



Comprehensive Assessment of the Potential for Efficient Heating and Cooling

Report for Point E Overview of Existing Policies Relevant for
Efficient Heating and Cooling

Report for Ministry of Energy Commerce and Industry (MECI) of the
Republic of Cyprus

Report for MECI, Cyprus

ED 14106 | Issue number 2 | Date 28th July 2021

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28th July 2021

Ref: ED14106

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1 Introduction

Annex VIII of the Energy Efficiency Directive 2012/27/EU requires that the comprehensive assessment of national heating and cooling potentials includes an overview of existing policies and measures (PaMs) relevant to heating and cooling:

- i. as described in the Member State's most recent Integrated National Energy and Climate Plan (NECP); plus
- ii. any further PaMs implemented to date and not identified in the NECP.

As required by Article 1(2) of the Governance Regulation (EU) 2018/1999, PaMs are categorised by the five energy union dimensions, which are:

1. Decarbonisation;
2. Energy efficiency;
3. Energy security;
4. Internal energy market; and
5. Research, innovation and competitiveness.

Cyprus's first NECP was finalised in January 2020. Sections 2.1 to 2.5 summarise, by the five energy union dimensions, those PaMs relevant to heating and cooling included under the NECP 'With Existing Measures' (WEM) scenario with the following exclusions since these cannot now be considered to be existing measures:

- various measures that were no longer operational at the time of NECP's development, having ceased or been succeeded by another measure on the WEM list of measures (the latest having ceased in 2018);
- one that ceased in 2019 – i.e. at about the time the NECP was finalised; and
- one that was planned to commence in 2018 but was abandoned.

The information has been adapted from the report *Impact Assessment of the Cyprus Integrated National Energy and Climate Plan, Deliverable 3: Policies and measures (and relevant data) to be taken into consideration in the Impact Assessment*, September 2019.

2 Summary of Existing Policies and Measures Relevant to Heating and Cooling

2.1 Dimension Decarbonisation

This dimension is split into two sub-groups: the first being measures related to the management of direct GHG emissions; and the second relating to expansion in the use of Renewable Energy Sources (RES).

2.1.1 Greenhouse Gas Emissions and Removals

| Name of policy or measure | Short description | Relevance to heating and cooling | Status |
|--|---|---|------------------------------|
| Preparation of the proper recovery system for F-gases in equipment | Preparation of the proper recovery system for F-gases in equipment; This is an obligation according to EU and national legislation. It is however still not properly implemented. WEM considers that the necessary implementing measures will be taken so that in 2020 proper recovery of F-gases in old equipment is performed. Commencement has been delayed to 2021 with a budget of €1 million. | All applications with older cooling or heat pump equipment, though assumed not to affect energy demand. | Expected to commence in 2021 |

| Name of policy or measure | Short description | Relevance to heating and cooling | Status |
|---|---|--|------------------------|
| Promotion of anaerobic digestion for the treatment of animal waste. | Further promotion of anaerobic digestion for the treatment and management of animal waste; promotion of anaerobic digestion in existing biogas plants; encouragement of new biogas plants to exploit organic waste from livestock breeding. | As well as reducing CH ₄ emissions, biogas from AD is typically used to generate renewable electricity. Also, if there are suitable heat loads in the vicinity, useful renewable heat can be generated via CHP. | Implemented Ongoing |

2.1.2 Renewable Energy Sources

| Name of policy or measure | Short description | Relevance to heating and cooling | Status |
|---|---|--|---|
| Support scheme for the production of electricity from renewable energy sources for own use. Category A: Net-metering | The implementation of the measure started in 2013 as national policy to promote RES electricity. Currently Net-metering category is available for small scale photovoltaic systems with capacity up to 10kW, for all consumers (residential and non-residential). The scope of the net-metering is to provide the option to residential and small commercial consumers to cover all or part of their electricity consumption from PV. The generated RES electricity is subtracted from building's electricity consumption. Consumers pay only for the difference between the energy consumed and energy produced (net electricity used) plus a cost that reflects the cost of the electricity grid to support continuous supply and taxes (VAT, RES levy). Scheme capped at 20MW total capacity; 5MW residential, 15MW non-residential. | Where electricity is used for heating and/or cooling, particularly heat pumps and cooling plant, and Joule effect heating. | Adopted 2013 Ongoing |
| Support scheme for the production of electricity from renewable energy sources for own use. Category B: Net-billing | The implementation of the measure started in 2018 as national policy to promote RES electricity and reduce the cost of electricity to commercial and industrial consumers. Currently net-billing is available for RES installations (PV, biomass/biogas systems, etc.) between 10kW and 10MW at commercial and industrial premises and public buildings. The scope of the measure is to provide an option to medium and large-scale electricity consumers to cover all or part of their electricity consumption from RES. The generated RES electricity that is not self-consumed is credited to the consumer at the respective wholesale price of electricity from RES and that amount is subtracted from the cost of the electricity bought from the grid. Fees that reflects the cost of the grid to support continuous supply and taxes (VAT, RES levy) are applied. Scheme capped at 20MW total capacity. | Where electricity is used for heating and/or cooling, particularly heat pumps and cooling plant, and Joule effect heating. | Adopted 2018 It is planned that after 2025 or the cap is reached, the net-billing scheme will cease, and only self-consumption will apply. |

