RESTORE

Renewable Energy based seasonal Storage Technology in Order to Raise Economic and environmental sustainability of DHC

Deliverable D6.11 Report on regulations & standards for wide replication along EU

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Summary

The deliverable D6.11 Report on regulations & standards for wide replication along EU summarizes the work carried out in the task 6.4: Regulations and Standards for EU-wide replication.

Starting from the analysis of the EU Green Deal, the task was focused on three main pillars:

- Energy Efficiency Directive
- Renewable Energy Directive
- Taxonomy

Starting from the European legislation, Chapter 2 includes the description of the three different measures, with particular focus on the renewable energy, waste heat recovery and District Heating

The reports also includes:

- Chapter 3: Analysis of the Waste Heat and its valorisation in the European Legislation
- Chapter 5: Policy recommendations aim to capture the full potential of waste heat.

In general terms, this deliverable provides information to have a better understanding of the regulatory framework that surrounds the RESTORE solution which is crucial to be considered for future steps in the development of the solution.

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1. Introduction

Restore project proposes 2 innovative technological solutions for District Heating&Cooling.

The first technology is an innovative thermal energy storage system using heat from chemical reactions, the Thermochemical Energy Storage (TCES). It provides daily and seasonal competitive energy storage due to its high energy density, very low energy losses and its low-cost. The system represents a key development due to the fact that it allows harnessing the enormous amount of energy that is normally wasted due to the mismatch between energy demand (loads) and energy generation (related to the availability of the renewable resource or waste heat), mainly occurring between seasons.

The second technology is a reversible Heat Pump (HP)/Organic Rankine Cycle (ORC) and is in combination with the Thermochemical Energy Storage (TCES). HP/ORC adapts the energy from different Renewable Energy Sources to feed the storage system. This allows for integrating a wide variety of renewable technologies as well as waste heat into the whole system to finally supply the energy demand under the specific conditions laid down by each District Heating network.

Both solutions would tackle the main barriers for a wide deployment of renewable energy technologies and waste heat in the existing and future DHC networks.

The European regulation plays a crucial role in promoting the adoption of heat pumps and energy storage in district heating systems for several reasons:

1. Harmonization and Standardization

- Common standard requirements can facilitate the integration of Restore solutions in District Heating network
- Common standard requirements can reduce market segmentation and costs

2. Investment Incentives:

- The EU can provide financial incentives, such as grants, subsidies, or tax breaks, to encourage the installation and operation of reversible Heat Pump (HP)/Organic Rankine Cycle (ORC) and Thermochemical Energy Storage (TCES) in district heating networks.
- These incentives can help offset the initial investment costs and make these technologies more economically attractive to both consumers and operators.

3. Grid Integration and Flexibility:

- EU regulations can address the challenges of integrating heat pumps and energy storage into the electricity grid, ensuring grid stability and reliability.
- This includes setting rules for demand-side response, energy storage management, and grid connection procedures.

4. Research and Development:

- The EU can support research and development projects to advance the performance, efficiency, and affordability of heat pumps and energy storage technologies.

- This can drive innovation and accelerate the commercialization of new and improved solutions.

5. Environmental Benefits:

- Heat Pump (HP)/Organic Rankine Cycle (ORC) and Thermochemical Energy Storage (TCES) can contribute to reducing greenhouse gas emissions and improving air quality.
- EU regulations can support the deployment of these technologies to achieve ambitious climate goals.
- Reduction of dependency on fossil fuel and enhance energy security.

6. Social Benefits:

- Creation of jobs in the renewable energy sector.

The Deliverable D6.4 is focused on the regulatory aspects, with special attention to Heat Pump (HP)/Organic Rankine Cycle (ORC) and Thermochemical Energy Storage (TCES) technologies. A clear framework, incentive schemes, policy support can accelerate a wide replication of Restore solutions with economical and environmental benefits.

2. EU Green Deal

The EU Green Deal is a comprehensive plan proposed by the European Commission to make the European Union (EU) climate-neutral by 2050. It aims to transform the EU into a modern, resource-efficient and competitive economy, while ensuring that no one is left behind in the transition.

The Green Deal sets out a number of ambitious goals, including:

- Reducing greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels.
- **Investing in renewable energy and energy efficiency.**
- Promoting sustainable agriculture and forestry.
- Protecting biodiversity.
- Creating new jobs and economic opportunities in the green economy.

The Green Deal is a major investment for the EU, with an estimated €1 trillion needed to achieve its goals. However, the Commission believes that the benefits of the Green Deal will far outweigh the costs, including improved air quality, reduced pollution, and increased energy security.

The Green Deal is a complex and ambitious plan, but it is essential if the EU is to meet its climate goals. It requires a coordinated effort from all EU member states, as well as from businesses, investors, and citizens.

Here are some of the key elements of the Green Deal:

- Climate Law: This law will set legally binding targets for reducing greenhouse gas emissions.1
- **Renewable Energy Directive:** This directive will set targets for the share of renewable energy in the EU's energy mix.
- **Energy Efficiency Directive:** This directive will set targets for improving energy efficiency in buildings, transport, and industry.
- Circular Economy Action Plan: This plan will promote a circular economy, where resources are used more efficiently and waste is minimized.

The Green Deal is a major challenge for the EU, but it is also a major opportunity. If the EU can successfully implement the Green Deal, it will be a world leader in the fight against climate change.

2.1. Energy Efficiency Directive

The EU energy efficiency directive (EED) originally adopted in 2012 to help the EU and its Member States make energy efficiency improvements, started the amending iter in 2021; The recast contains several points whose impact will probably show its effects for years to come,

reshaping some aspects related to energy efficiency targets, savings obligations, waste heat recovery and new definition of DHC and HCHP.

On 14 July 2021 – in particular - the European Commission adopted the 'Fit for 55' package, adapting existing climate and energy legislation to meet the new EU objective of a minimum 55% reduction in green-house gas (GHG) emissions by 2030.

The “Fit for 55” package included the recast of the Energy Efficiency Directive (EED), aligning its provisions to the new 55% GHG target. The EED currently sets out the level of energy savings the EU needs to make to meet the agreed goal of 32.5% energy efficiency improvements by 2030.

Another important element of the package is the revision of the Renewable Energy Directive (new RED III), which will help the EU deliver the new 55% GHG target.

Under new RED III recently approved, the EU is obliged to ensure at least 36% of its energy consumption comes from renewable energy sources by 2030.

Legislative ITER

The revision of the Energy Efficiency Directive is among those legislative under the Fit For 55 Package presented by the European Commission on 14 July 2021.

Some key aspects of the Commission’s proposal include:

1) an increasing EU 2030 energy efficiency target in final and primary energy consumption of 36% and 39%, respectively;
2) New annual energy saving obligations;
3) a new definition of efficient district heating and cooling (article 24);
4) a new definition of high-efficiency CHP and Waste Heat (Annex III);
5) a stricter planning and follow-up of the comprehensive assessments (CAs) on heating and cooling;

Overall, the proposal includes important recommendations such as the need for stronger coherence among the different tools and measures available to transform the EU heat market and more synergies among the different legislative instruments in place. However, there are other aspects that need to be further assessed to really exploit the EU energy efficiency potential of DHC and more broadly of the overall EU heating and cooling sector, in an effective and forward-looking way.

