

[^{F1}ANNEX VIII

Potential for efficiency in heating and cooling

Textual Amendments

- F1** Substituted by [Commission Delegated Regulation \(EU\) 2019/826 of 4 March 2019 amending Annexes VIII and IX to Directive 2012/27/EU of the European Parliament and of the Council on the contents of comprehensive assessments of the potential for efficient heating and cooling.](#)

The comprehensive assessment of national heating and cooling potentials referred to in Article 14(1) shall include and be based on the following:

Part I

OVERVIEW OF HEATING AND COOLING

1. heating and cooling demand in terms of assessed useful energy⁽¹⁾ and quantified final energy consumption in GWh per year⁽²⁾ by sectors:
 - (a) residential;
 - (b) services;
 - (c) industry;
 - (d) any other sector that individually consumes more than 5 % of total national useful heating and cooling demand;
2. identification, or in the case of point 2(a)(i), identification or estimation, of current heating and cooling supply:
 - (a) by technology, in GWh per year⁽³⁾, within sectors mentioned under point 1 where possible, distinguishing between energy derived from fossil and renewable sources:
 - (i) provided on-site in residential and service sites by:
 - heat only boilers;
 - high-efficiency heat and power cogeneration;
 - heat pumps;
 - other on-site technologies and sources;
 - (ii) provided on-site in non-service and non-residential sites by:
 - heat only boilers;
 - high-efficiency heat and power cogeneration;
 - heat pumps;
 - other on-site technologies and sources;
 - (iii) provided off-site by:
 - high-efficiency heat and power cogeneration;
 - waste heat;
 - other off-site technologies and sources;

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- (b) identification of installations that generate waste heat or cold and their potential heating or cooling supply, in GWh per year:
 - (i) thermal power generation installations that can supply or can be retrofitted to supply waste heat with a total thermal input exceeding 50 MW;
 - (ii) heat and power cogeneration installations using technologies referred to in Part II of Annex I with a total thermal input exceeding 20 MW;
 - (iii) waste incineration plants;
 - (iv) renewable energy installations with a total thermal input exceeding 20 MW other than the installations specified under point 2(b)(i) and (ii) generating heating or cooling using the energy from renewable sources;
 - (v) industrial installations with a total thermal input exceeding 20 MW which can provide waste heat;
- (c) reported share of energy from renewable sources and from waste heat or cold in the final energy consumption of the district heating and cooling⁽⁴⁾ sector over the past 5 years, in line with Directive (EU) 2018/2001;
- 3. a map covering the entire national territory identifying (while preserving commercially sensitive information):
 - (a) heating and cooling demand areas following from the analysis of point 1, while using consistent criteria for focusing on energy dense areas in municipalities and conurbations;
 - (b) existing heating and cooling supply points identified under point 2(b) and district heating transmission installations;
 - (c) planned heating and cooling supply points of the type described under point 2(b) and district heating transmission installations;
- 4. a forecast of trends in the demand for heating and cooling to maintain a perspective of the next 30 years in GWh and taking into account in particular projections for the next 10 years, the change in demand in buildings and different sectors of the industry, and the impact of policies and strategies related to the demand management, such as long-term building renovation strategies under Directive (EU) 2018/844;

Part II

OBJECTIVES, STRATEGIES AND POLICY MEASURES

- 5. planned contribution of the Member State to its national objectives, targets and contributions for the five dimensions of the energy union, as laid out in Article 3(2)(b) of Regulation (EU) 2018/1999, delivered through efficiency in heating and cooling, in particular related to points 1 to 4 of Article 4(b) and to paragraph (4)(b) of Article 15, identifying which of these elements is additional compared to integrated national energy and climate plans;
- 6. general overview of the existing policies and measures as described in the most recent report submitted in accordance with Articles 3, 20, 21 and 27(a) of Regulation (EU) 2018/1999;

Part III

ANALYSIS OF THE ECONOMIC POTENTIAL FOR EFFICIENCY IN HEATING AND COOLING

7. an analysis of the economic potential⁽⁵⁾ of different technologies for heating and cooling shall be carried out for the entire national territory by using the cost-benefit analysis referred to in Article 14(3) and shall identify alternative scenarios for more efficient and renewable heating and cooling technologies, distinguishing between energy derived from fossil and renewable sources where applicable.

The following technologies should be considered:

- (a) industrial waste heat and cold;
- (b) waste incineration;
- (c) high efficiency cogeneration;
- (d) renewable energy sources (such as geothermal, solar thermal and biomass) other than those used for high efficiency cogeneration;
- (e) heat pumps;
- (f) reducing heat and cold losses from existing district networks;

8. this analysis of economic potential shall include the following steps and considerations:

- (a) Considerations:
 - (i) the cost-benefit analysis for the purposes of Article 14(3) shall include an economic analysis that takes into consideration socioeconomic and environmental factors⁽⁶⁾, and a financial analysis performed to assess projects from the investors' point of view. Both economic and financial analyses shall use the net present value as criterion for the assessment;
 - (ii) the baseline scenario should serve as a reference point and take into account existing policies at the time of compiling this comprehensive assessment⁽⁷⁾, and be linked to data collected under Part I and point 6 of Part II of this Annex;
 - (iii) alternative scenarios to the baseline shall take into account energy efficiency and renewable energy objectives of Regulation (EU) 2018/1999. Each scenario shall present the following elements compared to the baseline scenario:
 - economic potential of technologies examined using the net present value as criterion;
 - greenhouse gas emission reductions;
 - primary energy savings in GWh per year;
 - impact on the share of renewables in the national energy mix.