| Name of policy or measure | Short description | Relevance to heating and cooling | Status |
|--|--|--|---|
| Self-consumption of electricity from renewable energy sources | Self-consumption of RES electricity was introduced in 2013 in the Support scheme for the production of electricity from renewable energy sources for own use. In 2018 the net-billing category was introduced as an alternative option to self-consumption. Self-consumption is applied to all commercial and industrial consumers. It covers the installation of RES systems with power 10kW to 10MW. The scope of the measure is to provide an option to medium and large-scale electricity consumers to cover all or part of their electricity consumption from RES. In this case, unlike net-billing the consumer receives no credit for the generated RES electricity that is not self-consumed. Fees that reflects the cost of the grid to support continuous supply and taxes (VAT, RES levy) are applied. Based on Governmental Regulation and the amendments of RED II Directive after 2020, no fees may be applied to the self-consumed electricity. | Where electricity is used for heating and/or cooling, particularly heat pumps and cooling plant, and Joule effect heating. | Adopted 2013. Ongoing |
| Installation of net metering PV systems in houses of vulnerable consumers | Financial support of €900 per installed kW, with maximum grand amount of €2,700, is given for the installation of net-metering PV systems in houses of vulnerable consumers (families with low income, disabled persons, etc.). | Where electricity is used for heating and/or cooling, particularly heat pumps and cooling plant, and Joule effect heating. | Adopted 2013 Ongoing |
| Support scheme for the installation of net-metering photovoltaic systems with capacity up to 20kW, in public school buildings. | The measure provides the regulatory framework for the installation of 4.2 MW of photovoltaic systems in 428 public schools. The PV system will operate under the net-metering scheme. Each PV system will have a power up to 20kW. The roof tops were PV will be installed will also be thermally insulated. | Where electricity is used for heating and/or cooling, particularly heat pumps and cooling plant, and Joule effect heating. | Ongoing Planned to be completed by April 2022 |
| Renewable Energy Communities | Installation of PV Systems in Governmental buildings with the net-billing scheme. | Where electricity is used for heating and/or cooling, particularly heat pumps and cooling plant, and Joule effect heating. | Ongoing Planned for 2019-2030 |
| Support scheme for the installation or replacement of solar water heaters in households | The measure provides a grant of €350 for the installation of a solar water heater and a grant of €175 for the installation/replacement of solar panels. | Hot water production | Adopted 2004 Ongoing - the scheme is repeated annually |

| Name of policy or measure | Short description | Relevance to heating and cooling | Status |
|---|--|---|-------------------------------|
| Incentives for encouraging the use of RES in different types of developments. | On 17 November 2014, the Minister for the Interior issued an order under Article 6 of the Town and Country Planning Act setting out incentives and/or requirements for encouraging the use of RES in different types of developments. The order aims to create the conditions for encouraging natural and legal persons to produce energy from RES and concerns different types of developments. The incentive comprises an increase of the building permit ratio, or in some cases the use of RES is a requirement for applicability of other incentives under the development plans. | RES in such developments is likely to provide heating and/or cooling | Adopted 2014. Ongoing. |
| Certification of small-scale RES system installers | From 2015 a certification scheme is available for installers of small scale (up to 30kW) biomass boilers and stoves, photovoltaic systems, solar thermal system, shallow geothermal systems and heat pumps. The candidates after the completion of their training and a success in a theoretical and practical examination can be registered in a registry of certified installers of RES systems of the Ministry of Energy, Commerce and Industry. | Important for ensuring that such RES systems for heating and/or cooling perform successfully, which gives confidence to potential adopters. | Implemented 2015. Ongoing. |
| Installation of PV systems for auto-production | This measure aims at installing photovoltaic systems in the holdings of commercial and industrial consumers, for own use. Following a relevant decision of the Cyprus Energy Regulatory Authority (CERA), commercial and industrial consumers will be able to install PV systems on the roofs of their holdings, to generate electricity for own use. No grant will be given under this measure for purchasing and installing the systems. By the end of 2017 94 PV Systems of total capacity 4.276 kW were installed. | Where electricity is used for heating and/or cooling, particularly heat pumps and cooling plant, and Joule effect heating. | Implemented 2013 Ongoing |