Recent developments

In March 2023, the trialogue negotiations ended. However, it took a few more technical meetings to finalize some parts of the directive, for example Annex III (high efficiency

cogeneration). The final agreement collects positive aspects from both the Parliament and the Council texts:

Description

1) An increasing EU 2030 energy efficiency target

- The European Parliament and Council negotiators reached a provisional agreement on 10 March 2023. It sets a reduction of primary and final energy consumption by 11.7% (compared to the 2020 scenario) at EU level, bringing the total up to 36% (for final energy consumption) and 39% (for primary energy consumption).
- The Council successfully kept its position to set an indicative, non-binding primary energy saving target, both at EU and national level. The final energy saving target, on the other hand, it is binding. This target falls short to ensuring high energy savings, which would result lower need for fossil fuel import.

EU's primary energy saving target	11,7%	Indicative
EU's final energy saving target	11,7%	Binding
National contributions	with 2,5% margin	Indicative

2) Annual energy saving obligations

Annual energy savings by member states shall begin as following:

From 1 January 2021 to 31 December 2023:
0,8% of annual final energy consumption

From 1 January 2024 to 31 December 2025:
1,3% of annual final energy consumption

From 1 January 2026 to 31 December 2027:
1,5% of annual final energy consumption

From 1 January 2028 to 31 December 2030:
1,9% of annual final energy consumption

3) New definition of efficient district heating and cooling

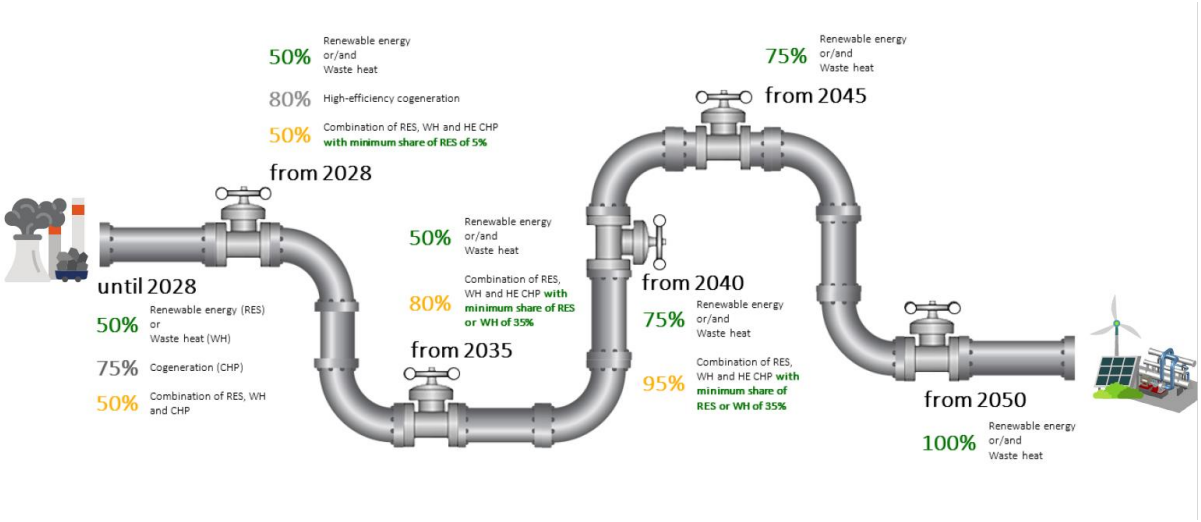
In line with EHP's position, the final text mirrors the Council's approach on the efficient district heating and cooling systems definition. Renewable and waste heat are both counted towards the targets jointly, while the Council's alternative definition based on

CO2 emissions remains an option for Members States with different decarbonization approach.

High efficiency CHP (HE CHP) must reduce primary energy consumption by 10% vs power-only & heat only

- HE CHP must emit less than 270 g of CO2/kWh of total energy output
- No new CHP using fossil fuels, except for natural gas until 2030 (DHC timeline following*)

Regional and local authorities will also have to develop local heating and cooling plans for municipalities above 45k inhabitants



New EDHC timeline

The final high efficiency cogeneration definition is also beneficial for our largest heat generation solution, as the 270gCO2/kWh threshold is limited to renovated and new CHP installations. However, CHP units emitting more have to develop a plan to decrease their emissions and reach the 270gCO2/kWh target by 2034.

4) High efficiency CHP (HE CHP) and Waste Heat

Waste heat recognized as comparable RES solution throughout the directive with concrete measures to recover and utilize it, particularly in High efficiency CHP (HE CHP) key to meet efficient DHC status un-til 2044, with >35% share of RES and waste heat as of 2035.

HE CHP can be indeed used as of 2045 in combination with >75% RES and waste heat, while no new heat source in new/refurbished DHC running on fossil fuels are allowed, except for natural gas until 2030.

5) Comprehensive assessments on heating and cooling

The text on the Energy Efficiency National Fund also introduces financial support schemes for energy efficiency improvements for newly built or substantially refurbished DHC, which will be beneficial for the sector:

- Enterprises with an average annual consumption higher than 85TJ of energy over the previous 3 years have to implement an energy management system (at the latest 2 years after the transposition deadline)
- Enterprises with an average annual consumption higher than 10TJ of energy over the previous 3 years are subject to an energy audit (at the latest 1 year after the transposition deadline and at least every 4 years)

From June 2024, comprehensive heating and cooling assessment should be integrated into National Energy and Climate Plans (NECPs)

2.2. Renewable Energy Directive

The EU Renewable Energy Directive (RED) was adopted in 2009 to deliver a minimum 20% share of renewable energy sources (RES) in EU final energy consumption by 2020 and substantially revised (recast) in 2018 to deliver the EU objective of a minimum 32 % share of RES in final energy consumption by 2030.

As part of the European Green Deal, the EU adopted even more ambitious climate goals, setting a target of -55 % greenhouse (GHG) emissions by 2030 and a long-term goal of net zero GHG emissions by 2050. Both targets were enshrined in the new European Climate Law, agreed by the Council and the Parliament in May 2021. However, achieving these climate goals will require substantial changes to existing EU energy legislation, including a much higher share of RES in the energy mix of the EU and its Member States. As a result, the 'fit for 55' package adopted by the European Commission on 14 July 2021 included a significant revision of the RED.

The revision of the Renewable Energy Directive set indeed a more ambitious a target in terms of RES share, now **increased to 42,5 (with a maximum of 45%) by 2030.**

The package aims at aligning the existing energy and climate legislative framework – proposed in 2016 – with the revised Climate target (at least 55% carbon emission reduction in 2030 - compared to 1990 levels) and the long-term objective of climate neutrality by 2050.

Moreover, the agreement also provides for more stringent criteria for the production of energy from biomass, which however remains counted as renewable.

