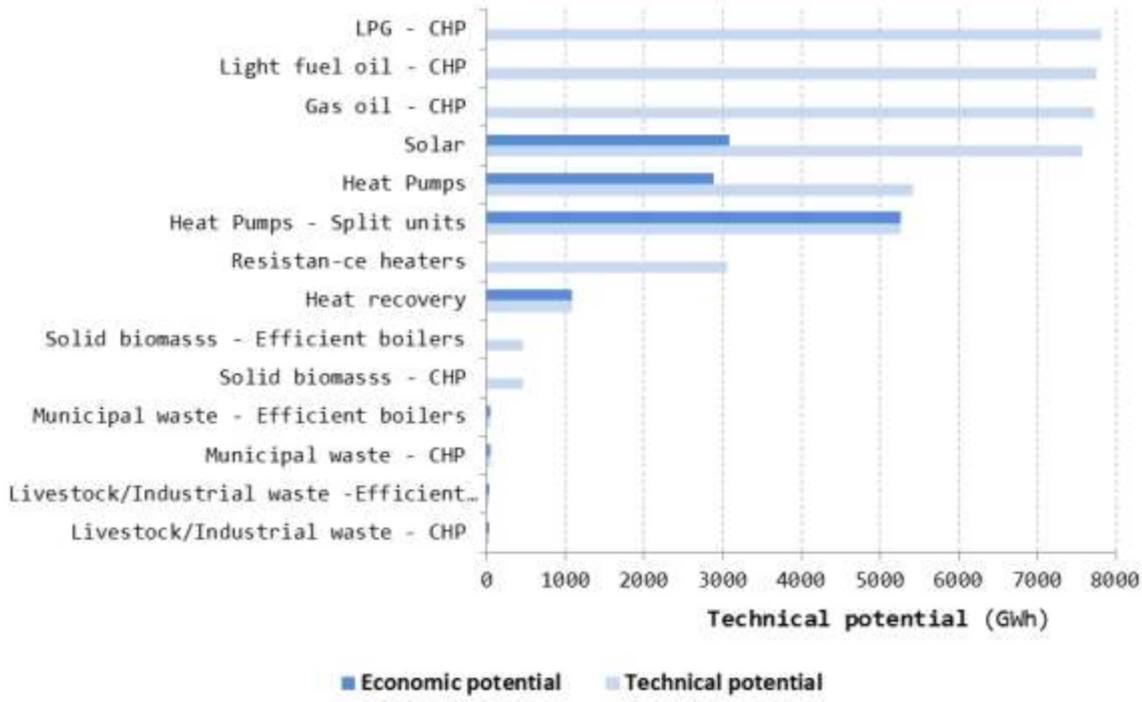

Figure 1. Technical and economic potential of efficient heating and cooling solutions in Cypus in 2013 [GWh].

The fossil primary energy savings that are possible to achieve compared to the baseline with the above mentioned technology solutions are:

1. Heat pumps split units without water based heating in the residential and service sectors – 800 GWh (22 %) in residential and 400 GWh (15 %) in the service sector.
2. Heat recovery with district heating and cooling in Larnaca and Limassol – about 215 GWh (20 %) in the residential and service sectors.
3. Municipal waste use with CHP and boilers in the industrial sector (expect for *other industries* sector) – 64 GWh (45 %)
4. Solar thermal – 36 GWh (30 %) in the industry sector, 975 GWh (65 %) in the residential sector, 855 GWh (57 %) in the service sector.
5. Livestock/industrial waste in the agricultural sector – 64 GWh (48 %.)

It should be noted that the economic potentials mentioned above is often overlapping. For example Point 1, 2 and 4 cannot be added, i.e. if heat recovery with DHC is installed in Larnaca and Limassol the heat pump split units and solar thermal would not be installed in those areas.

1.3 Financial support measures

The CA revealed that most technology solutions with positive ENPV (Point 1-4) have a positive FNPV too. Hence, they are commercially viable and they do not require financial support. Other types of measures to support these are suggested, see Section 1.4.

1.3.1 High-efficiency cogeneration

Most CHP technology solutions had a negative ENPV according to the CA.

The only CHP technology solution with a positive ENPV that requires financial support is livestock/industrial waste in the agriculture sector. Two alternative measures to render the investor a positive FNPV can be considered:

- a 50 % subsidy on the capital cost of the CHP plant;
- to provide the plant owner with the fuel (waste) for free.

The CA suggests that the installed capacity would reach 52 MW in 2050. The anticipated cost for public support measures is about EUR 7 million.

1.3.2 Heat recovery and district heating and cooling networks

Heat recovery from existing power plants linked to new district heating and cooling networks in cities is a viable option according to the CA. It shows that heat recovery could potentially provide 670 GWh in Limassol and 409 GWh in Larnaca annually.