2.2 Dimension Energy Efficiency

| Name of policy or measure | Short description (precise scope and modalities of operation) | Relevance to heating and cooling | Status |
|--|---|--|--------------------------------------|
| Support Scheme for promoting energy audits and energy management schemes in SMEs | The scope is to encourage SMEs to perform energy audits and was launched in 2019. It provides financial support to cover part of the cost of the energy audit. Financial Support for energy management systems to be considered after 2019. The scheme is implemented by the National Government using national funds | Audits will identify energy saving measures likely to mainly address heating and/or cooling. | Adopted 2019-2030 Ongoing |
| Financing tool providing soft loans for energy efficiency investments | The scope is to provide soft loan to cover the capital cost for implementing energy efficiency investments. Launch year is 2021 (estimated). Target group is households, SMEs and public sector. It will provide low interest loans. The PAM will be implemented by the National Government and local banks. Source of financing: European and Structural funds | Energy saving measures likely to mainly address heating and/or cooling. | Adopted Expected to commence 2021 |

| Name of policy or measure | Short description (precise scope and modalities of operation) | Relevance to heating and cooling | Status |
|--|--|---|---------------------------------|
| Support Scheme for promoting roof thermal insulation | The scope is to encourage households to implement the measure. It will provide financial support to cover part of the cost of the investment (possibility to combine with installation of net metering photovoltaics). The scheme was implemented by the National Government. Source of financing: National funds | Roof insulation will reduce demands of heat and/or cooling. | Adopted 2018-2020 Ongoing |
| Energy efficiency network with voluntary agreements of businesses to reduce their energy consumption | Voluntary commitment from businesses to reduce their emissions by more than 8% by 2030. It includes specific commitment for improving their energy efficiency. The voluntary agreements are implemented by Cyprus Employers & Industrialists Federation, Cyprus Energy Agency and the National Government. | Heating and cooling will be significant energy uses in many of the participating businesses from the agriculture, industry and service sectors. | Adopted 2018-2030 Ongoing |
| Applying a lower VAT rate for the renovation and repair of private dwellings. | Has been in force since December 2015 and relates to applying a lower VAT rate (5%), instead of 19%, for renovation and repair works carried out in existing private dwellings, for works consisting in applying thermal insulation on the external envelope and replacing external door and window frames. | The eligible works reduce the demands for heating and/or cooling. | Adopted 2015-2030 Ongoing |
| Net billing scheme for high efficiency cogeneration (HECHP) | The net-billing scheme applies to commercial/industrial and public administration consumer categories for the installation of HECHP systems with the prime goal of covering their own consumption. The installed capacity of each net-billing system can be up to 5 MW. Launching year 2018 | Supports viability of HECHP and thus the efficient generation of heat for space and water heating. | Adopted 2018 onwards Ongoing |
| Minimum energy performance requirements for new buildings (Law 142/2006) | All new tertiary sector buildings and all new dwellings, except those described in the Annex to the Regulation on the Energy Performance of Buildings Law (Law 142(I)/2006) must satisfy the minimum energy performance requirements established by a relevant decree adopted by the Minister for Commerce, Industry and Tourism. This measure arises from Cyprus' obligation to implement the Buildings Directive concerning the energy performance of buildings. | Heating and cooling would make up most of the energy consumption addressed. | Implemented 2009 Ongoing |
| National green public procurement action plan. | 'Green public procurement' (GPP) means that environmental factors are taken into account in entering into (public) contracts for buying products, services or works falling within the scope of the two Coordination of Public Procurement Procedures Laws, with a view to ensuring continued progress in environmental performance, by reducing environmental impacts and maintaining economic sustainability. | Energy saving measures likely to mainly address heating and/or cooling. | Implemented 2007 Ongoing |