The main revision of the Renewable Energy Directive that **will impact Restore project** (among others):

1) a target in terms of RES share increased to 42.5% (BINDING), up to 45% (NON-BINDING) by 2030 at EU level **(+)**
2) GHG reduction criteria **(-)**
3) reinforced sustainability criteria for biomass **(-)**
4) framework for the deployment of RES across sectors with new targets for the use of renewable energy sources and for heating and cooling, which becomes binding **(+)**

5) an increased (indicative) target in terms of renewable and waste heat share to green the mix of district heating and cooling networks; **(+)**
6) new provisions to accelerate the uptake of renewable energy sources within industries **(+)**
7) increased role of waste heat recovery **(+)**
8) sector integration - strengthened cooperation frameworks with electricity DSO-TSO and between waste heat actors **(+)**
9) fast permitting process **(+)**

***(+) = positive; (=) = neutral; (-) = negative**

Description

1) RES share target

- The Primary Woody Biomass definition is not included in the final text. There is no cap on the counting of biomass towards the 2030 renewable targets and certain types of biomass (residues) are still eligible for subsidies.
- **The RES share target is set at 42,5% by 2030, with plans to increase it to 45% in a non-binding manner**.
- For **bioenergy**, and particularly **Article 3 on cascading**, the agreement:

  Improves the definition of **Industrial Grade Roundwood** with the focus on suitability for industrial use rather than feasibility to debark. It introduces market conditions to reflect the importance of applying the cascading principle. However, the definition includes pulpwood, which can be problematic as it is often used – in addition to being used by the pulp and paper industry – to make pellets for heat production.

  Cascading principle: woody biomass must be "used according to its highest economic and environmental added value in the following order of priorities: 1) wood-based products, 2) extending their service life, 3) re-use, 4) recycling, 5) bio-energy and 6) disposal".

  - There is **no direct financial support to the production of energy from saw logs, veneer logs, industrial grade roundwood, stumps and roots**. However, the **use of residues for energy production remains eligible for financial support** and considered as renewable.
  - **No support is to be granted or renewed** to the production of electricity from forest biomass in **electricity-only** installations*. Exceptions include:
    - consumption in just transition areas;
    - outermost regions;
    - installations deploying CCUS.

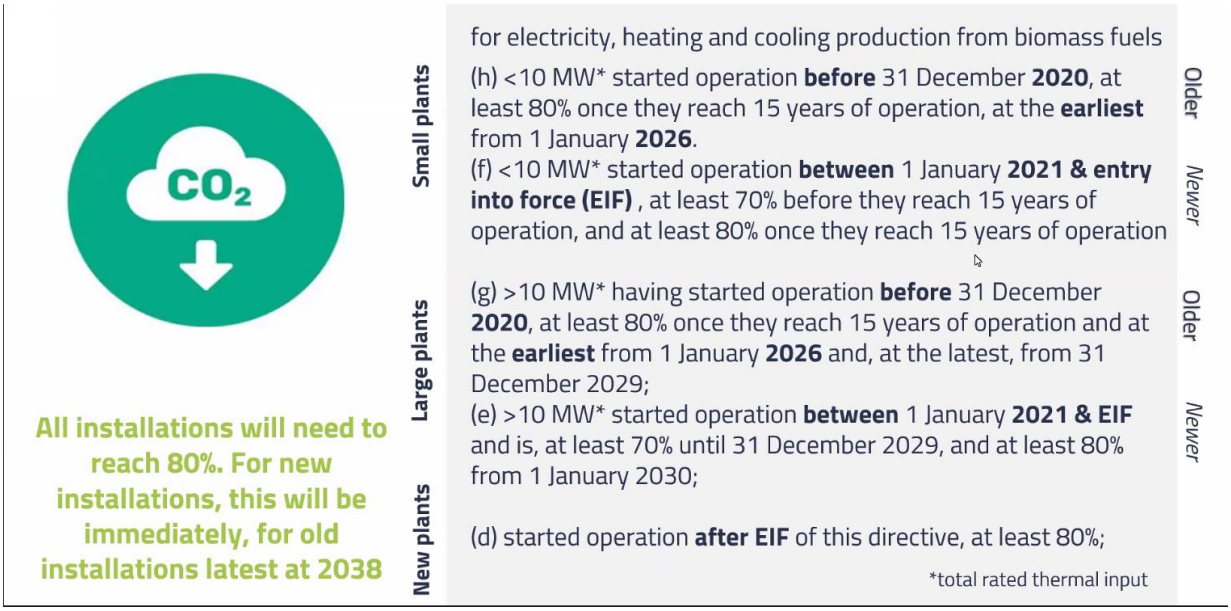
**For eligibility for financial support, the provision is without prejudice to support granted under support schemes approved by 25 December 2021*

Although it does not directly affect the RESTORE system itself, it may affect a potential energy source coupled to RESTORE, thus the authors consider it relevant to mention this information

2) GHG Criteria

GHG emissions savings from the use of biomass for electricity, heating and cooling production from biomass fuels (than the fossil fuel alternative):

- Installations beginning operations after entry into force of the directive – at least 80%;
- Installations (over 10 MW) beginning operation between 01 January 2021 and entry into force of the directive – 70% until end of 2029, 80% from beginning of 2030 ;
- Installations (over 10 MW) that began operation before 31 December 2020 – 80% once they reach 15 years of operation (earliest 01 January 2026, latest 31 December 2029);
- Installations (< 10 MW) started operation before 31 December 2020, at least 80% once they reach 15 years of operation, at the earliest from January 2026;
- Installations (< 10 MW) started operation between 1 January 2021 and entry into force of the directive, at least 70% before they reach 15 years of operation and at least 80% once they reach 15 years of operation.



Note: All installations will eventually be required to meet an 80% greenhouse gas savings compared with a fossil alternative. This means that biomass can only have a little bit of lifecycle emissions from sourcing and processing (for example at most, only 20% of the emissions that would be released from using fossil fuels can be released in the drying of biomass by natural gas, and the transport in a truck using diesel).

Under the previous version of RED, only new installations had to meet these criteria on lifecycle emissions, but after a grace period for existing installations, all installations (above the exemption threshold of 7,5 MW) will need to be able to show at least an 80% savings.

3) Frameworks and targets

The REDIII text establishes a binding target for the share of renewables in heating and cooling, with an annual increase of 0.8 percentage points for 2021-2025 and 1.1 percentage points for 2026-2030.

The ambition is even higher for District Heating and Cooling, which is required to fulfil a 2.2% annual increase in renewables shares, although the target remains indicative. The compromise text also foresees specific renewable targets for buildings and industry, **which present the opportunity to account for waste heat (WH).**

Following, a general overview of different annual RES target by sector, introduced in the compromise text, divided according to binding Vs indicative ones:

Sector	Renewables Target	Nature
H&C	0.8 pp (2021-2025) 1.1 pp (2026-2030)	Binding
DHC	2.2 pp	Indicative
Buildings	49% (2030)	Indicative
Industry	1.6 pp	Indicative
Innovative renewable energy technology	5% of newly installed renewable energy capacity	Indicative

4) Accelerate RES within industries

For industry sector has been provided an indicative annual increase of 1.6% of RES shares in the energy mix, with WH included if supplied by efficient DHC.