Since economic potential for heat recovery and district heating and cooling was identified, the EED Article 14(4) requires adequate measures for this potential to be developed in accordance with Articles 14(5) and 14(7).

Article 14(5) says that a cost-benefit analysis in accordance with Part 2 of Annex XI should be carried out, in order to determine whether heat recovery with district heating and cooling should be pursued.

Article 14(7) says that authorisation criteria should be prepared as referred to in Article 7 of Directive 2009/72/EC.

1.3.3 Discontinue fiscal incentives aimed at promoting solutions different to those identified in this CA

Existing public incentives aimed at promoting heating and cooling technology solutions that did not show a positive ENPV in this CA could be discontinued.

1.4 Information campaigns and stakeholder involvement

As mentioned above, most of the identified technology solutions are already commercially competitive, so they do not require public support measures from authorities.

Instead, education and information campaigns are needed to show the benefits to individual investors from installing these efficient heating and cooling technology solutions. The information can be shared on websites or through distributed materials. Also, identifying and involving the main stakeholders in this process could be an important component, e.g. advisors at energy departments, municipalities, and vendors of heating and cooling equipments.

1.5 Other measures

Other measures to assure the compatibility of the transition towards a more sustainable and efficient heating and cooling mix in Cyprus and socio-economic benefits for the society in Cyprus are:

1.5.1 Analysing electricity transport load capacity

The CA shows that the use of heat pumps split units in the heating and cooling sector in the *household* and *service* sector in Cyprus should be expanded. Hence, the heating and cooling system of Cyprus would become more electrically driven. Due to the fact that cooling is mostly provided by electrical air conditioning units today, the deployment of heat pumps split units is not foreseen to require any significant expansion of power capacity or transmission grids. Nevertheless, it is still advisable to conduct a detailed analysis on transmission networks capacity requirements of the future energy system of Cyprus.

1.5.2 Market analysis of supplying options

This analysis is aimed at assessing the market response capacity to assure the supply of equipment and work force skills, in order to avoid potential gaps on installation or maintenance level. Strategies to maximize the local benefits for suppliers and local employment within the value chain can also be developed.

2 Share of high-efficiency cogeneration and the potentials established and progress achieved under Directive 2004/8/EC

In 2006 the installed CHP capacity was 2.3 MW. The currently operating high-efficiency cogeneration units have total installed electrical and thermal capacities of 13.2 and 12.4 MW, respectively. All existing units are biogas fuelled.

This CA identified an economic potential for high-efficiency cogeneration of 45 MW in 2013 and 104 MW in 2050, see Figure 1.[2]

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[2] The 'Assessment of the national potential for cogeneration in Cyprus' of 2009 predicted an installed electrical capacity of high-efficiency cogeneration of 124 MWe in 2015 and 228 MWe in 2020, which is significantly higher than for this CA. Some reasons for the discrepancy are: 1. Economic crisis in Cyprus, 2. Lower electricity and fuel prices which makes CHP less economically attractive compared to alternatives like heat pumps split units.

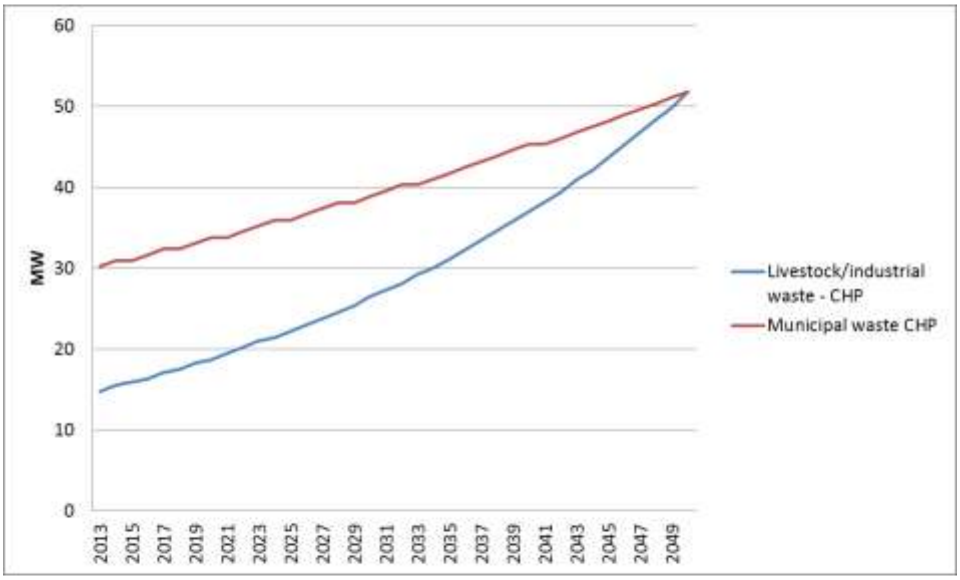

Figure 2. Economic potential of high-efficiency cogeneration in Cyprus

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