| Name of policy or measure | Short description (precise scope and modalities of operation) | Relevance to heating and cooling | Status |
|--|--|--|------------------------------------|
| Horizontal measures (information campaigns, training eco-driving, organisation of workshops, etc.) to attain the target referred to in Article 7 of the Directive. | <p>This consists in implementing energy savings information campaigns, carrying out advertising actions, organising workshops, conducting pupils' competitions, etc. All these are organised by MECI on an annual basis.</p> <p>An annual budget of €167,000 available for the period 2021-2030</p> | Broad activities that will include energy efficiency in heating and cooling. | Implemented 2014 ongoing |
| Implementation of measures aimed at attaining the target referred to in Article 5 EED | This measure consists in implementing major renovation and individual energy savings measures in public sector buildings, as well as measures intended to improve user behaviour with a view to a more rational use of energy in public buildings | Energy saving measures likely to mainly address heating and/or cooling. | Implemented 2014 Ongoing |
| Increase in the RES fee applied on electricity. | This measure consists in increasing the RES and ES fee applied on electricity, which has been in force since 1 January 2017. From 01/01/2017 until 31/12/2019 the tax levy for RES and Energy Conservation in the electricity bill is increased from 0.5 euro cent per KWh to 1 euro cent per KWh. The measure applies to all electricity consumers excluding only the vulnerable consumers. | Agriculture, Industry, Service, Transport, Households | Implemented 2017-2019 Ongoing |
| Incentives for new buildings with higher energy efficiency than EPBD requirements | <p>New buildings and buildings renovated can receive a 5% extra building factor if they achieve higher energy efficiency than the minimum mandatory levels provided by the legislation.</p> <p>Ongoing with different minimum requirements for the period 2021-2030</p> | Energy saving measures likely to mainly address heating and/or cooling. | Implemented 2016-2020 2021-2030 |
| Energy efficiency in existing hotels | Financial support, in the form of grants, for individual energy efficiency interventions. Implemented by the National Government | Energy saving measures likely to mainly address heating and/or cooling. | Implemented 2017 Ongoing |

2.3 Dimension Energy Security

There are no specific policies and measures relevant to heating and cooling that affect energy security. In general terms, reductions through energy efficiency in end use demand improves energy security. However, a shift over time from fossil fuel heating systems to heat pumps risks increasing the stress on centralised electricity supply infrastructure. This can be ameliorated through increased local renewable power generation, particularly solar photovoltaics, and through greater energy efficiency of non-heating and cooling uses of electricity such as lighting, motive power, and appliances.

2.4 Dimension Internal Energy Market

| Name of policy or measure | Short description (precise scope and modalities of operation) | Relevance to heating and cooling | Status |
|---|--|--|---|
| Ministerial Order (no. K.D.P. 289/2015) regarding energy poverty, the categories of vulnerable customers of electricity and the measures to be taken to protect such customers. | <p>Based on the provisions of Directive 2009/72/EC the Order determines the categories of vulnerable consumers of electricity. Additionally, the Order defines the measures to protect vulnerable categories of electricity customers as follows:</p> <p>(a) reduced prices on electricity tariffs (special electricity tariff 08) which is based on a Ministerial Decision (no. K.D.P. 286/2016)</p> <p>(b) financial incentives (depending on the available budget) for installing a net-metering photovoltaic system</p> <p>(c) financial incentives (depending on the available budget) for upgrading the energy efficiency of their houses</p> <p>(d) safeguarding the continuous supply of electricity, during critical periods, to those vulnerable consumers that uninterrupted power supply is essential for reasons related to their health.</p> | Vulnerable electricity consumers, particularly where electricity use is high due to it providing heating and/or cooling. | Implemented (a) since 2006 (b) since 2013 (c) since 2014 (d) since 2015 |

2.5 Dimension Research, Innovation and Competitiveness

There are no specific measures relevant to heating and cooling.