This Directive is key for the sector and has become the new corner stone also for DH in EU legislation, with the introduction (in 2016) of a dedicated target on the share of renewable and waste heat as well as a dedicated article on DHC and an increased (indicative) target in terms of renewable and waste heat share to green the mix of district heating and cooling networks.

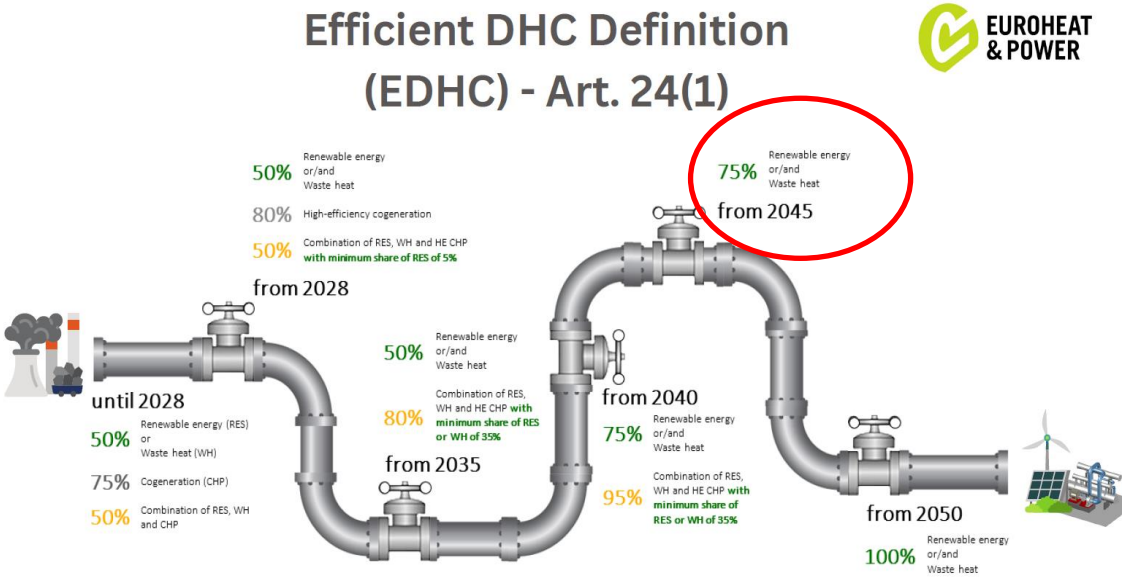
For the first time, the RED III integrates a toolbox of measures (risk mitigation frameworks, incentive schemes, increased coordination of WH actors) available to Member States to stimulate the uptake of RES and waste heat for heating and cooling. National climate and energy plans will be the main vehicle for converting these requirements into workable instruments to uptake clean heat projects.

Also in the Energy Efficiency Directive, Renewable and waste heat are counted towards the targets jointly, while the Council's alternative definition based on CO2 emissions remains an option for Members States with different decarbonization approach.

Within the same EED, **Waste heat is recognized throughout the directive with "concrete measures to recover and utilize it**".

5) Increased role of Waste Heat recovery

As mentioned, Waste heat also gained recognition as a vital solution to aid decarbonization, with an increase (indicative) target in terms of renewable and waste heat share to green the mix of district heating and cooling networks (so equalizing WH to RES) and a strengthened cooperation framework with electricity DSO-TSO and between waste heat actors, where needed. Among that, from 2045 on, in the Energy Efficiency Directives is stated that both Waste heat recovery and RES will be the only energy sources allowed for EDHC.



6) Sector integration

After the legislative proposal put forward by the European Commission as part of its RepowerEU plan (May 2022) to phase out energy imports from Russia while accelerating the clean energy transition and according to the ITRE report, Member States should aim for 5 % of newly installed RES capacity to come from innovative renewable energy technologies, with a further indicative target for storage technologies that can improve demand-side flexibility and deliver a 5 % reduction in peak electricity demand by 2030.

It also provides an increase in coordination with electricity grids (and gas networks), enabling DHC flexibility services to participate in the electricity market, also strengthening cooperation frameworks with electricity DSO-TSO and between waste heat actors, providing a DSO to assess DHC services every 4 years, all of this reflecting a growing awareness of the role of DHC networks in a resilient and increasingly variable energy system.

7) Fast permitting process

The legislation also provides for the streamlining of procedures for granting permits for new systems, such as solar panels, wind farms or others, or for the adaptation of existing ones. The authorities of the various Member States will not be able to take more than **12**

months for the processes in the so-called **"reference areas for renewable energy**". Outside these areas, the procedure **cannot exceed 24 months.**

Important steps

Council:
The European Parliament has formally approved the update of the Renewable Energy Directive REDIII, and now it needs to be formally endorsed by the Council in order to come into law.

European Parliament:

- ITRE agrement: 30 March2023
- Plenary vote: 12 September 2023
- Council final approval: Q4 2023
- EU gazette publication: Q4

Final adoption

- RED III Directive should be published in the Official Journal by Q3 2023;
- Enter into force by Q3 2023
- Each Member State must adopt it by Q4 2024

2.3. Taxonomy

EU Taxonomy is a **green classification system** that translates the EU's climate and environmental objectives into criteria for specific economic activities for investment purposes.

It recognizes as green, or 'environmentally sustainable', economic activities that make a **substantial** contribution to at least one of the **six EU's climate and environmental objectives**, while at the same time not significantly harming any of these objectives and meeting minimum social safeguards.

The six EU environmental principles or objectives, according to the Taxonomy regulation are the following:

1. climate change mitigation,
2. climate change adaptation,
3. sustainable use and protection of water and marine resources,
4. transition to a circular economy,
5. pollution prevention and control, and
6. protection and restoration of biodiversity and ecosystems.

It also sets out **four conditions** that an economic activity has to meet to be recognised as **Taxonomy- aligned**:

- making a substantial contribution to at least one environmental objective;

- doing no significant harm (DNSH) to any other environmental objective;

- complying with minimum social safeguards;

- complying with the technical screening criteria

Companies can reliably use the EU Taxonomy to **plan their climate and environmental transition and raise finance** for this transition, while Financial companies can use the EU Taxonomy to **design credible green financial products**.

Nevertheless, the EU Taxonomy **is not a mandatory list of economic activities for investors** to invest in. Nor does it set mandatory requirements on environmental performance for companies or for financial products. Investors are free to choose what to invest in. However, it is expected that over time, the EU Taxonomy will be an enabler of change and encourage a transition towards sustainability.

Economic activities that are not recognized by the EU Taxonomy Delegated Acts as substantially contributing to one of the EU's climate and environmental objectives **are not necessarily environmentally harmful or unsustainable**, like any other applications that, even if compliance with the above-mentioned principals, does not found a specific mention inside the technical annex. For this reason, **not all activities that can make a substantial contribution to the environmental objectives are yet part of the EU Taxonomy Delegated Acts.**

EU taxonomy parameters offer a common understanding, for both public and private investors, to clearly redefine their business model, at the same time embracing a more oriented vision towards energy efficiency and sustainability criteria.