Scenarios that are not feasible due to technical reasons, financial reasons or national regulation may be excluded at an early stage of the cost-benefit analysis, if justified based on careful, explicit and well-documented considerations.

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The assessment and decision-making should take into account costs and energy savings from the increased flexibility in energy supply and from a more optimal operation of the electricity networks, including avoided costs and savings from reduced infrastructure investment, in the analysed scenarios.

(b) Costs and benefits

The costs and benefits referred to under point 8(a) shall include at least the following benefits and costs:

(i) Benefits:

- value of output to the consumer (heating, cooling and electricity);
- external benefits such as environmental, greenhouse gas emissions and health and safety benefits, to the extent possible;
- labour market effects, energy security and competitiveness, to the extent possible.

(ii) Costs:

- capital costs of plants and equipment;
- capital costs of the associated energy networks;
- variable and fixed operating costs;
- energy costs;
- environmental, health and safety costs, to the extent possible;
- labour market costs, energy security and competitiveness, to the extent possible.

(c) Relevant scenarios to the baseline:

All relevant scenarios to the baseline shall be considered, including the role of efficient individual heating and cooling.

- (i) the cost-benefit analysis may either cover a project assessment or a group of projects for a broader local, regional or national assessment in order to establish the most cost-effective and beneficial heating or cooling solution against a baseline for a given geographical area for the purpose of planning;
- (ii) Member States shall designate the competent authorities responsible for carrying out the cost-benefit analyses pursuant to Article 14. They shall provide the detailed methodologies and assumptions in accordance with this Annex and establish and make public the procedures for the economic analysis.

(d) Boundaries and integrated approach:

- (i) the geographical boundary shall cover a suitable well-defined geographical area;
- (ii) the cost-benefit analyses shall take into account all relevant centralised or decentralised supply resources available within the system and geographical boundary, including technologies considered under point 7 of Part III of this Annex, and heating and cooling demand trends and characteristics.

(e) Assumptions:

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- (i) Member States shall provide assumptions, for the purpose of the cost-benefit analyses, on the prices of major input and output factors and the discount rate;
 - (ii) the discount rate used in the economic analysis to calculate net present value shall be chosen according to European or national guidelines;
 - (iii) Member States shall use national, European or international energy price development forecasts if appropriate in their national and/or regional/local context;
 - (iv) the prices used in the economic analysis shall reflect socio economic costs and benefits. External costs, such as environmental and health effects, should be included to the extent possible, i.e. when a market price exists or when it is already included in European or national regulation.
- (f) Sensitivity analysis:
- (i) a sensitivity analysis shall be included to assess the costs and benefits of a project or group of projects and be based on variable factors having a significant impact on the outcome of the calculations, such as different energy prices, levels of demand, discount rates and other.

Part IV

POTENTIAL NEW STRATEGIES AND POLICY MEASURES

9. overview of new legislative and non-legislative policy measures⁽⁸⁾ to realise the economic potential identified in accordance with points 7 and 8, along with their foreseen:
- (a) greenhouse gas emission reductions;
 - (b) primary energy savings in GWh per year;
 - (c) impact on the share of high-efficiency cogeneration;
 - (d) impact on the share of renewables in the national energy mix and in the heating and cooling sector;
 - (e) links to national financial programming and cost savings for the public budget and market participants;
 - (f) estimated public support measures, if any, with their annual budget and identification of the potential aid element.]

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- (1) [^{F1}The amount of thermal energy needed to satisfy the heating and cooling demand of end-users.]
- (2) [^{F1}The most recent data available should be used.]
- (3) [^{F1}The most recent data available should be used.]
- (4) [^{F1}The identification of ‘renewable cooling’ shall, after the methodology for calculating the quantity of renewable energy used for cooling and district cooling is established in accordance with Article 35 of Directive (EU) 2018/2001, be carried out in accordance with that Directive. Until then it shall be carried out according to an appropriate national methodology.]
- (5) [^{F1}The analysis of the economic potential should present the volume of energy (in GWh) that can be generated per year by each technology analysed. The limitations and interrelations within the energy system should also be taken into account. The analysis may make use of models based on assumptions representing the operation of common types of technologies or systems.]
- (6) [^{F1}Including the assessment referred to in Article 15, paragraph 7 of Directive (EU) 2018/2001.]
- (7) [^{F1}The cut-off date for taking into account policies for the baseline scenario is the end of the year preceding to the year by the end of which the comprehensive assessment is due. That is to say, policies enacted within a year prior to the deadline for submission of the comprehensive assessment do not need to be taken into account.]
- (8) [^{F1}This overview shall include financing measures and programmes that may be adopted over the period of the comprehensive assessment, not prejudging a separate notification of the public support schemes for a State aid assessment,]

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