3 NECP Heating and Cooling With Existing Measures (WEM) Scenario

The report *Comprehensive Impact Assessment of the Planned Policies and Measures of the National Energy and Climate Plan of Cyprus, Deliverable 5*, December 2019 presents the projected impacts of the existing policies and measures, referred to as the With Existing Measures (WEM) scenario on the energy mix and emissions until 2030. The results are broken down by sector, i.e. electricity, transport, and heating and cooling. The heating and cooling results are presented and considered here. Whilst some of the measures originally included in the WEM Scenario were already historic, have since ceased or have been abandoned, their individual contributions to the projected final energy demands (if any) are not provided in the NCEP or the Impact Assessment reports. We assume that the measures that were already historic at the time of developing the NCEP will have not affected the projected final energy demands. Given this, we have used the NCEP WEM Scenario projections as the basis of the following analysis.

3.1 Final Energy Demand, Primary Energy Supply and Carbon Emissions

Table 1 and Figure 1 below shows the WEM scenario projected final energy demands by energy type from 2021 to 2050 based on data in the NCEP Impact Assessment, Deliverable 5, plus the situation in 2018 as determined under Point A of the current work. The Impact Assessment and the NCEP itself do not provide values for the ambient heat captured by heat pumps, but this has been calculated and included in Table 1 here. It is understood however, that the calculation of the percentage RES in the NCEP tables includes ambient heat in the numerator and denominator, but electricity is excluded from the denominator; i.e.:

$$\text{RES share (NCEP tables)} = \frac{(\text{Biomass} + \text{Geothermal} + \text{Solar thermal} + \text{Ambient heat})}{(\text{Total (incl. Ambient heat)} - \text{Electricity})}$$

The equivalent data for primary energy supply are presented in Table 2 and Figure 2, and for carbon emissions in Table 3 and Figure 3. These have also been determined from data in the NCEP Impact Assessment, Deliverable 5, plus the situation in 2018 as determined under Point A. The emissions factor for delivered electricity has been determined from the projected WEM fuel mix for each year and is also shown in Table 3.

Indices for the three parameters are shown together for comparison in Figure 4.

Table 1: Final energy demand (FED) of the heating and cooling sector (PJ) – WEM scenario

| | 2018 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2035 | 2040 | 2045 | 2050 |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Electricity | 6.68 | 7.83 | 8.12 | 8.30 | 8.51 | 8.69 | 8.91 | 9.14 | 9.38 | 9.64 | 9.79 | 10.42 | 10.87 | 11.31 | 11.71 |
| Other oil products | 7.99 | 6.88 | 6.83 | 6.70 | 6.67 | 6.69 | 6.70 | 6.69 | 6.68 | 6.65 | 6.62 | 6.06 | 5.74 | 4.99 | 4.24 |
| Pet Coke | 2.33 | 3.16 | 2.95 | 2.74 | 2.58 | 2.49 | 2.41 | 2.33 | 2.26 | 2.18 | 2.13 | 1.92 | 1.72 | 1.58 | 1.47 |
| LPG | 1.40 | 2.61 | 2.60 | 2.56 | 2.57 | 2.61 | 2.65 | 2.70 | 2.74 | 2.78 | 2.82 | 2.81 | 2.69 | 2.48 | 2.19 |
| Biomass | 2.22 | 1.04 | 1.02 | 0.99 | 1.04 | 1.10 | 1.16 | 1.21 | 1.25 | 1.29 | 1.33 | 1.44 | 1.63 | 1.65 | 1.63 |
| Geothermal | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.07 | 0.09 | 0.14 | 0.21 |
| Solar thermal | 2.93 | 3.01 | 3.03 | 3.03 | 3.11 | 3.20 | 3.29 | 3.40 | 3.51 | 3.63 | 3.75 | 4.77 | 5.99 | 7.09 | 8.2 |
| HP ambient heat | 1.93 | 2.01 | 2.04 | 2.07 | 2.10 | 2.13 | 2.16 | 2.19 | 2.23 | 2.24 | 2.27 | 2.41 | 2.56 | 2.69 | 2.85 |
| Total | 25.55 | 26.60 | 26.65 | 26.45 | 26.64 | 26.97 | 27.34 | 27.71 | 28.10 | 28.46 | 28.76 | 29.90 | 31.29 | 31.93 | 32.50 |
| RES share | 30.4% | 32.6% | 33.2% | 33.9% | 34.8% | 35.5% | 36.2% | 36.9% | 37.6% | 38.3% | 39.0% | 44.6% | 50.3% | 56.1% | 62.0% |
| FED index (2018 = 100) | 100.00 | 104.10 | 104.31 | 103.54 | 104.26 | 105.55 | 107.01 | 108.46 | 109.97 | 111.37 | 112.55 | 117.01 | 122.47 | 124.95 | 127.19 |