However, this guide is part of a broader framework, above which the **6 general principles** to be respected are included, so that we can speak of a **"taxonomy compliance"**. Commission Delegated Regulation (EU) 9.3.2022. In fact, if a specific case is not explicitly included in the technical annexes, its compliance is not excluded in advance, but it can be demonstrated starting from the 6 principles defined by the European Commission.

The technical screening criteria for **'substantial contribution'** to an environmental objective ensure that the economic activity either has a substantial positive environmental impact or substantially reduces negative impacts on the environment, e.g. substantially reduced levels of greenhouse gas emissions.

The technical screening criteria for **'do no significant harm'** ensure that the economic activity does not impede on the other environmental objectives from being reached, i.e. it has no significant negative impact on them

Both sets of criteria together ensure coherence between the objectives in the EU Taxonomy and **guarantee that progress towards one objective is not made at the expense of another**.

Given the strong impact that research and technical developments have had and continue to have on the EU continent and worldwide, the EU Taxonomy regulation represents a "living document" that collects and analyses the various processes in place (eg. Research and innovation), making use of the support of the EU Technical Expert Group (TEG), which is

invited, during the years, to update this guide, opening to dialogue with third parties, institutions and experts.

Considering the above-mentioned analysis, we highlight **how the following technologies must therefore be fully included in the criteria of the EU Taxonomy, as they are compliant with the 6 principles highlighted.**

The main goal of the information contained herein is to identify among the Restore applications, those already compliant with taxonomy or in any case deductible starting from the six EU environmental principals and the four conditions abovementioned.

For the categories already included in the technical annex (TA), those relating to the sectors of interest of Restore have been reported, including data and dedicated cards.

Regulatory Framework

- Taxonomy Regulation - Regulation (EU) 2020/852 (Taxonomy) on the establishment of a framework to facilitate sustainable investment

- Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021 - supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives

- Delegated Regulation (EU) 2021/2178 of 6 July 2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by specifying the content and presentation of information to be disclosed by undertakings subject to Articles 19a or 29a of Directive 2013/34/EU concerning environmentally sustainable economic activities, and specifying the methodology to comply with that disclosure obligation

- Taxonomy Complementary Delegated Act - amending Delegated Regulation (EU) 2021/2139 as regards economic activities in certain energy sectors and Delegated Regulation (EU) 2021/2178 as regards specific public disclosures for those economic activities.

HEAT PUMPS

LHP technology is eligible within the taxonomy framework, except for the specific technical indications to be checked in the following forms.

4.16 Installation and operation of Electric Heat Pumps

Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Installation and operation of electric heat pumps

Principle	• Support a transition to a net-zero emissions economy • Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy • Ensure that economic activities meet best practice standards • Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target • Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds • Electric heat pumps have no direct emissions and can increase the use of low carbon electricity with a high coefficient of performance.
Metric & Threshold	Currently, installation and operation of electric heat pumps is eligible, if: • **Refrigerant threshold: GWP ≤ 675;** and • Must meet energy efficiency requirements stipulated in the implementing regulations under the Ecodesign Framework Directive[266] The criterion is subject to regular review.

Rationale
Providing energy services in a low-carbon manner, particularly for heating and cooling distribution will require investments in newer and more efficient delivery models. Heat pumps are an energy efficient heating/cooling method. Heat pumps will play an important role in the European Union's decarbonisation efforts.
The Taxonomy criteria on the Installation and Operation of Heat Pumps, provide guidance that seeks to foster the market as a whole and ultimately lower the emissions intensity of the energy services that society needs.

Do no significant harm assessment

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	• Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management • plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.

WASTE HEAT RECOVERY WITH INDUSTRIAL HEAT PUMP

WHR technology is eligible within the taxonomy framework, except for the specific technical indications to be checked in the following forms.

4.25 Production of Heat/Cool using Waste Heat

Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of heating and cooling using Waste Heat

Principle	• Support a transition to a net-zero emissions economy • Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy • Ensure that economic activities meet best practice standards • Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target • Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	All recovery of waste heat is eligible.

The operation of waste heat infrastructure is eligible because the emissions from the underlying economic activity would be generated with or without the waste heat recovery system. Hence the waste heat recovery system would not increase operational emissions.
Waste heat is heat that is discarded by an existing industrial process.

Key environmental aspects to be considered for the production of heat/cool using waste heat are generally moderate and should mostly be covered by considerations at the heat / cool source.

(2) Adaptation	• Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).
(5) Pollution	Pumps and whatever kind of equipment is covered by Ecodesign and used should comply, where relevant, with the top class requirements of the energy label, and otherwise be compliant with the latest implementing measures of the Ecodesign Directive and representing the best available technology.
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that: • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6:

Biodiversity Conservation and Sustainable Management of Living Natural Resources;
• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and
• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

DISTRICT HEATING/COOLING

4.15 District Heating/Cooling Distribution

Sector classification and activity

Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Construction and operation of pipelines and associated infrastructure for distribution of heating and cooling, ending at the sub-station or heat exchanger.

Mitigation criteria

Principle

- Support a transition to a net-zero emissions economy
- Avoidance of lock-in to individual equipment that do not support the transition to a net-zero emissions economy
- Ensure that economic activities meet best practice standards, including use of best available climate-friendly refrigerant
- Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target
- Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
- Support the installation and operation of energy efficiency upgrades

Metric & Threshold

Construction and operation of pipelines and associated infrastructure for distributing heating and cooling is currently eligible, if the system meets the definition of efficient district heat/cool systems in the EU Energy Efficiency Directive.
The EU Energy Efficiency Directive defines “efficient district heating and cooling” as a district heating or cooling system using at least 50% renewable energy or 50% waste heat or 75% cogenerated heat or 50% of a combination of such energy and heat.
The following activities are always eligible:

- Modifications to lower temperature regimes
- Advanced pilot systems (control and energy management systems, Internet of Things)

Rationale

Providing energy services in a low-carbon manner, particularly for heating and cooling distribution will require investments in newer and more efficient delivery models. The Taxonomy criteria on District Heating and Cooling Networks provide guidance that seeks to foster the market as a whole and ultimately lower the emissions intensity of the energy services that society needs.

Do no significant harm assessment

Key environmental aspects to be considered for the investments in Distribution of District Level Heating and Cooling are summarised as follow:
For the **construction** of the mains, the potential significant harms to the environmental objectives are constituted by the typical potential harms connected to construction of facilities in general. This includes inter alia, terrestrial habitat alteration, loss of valuable ecosystem, land consumption, overburden disposal, negative effects on biodiversity, emissions of particles and NOx, noise and hazardous materials.
For the **operation** of the district heating networks, potential significant impacts are considered low. They relate mainly to the potential impact of underground district heating networks on drinking water/ground water systems and local ecosystems through corrosion products from corrosion of the distribution system elements and applied water additives that may be non-biodegradable.

(2) Adaptation	• Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	• Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:

• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and
• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

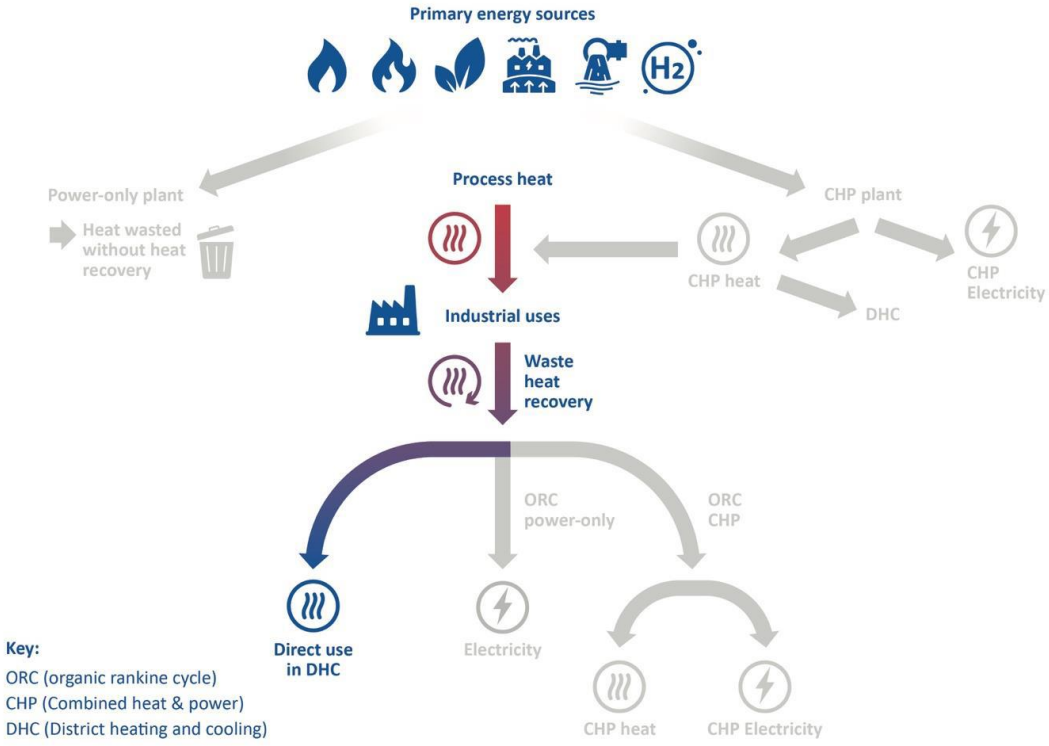
3. Waste Heat in the European legislation

Waste heat recovery is recognised in high level EU strategies and policies as an energy efficiency measure, a source of clean heat and a "*more circular energy system, with energy efficiency at its core*".

An EU-wide definition for waste heat was recently introduced in the Renewable Energy Directive, covering the direct use of waste heat in district heating applications.

WASTE HEAT DEFINITION IN THE EUROPEAN POLICY:

unavoidable heat or cold generated as by-product in industrial or power generation installations, or in the tertiary sector, which would be dissipated unused in air or water without access to a district heating or cooling system, where a cogeneration process has been used or will be used or where cogeneration is not feasible.
RED III, Article 2 (9)



Waste heat recovery pathway captured in EU definition

As shown in the overview below, other EU legislation and provisions appear to prioritise the direct use of waste heat from industrial and commercial applications in district heating. This approach limits unlocking the full potential of waste heat, as long as other feasible applications do not get visibility or receive sufficient support.

Direct waste heat use in DHC

- ☑ Waste heat used directly in DHC is recognised as a clean heat source, contributing to the renewable heat obligation (RED III, Recital 27, Article 1).
- ☑ Waste heat used directly in DHC is recognised as a clean source for "efficient DHC", as an alternative to renewable heat sources, with binding requirements and milestones until 2050 (EED recast, Article 24.1).
- ☑ Waste heat used to produce heat and cool (for DHC) is recognised in EU Taxonomy as a climate mitigation measure and green investment (EU Taxonomy Delegated Act, Annex I, Section 4.25).
- ☑ The EU definition for "waste heat" refers to the portion of waste heat supplied directly to DHC (RED II, Article 2(9)).

Waste heat use in power-only applications

Industrial installations above 8 MW are required to carry out a cost-benefits analysis (CBA) on the utilisation of waste heat on-site or off-site. Yet, no binding action to implement the results of the CBA and no link is made to energy audits for industry (EED recast, Article 24.4.b).

- ☑ Waste heat recovery is encouraged for facilities with substantial energy inputs (EED recast, Recital 80).
- ⊗ The EU definition for "waste heat" refers to the portion of waste heat supplied directly to DHC, but excludes the use of waste heat for power and/or heat production (RED II, Article 2(9)).
- ⊗ Member States are required to estimate waste heat potential as part of heating and cooling assessments and introduce measures to encourage the deployment of waste heat recovery installations, including in the industrial sector. Yet, no specific measures or recognition is provided for systems converting waste heat to power (EED recast, Article 23.4, Annex IX).
- ⊗ Industrial installations above 8 MW are required to carry out a cost-benefits analysis (CBA) on the utilization of waste heat on-site or off-site. Yet, no binding action to implement the results of the CBA and no link is made to energy audits for industry (EED recast, Article 24.4.b).

4. Energy Storage in EU legislation

Energy storage plays a crucial role in the transition to a decarbonized district heating and cooling sector. By storing excess energy during periods of low demand and releasing it during periods of high demand, energy storage systems can help to balance supply and demand, reduce reliance on fossil fuels, and integrate renewable energy sources more effectively.

Several EU legislative frameworks directly address energy storage in the context of district heating and cooling:

- **Renewable Energy Directive (RED):** Promotes the use of renewable energy in heating and cooling, including through the integration of energy storage systems.
- **Energy Efficiency Directive (EED):** Encourages the efficient use of energy in district heating and cooling networks, which can be achieved through the use of energy storage technologies.
- **Fit for 55 Package**: Sets ambitious targets for reducing greenhouse gas emissions, including in the heating and cooling sector. Energy storage is considered a key tool for achieving these targets.

Provision and incentives

EU legislation provides various incentives and support measures to promote the adoption of energy storage in district heating and cooling systems:

- **Financial Support**: Member states are encouraged to provide financial incentives, such as grants, loans, or tax breaks, to support the investment in energy storage projects.
- **Market-Based Mechanisms**: EU legislation supports the development of markets for energy storage services, allowing for the efficient trading and deployment of these technologies.
- **Regulatory Framework**: Clear and supportive regulatory frameworks are essential for the successful integration of energy storage into district heating and cooling systems. This includes guidelines for grid connection, metering, and pricing.

Benefits of Energy Storage in DHC Systems

- Increased renewable energy integration: Energy storage allows DHC systems to store excess heat or cold generated from renewable sources, such as solar thermal or geothermal, for use during periods of high demand or when renewable energy generation is low.
- Improved system efficiency: By optimizing the use of stored energy, DHC systems can reduce energy losses and improve overall efficiency.