Derived from: Point A and Tables 14 and 54 of the NCEP Impact Assessment Deliverable 5

Figure 1: Final energy demand (FED) of the heating and cooling sector (PJ) – WEM scenario

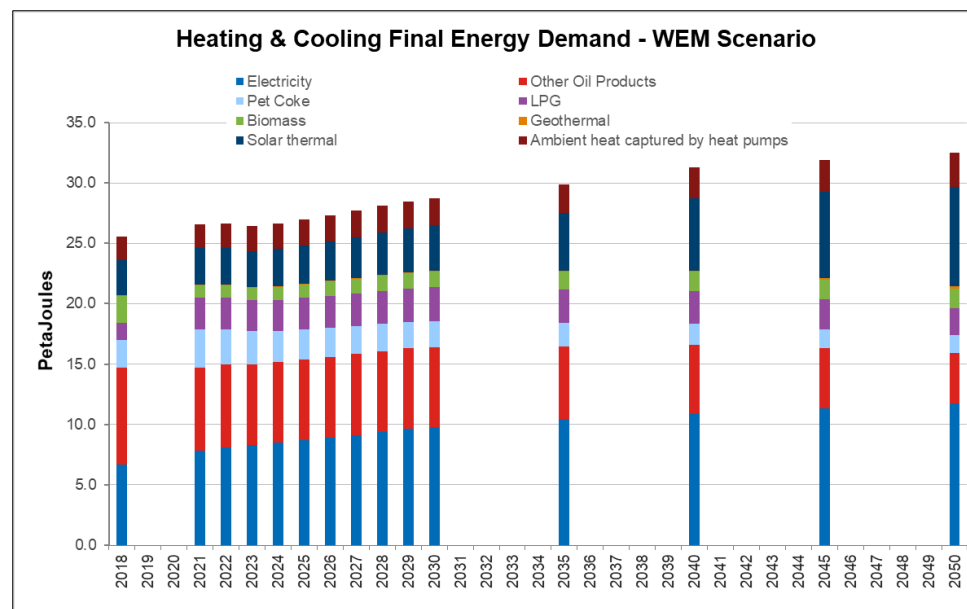


Table 2: Primary energy supply (PES) for the heating and cooling sector (PJ) – WEM scenario

| | 2018 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Fuel for power generation | 17.91 | 18.07 | 16.45 | 16.82 | 15.98 | 16.31 | 16.38 | 16.72 | 17.25 | 17.78 | 18.09 | 14.43 | 11.25 | 9.53 | 8.47 |
| Other oil products | 7.99 | 6.88 | 6.83 | 6.7 | 6.67 | 6.69 | 6.7 | 6.69 | 6.68 | 6.65 | 6.62 | 6.06 | 5.74 | 4.99 | 4.24 |
| Pet Coke | 2.33 | 3.16 | 2.95 | 2.74 | 2.58 | 2.49 | 2.41 | 2.33 | 2.26 | 2.18 | 2.13 | 1.92 | 1.72 | 1.58 | 1.47 |
| LPG | 1.40 | 2.61 | 2.6 | 2.56 | 2.57 | 2.61 | 2.65 | 2.7 | 2.74 | 2.78 | 2.82 | 2.81 | 2.69 | 2.48 | 2.19 |
| Biomass | 2.22 | 1.04 | 1.02 | 0.99 | 1.04 | 1.1 | 1.16 | 1.21 | 1.25 | 1.29 | 1.33 | 1.44 | 1.63 | 1.65 | 1.63 |
| Geothermal | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.07 | 0.09 | 0.14 | 0.21 |
| Solar thermal | 2.93 | 3.01 | 3.03 | 3.03 | 3.11 | 3.2 | 3.29 | 3.4 | 3.51 | 3.63 | 3.75 | 4.77 | 5.99 | 7.09 | 8.2 |
| HP ambient heat | 1.93 | 2.01 | 2.04 | 2.07 | 2.10 | 2.13 | 2.16 | 2.19 | 2.23 | 2.24 | 2.27 | 2.41 | 2.56 | 2.69 | 2.85 |
| Total | 36.78 | 36.84 | 34.98 | 34.98 | 34.11 | 34.59 | 34.82 | 35.30 | 35.97 | 36.60 | 37.06 | 33.91 | 31.67 | 30.15 | 29.26 |
| PES index (2018 = 100) | 100.00 | 100.15 | 95.11 | 95.10 | 92.74 | 94.03 | 94.66 | 95.97 | 97.80 | 99.51 | 100.76 | 92.20 | 86.12 | 81.97 | 79.56 |