- Enhanced grid stability: Energy storage can help stabilize the electrical grid by providing flexibility and balancing supply and demand.
- Reduced reliance on fossil fuels: By increasing the use of renewable energy, energy storage can help reduce greenhouse gas emissions and mitigate climate change.

Barriers to Energy Storage in DHC systems

- **High Costs:** The initial investment for large-scale thermal energy storage systems can be substantial, often making it difficult to justify economically.
- **Technical Challenges**: Ensuring efficient and reliable storage, especially for long durations, requires overcoming technical hurdles such as heat losses, temperature stratification, and material degradation.
- **Limited Availability of Suitable Technologies**: While various storage methods exist (e.g., sensible, latent, chemical), their suitability for DHC applications varies, and the most effective options may still be under development.
- **Integration Challenges:** Integrating energy storage systems with existing DHC infrastructure can be complex, requiring careful planning and coordination.
- **Policy and Regulatory Barriers**: Lack of clear policies and regulations supporting energy storage in DHC systems can create uncertainty and hinder investment.

Opportunities for Overcoming Barriers

Despite these challenges, there are promising opportunities to overcome barriers and promote the adoption of energy storage in DHC systems:

- Technological Advancements: Continued research and development can lead to more efficient, cost-effective, and reliable storage technologies.
- Economies of Scale: As the market for energy storage grows, economies of scale can drive down costs and make these systems more accessible.
- Policy Support: Government incentives, such as tax credits or subsidies, can encourage investment in energy storage and DHC systems.
- Integration with Renewable Energy: Combining energy storage with renewable energy sources like solar and wind can help address intermittency and increase system efficiency.
- Innovative Business Models: Exploring innovative business models, such as energy service agreements, can help manage risks and attract private investment.

By addressing these barriers and capitalizing on emerging opportunities, energy storage can play a crucial role in enhancing the sustainability, resilience, and efficiency of district heating and cooling systems.

5. F-Gas PFAS Regulation – General Overview

Brief Overview

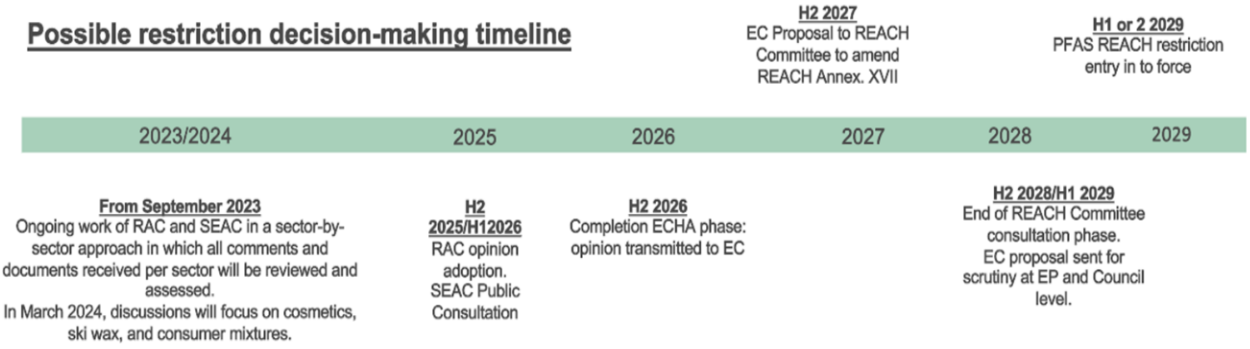
In 2014, the EU adopted the revision of the 2006 F-Gas Regulation. The 2014 Regulation limited the total amount of F-gases that can be sold in the EU from 2015 and introduced a phase-down for virgin HFCs to reach one-fifth of 2014 levels in 2030.

The Regulation also banned the use of certain F-gases in equipment where less harmful alternatives were available and required servicing and recovery of the gases at the end of the equipment's life.

In 2022, the European Commission (EC) proposed a revised version of the Regulation which would bring F-Gas use down much faster.

In February 2024, the Revised F-gas regulation was published in the Official Journal, entering into force on the 11th of March 2024.

However, Heat pumps market see a wide range of use of F-gases as refrigerants and so the new F-Gas regulation will require the industry to transition to alternative refrigerants with a **lower Global Warming Potential (GWP)** more rapidly, **in line with the EU climate targets and starting from 2030**.



In May 2024, the European Commission opened a Have Your Say consultation on the new format of F-gas reporting, to be updated to reflect new target set by the European green deal. The feedback period closed in June. The Commission adoption is planned for the third quarter of 2024 and the next phase down planned from 2025.

A final draft will have to be approved through the formal procedure. When ready, they will be available on the Have Your Say platform.

In September 2024, three implementing regulations have been adopted by the EC:

- Commission Implementing Regulation (EU) 2024/2215 establishing minimum requirements for the issuance of certificates to natural and legal persons

- Commission Implementing Regulation (EU) 2024/2195 determining the format for submitting the reports of data
- Commission Implementing Regulation (EU) 2024/2174 as regards the format of the labels for certain products and equipment containing fluorinated greenhouse gases

In 2025 both contributes from RAC and SEAC will be completed and sent to the European Commission (2026) for its first approval. These contributes was asked to set up a common ground for future implementation.

RAC: The Committee for Risk Assessment (RAC) prepares the opinions of ECHA (European Chemicals Agency) related to the risks of substances to human health and the environment in the following REACH and CLP processes. The final decisions are taken by the European Commission. RAC assesses the risk of a substance arising from the uses of a substance when an application for authorisation is submitted. This includes an assessment of the appropriateness and effectiveness of the risk management measures as described in the authorisation application, and if relevant, of the risks of possible alternatives. Third party contributions linked to the application will also be assessed.

SEAC: The Committee for Socio-economic Analysis (SEAC) prepares the opinions of ECHA related to the socio-economic impact of possible legislative actions on chemicals in the following REACH processes. The final decisions are taken by the European Commission. SEAC assesses the socio-economic factors and the availability, suitability and technical feasibility of the alternatives associated with the uses of a substance when an application for authorisation is submitted. Third party contributions linked to the application will also be assessed.

Prohibitions on heat pumps in the F-Gas regulation

New prohibitions on placing on the market of heat pumps are included in Annex IV of the revised F-gas regulation.

Monoblock ('self-contained'[1]) heat pumps and air-conditioning

Product category	GWP value	Year of ban
Plug-in room air-conditioning **which is moveable between rooms** by the end user that contains HFCs with GWP of 150 or more	≥ 150	January 2020
Plug-in room air-conditioning, monoblock air-conditioning, other self-contained air-conditioning and self-contained heat pumps, **max 12 kW capacity with F-gases with a GWP of 150 or more,** except if required to meet safety requirements*	≥ 150	January 2027

[1] 'self-contained' means a complete factory-made system which is in a suitable frame or casing, is fabricated and transported complete or in two or more sections, can contain isolation valves and in which no gas-containing parts are connected on site;

Plug-in room air-conditioning, monoblock air-conditioning, other self-contained air-conditioning and self-contained heat pumps, **max 12 kW that contain F-gases,** except if required to meet safety requirements*	*No F-Gas*	January 2032
Monoblock and **other self-contained** air-conditioning and heat pumps, between 12 kW and 50 kW that contains F-gases with a GWP of 150 or more, except if required to meet safety requirements*	≥ 150	January 2027
Other self-contained air-conditioning and heat pumps that contain F-gases with GWP of 150 or more, except if required to meet safety requirements*	≥ 150	January 2030

*If safety requirements at the site of operation would not allow using alternatives to fluorinated greenhouse gases, the GWP limit is 750.