Derived from: Point A and Tables 15, 16, 55 and 56 of the NCEP Impact Assessment Deliverable 5

Figure 2: Primary energy supply (PES) for the heating and cooling sector (PJ) – WEM scenario

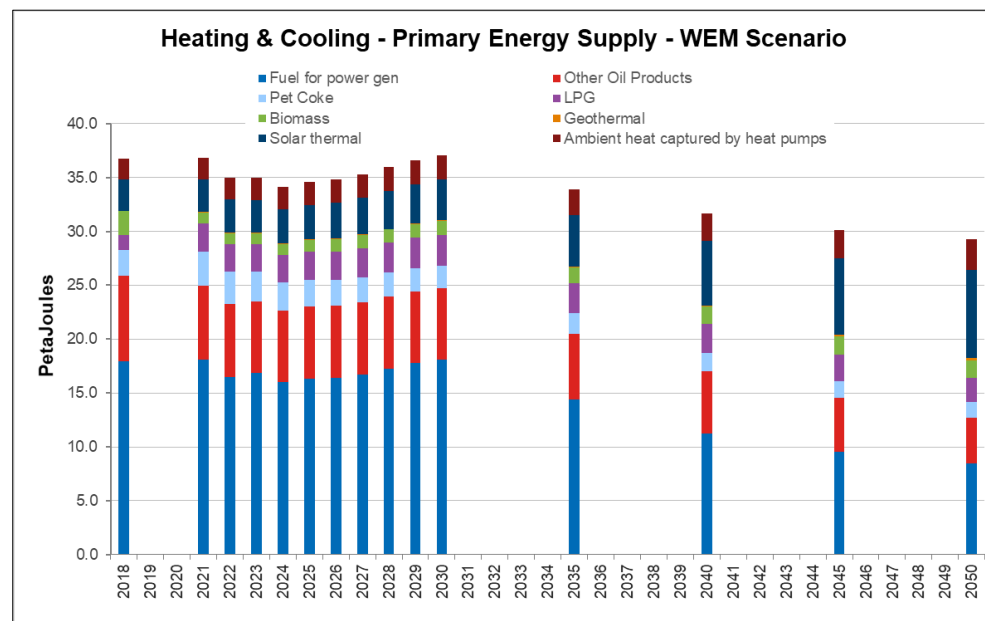


Table 3: Carbon dioxide equivalent emissions for the heating and cooling sector (ktCO₂e) – WEM scenario

| | 2018 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|---------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| All fuels | 2,339 | 2,287 | 1,867 | 1,845 | 1,747 | 1,752 | 1,720 | 1,725 | 1,748 | 1,770 | 1,782 | 1,424 | 1,207 | 1,036 | 876 |
| CO ₂ e emissions index (2018 = 100) | 100.00 | 97.75 | 79.79 | 78.88 | 74.67 | 74.89 | 73.52 | 73.73 | 74.74 | 75.68 | 76.16 | 60.86 | 51.58 | 44.31 | 37.43 |
| CO ₂ e emissions factor for delivered electricity (tCO ₂ e/PJ) | 204,942 | 159,440 | 105,162 | 104,402 | 92,334 | 91,547 | 86,206 | 85,183 | 86,058 | 86,821 | 87,132 | 53,906 | 36,596 | 27,898 | 20,898 |

Figure 3: Carbon dioxide equivalent emissions for the heating and cooling sector (ktCO₂e) – WEM scenario

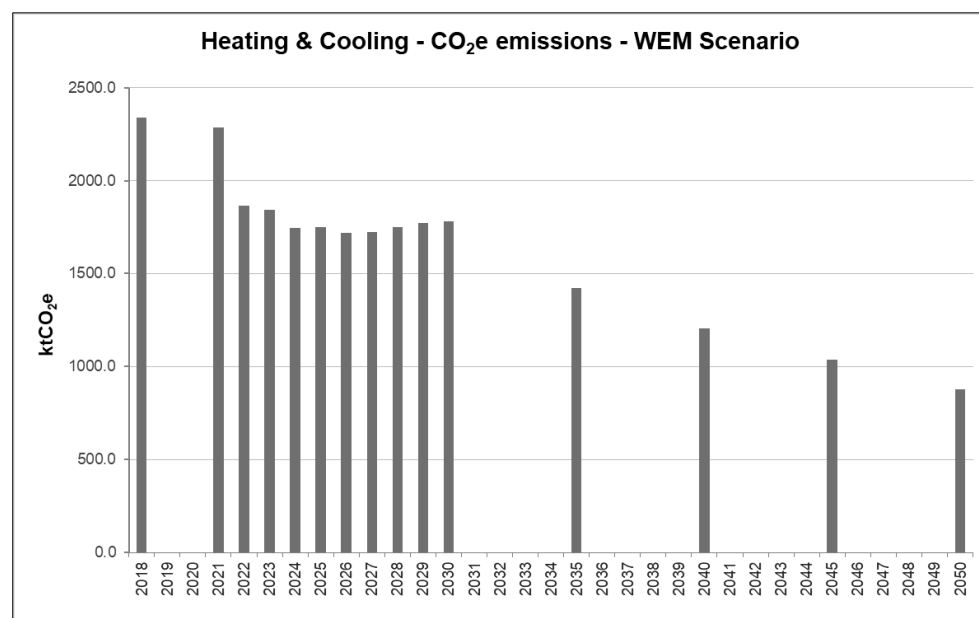
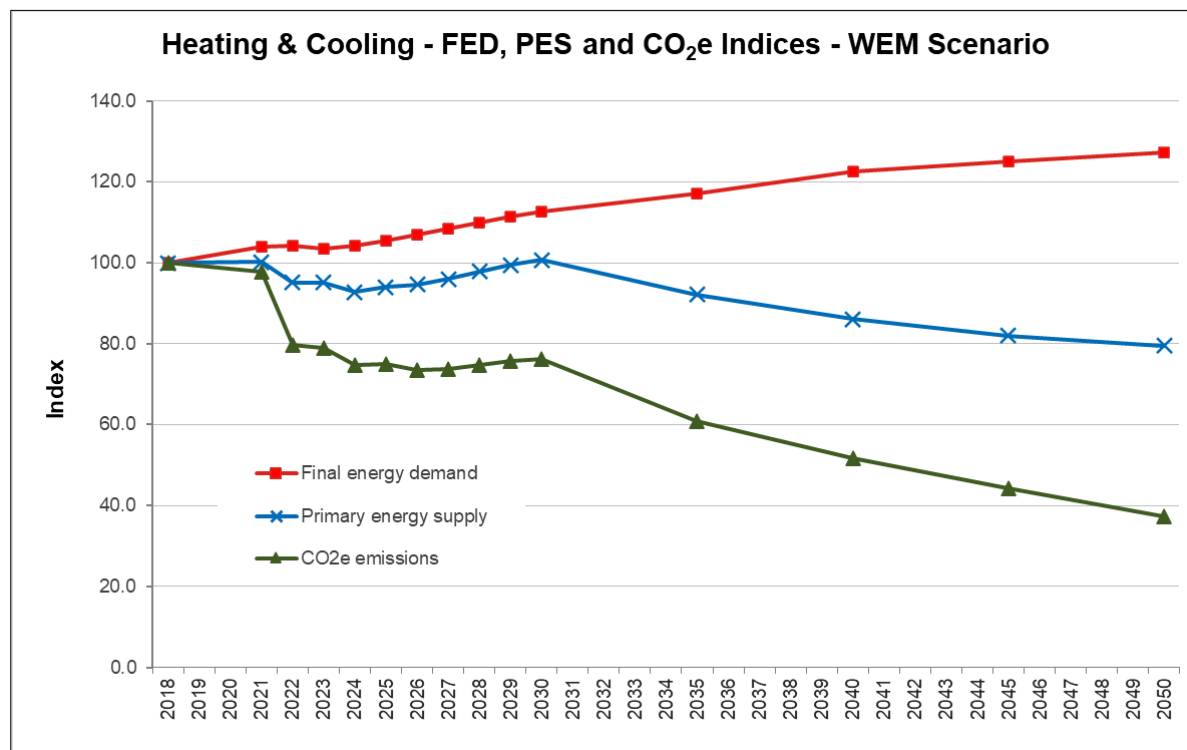


Figure 4: Carbon dioxide equivalent emissions for the heating and cooling sector (ktCO₂e) – WEM scenario





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