Split heat pumps ('split system[2]') and air conditioning

Product category	GWP value	Year of ban
Single split systems, containing < 3 kg of F-gases that contain, or whose functioning relies upon, F-gases with GWP of 750 or more	≥ 750	January 2025
Split air-to-water systems, max 12 kW containing, or whose functioning relies upon, F-gases with GWP of 150 or more, except if required to meet safety requirements at the site of operation	≥ 150	January 2027
Split air-to-air systems max 12 kW containing, or whose functioning relies upon, F-gases with GWP of 150 or more, except if required to meet safety requirements at the site of operation	≥ 150	January 2029
Split systems, max 12 kW containing, or whose functioning relies upon, F-gases, except if required to meet safety requirements at the site of operation	No F-Gas	January 2035
Split systems, more than 12 kW containing, or whose functioning relies upon, F-gases with GWP of 750 or more, except if required to meet safety requirements at the site of operation	≥ 750	January 2029
Split systems, more than 12 kW containing, or whose functioning relies upon, F-gases with GWP of 150 or more, except if required to meet safety requirements at the site of operation	≥ 150	January 2033

Phase down quota in the F-GAS REGULATION (Annex VII)

[2] 'split system' means a system consisting of a number of refrigerant piped units that form a separate but interconnected unit, requiring the installation and connection of refrigerant circuit components at the point of use;

The new phase down of virgin hydrofluorocarbons (HFCs) will start in 2025, one year after the publication of the law.

From 2050 onwards, the amount of virgin HFCs allowed on the EU market each year will be zero, but this is subject to a review by 2040.

The maximum amount of hydrofluorocarbons allowed to be placed on the Union market in a given year is as follows:

Years	Maximum quantity in tonnes CO_2 equivalent
2025 – 2026	42 874 410
2027 – 2029	21 665 691
2030 – 2032	9 132 097
2033 – 2035	8 445 713
2036 – 2038	6 782 265
2039 – 2041	6 136 732
2042 – 2044	5 491 199
2045 – 2047	4 845 666
2048 – 2049	4 200 133
2050 onwards	0

6. Policy recommendations

Waste Heat

Despite the high-level recognition of waste heat across EU legislation, the definitions and provisions pertaining to waste heat are not sufficient to capture the full potential of waste heat recovery and does not cover the entire range of applications.

1. Harmonise waste heat definitions to cover all relevant applications

Energy Efficiency Directive/Renewable Energy Directive

- The waste heat definition must be encompassing enough to cover all relevant and feasible waste heat applications, namely (Energy Efficiency Directive/Renewable Energy Directive):
- Direct waste heat use in district heating
- Electricity production from waste heat
- Electricity and heat production from waste heat in cogeneration mode

2. *Support and promote waste heat as a clean energy resource in EU legislation*

Due to the incomplete "waste heat" definition in RED II, references to it in other EU legislation results in the exclusion of important waste heat applications from support schemes, funding and clean energy accounting.

3. Long term financing of sustainable projects to reduce the high investment risks

The recognition of specific financial mechanism for investment in energy efficiency and renewable energy

4. Contribution and other financial support for reducing payback time period

There are several direct and indirect subsidies for waste heat extraction and its use in DH networks on national and regional level for reducing payback periods and making investments more attractive.

Some examples:

- The German Wärmenetz 4.0 scheme (BAFA - Wärmenetze)
- The Italian "White Certificate Scheme" (Arera: Home | ARERA)
- France has put in place special funds to support investment in renewable heat (including DHC) (Le Fonds Chaleur - La chaleur renouvelable, c'est profitable (ademe.fr)

5. EU to promote best practices and incentivise Member States to adopt measures to promote waste heat recovery

Countries have supported directly or indirectly the recovery and use of waste heat in different ways. The European Commission should better promote these best practices on waste heat in the framework of concerted actions77 aiming at supporting the implementation of EU legislation.

Energy Storage

1. **Financial Incentives:**
- **Tax credits or rebates:** Offer tax credits or rebates to incentivize the installation of energy storage systems in DHC networks.
- **Loan guarantees:** Provide loan guarantees or low-interest loans to reduce the upfront costs of energy storage projects.

2. **Regulatory Support:**
- **Grid integration:** Develop clear guidelines and regulations for the integration of energy storage systems into DHC networks.
- **Net metering:** Implement net metering policies to allow DHC operators to offset their energy costs by selling excess stored energy back to the grid.

3. **Research and Development:**
- **Technological advancements:** Support research and development efforts to improve the efficiency and cost-effectiveness of energy storage technologies for DHC applications.
- **Pilot projects:** Encourage the development and demonstration of innovative energy storage solutions through pilot projects.

4. **Public-Private Partnerships:**
- **Collaboration:** Foster collaboration between government agencies, utilities, and private sector companies to develop and implement energy storage solutions for DHC systems.
- **Shared risk:** Encourage public-private partnerships to share the risks and benefits of energy storage projects.

7. Conclusion

The present deliverable is the basis for an overview about the European legislation and standardization.

This report analyses existing regulations and standards impacting the wide replication of innovative district heating and cooling (DHC) technologies across the European Union (EU).

The report highlights recent revisions to the EED and RED, both of which strengthen the role of renewable energy sources (RES) and waste heat recovery in DHC systems. Also biomass has been considered in the RED analysis as potential renewable energy sources applicable for Restore project. Key takeaways include:

- Increased EU targets for energy efficiency and RES use.
- New definition of efficient DHC that considers both RES and waste heat.
- Recognition of waste heat as a renewable energy source throughout the EED.
- Binding targets for the share of renewables in heating and cooling, with a specific focus on increasing RES in DHC networks.
- Measures to accelerate the deployment of RES and waste heat for heating and cooling.

The report also examines the EU Taxonomy, a classification system that defines environmentally sustainable economic activities. While the current iteration may not explicitly mention all applications related to DHC, the six general environmental principles outlined in the Taxonomy can be used to assess the sustainability of DHC projects. These revisions and the EU Taxonomy provide a framework for promoting the wide replication of the RESTORE project's innovative DHC technologies, contributing to the EU's Green Deal goals

The section for Energy Storage system includes an overview about the European legislation, the main barriers and solutions to overcome them.

F-GAS regulation has been analysed in a dedicated paragraph that gives an overview of the framework and a brief explanation about the future scenario of F-GAS

Overall, the regulatory landscape in the EU is increasingly supportive of DHC systems that utilize RES waste heat and energy storage system.

EU legislation provides framework for promoting the integration of Restore solutions into district heating and cooling networks. Policy recommendations can help policymakers and industry stakeholders to accelerate the transition to a more sustainable and efficient energy system

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