Wallonie énergie SPW

DIRECTIVE 2012/27/EU (ENERGY EFFICIENCY DIRECTIVE) – ARTICLE 14

POTENTIAL FOR EFFICIENCY IN HEATING AND COOLING

Strategy for district heating and cooling networks supplied by cogeneration, waste heat or renewable energy sources

Summary note

endorsed by the Walloon Government on 11 March 2021

March 2021

Introduction

Purpose of the study

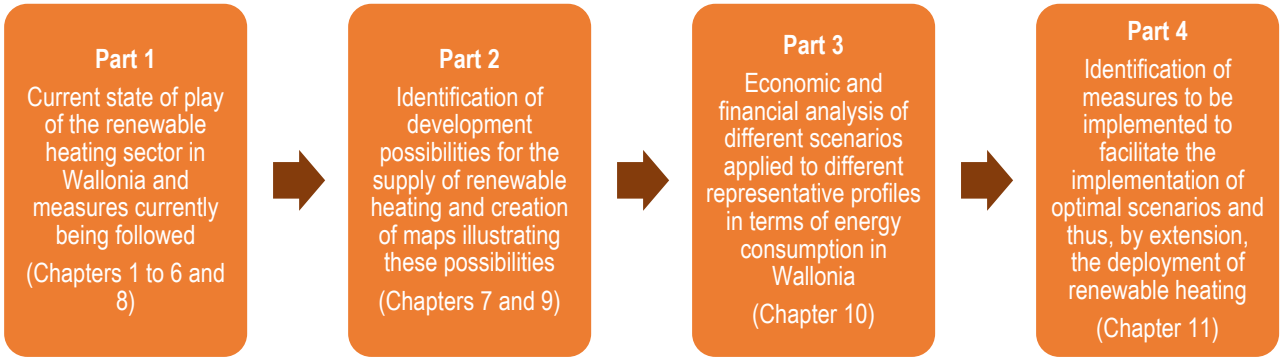
The report *Directive 2012/27/EU (Energy Efficiency Directive) – Article 14 – Potential for efficiency in heating and cooling; Strategy for district heating and cooling networks supplied by cogeneration, waste heat or renewable energy sources* forms part of the implementation of Article 14 of Directive 2012/27/EU on energy efficiency and of Annexes VIII and IX thereto, as amended by Delegated Regulation (EU) 2019/826 of 4 March 2019.

In particular, Article 14(1) of the Directive lays down that Member States must carry out and notify to the Commission a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling, containing the information set out in Annex VIII. An update to that assessment is required every 5 years (first version submitted in December 2015). The following assessment is therefore intended to fulfil the aforementioned requirement under Article 14.

This document summarises that report, the drafting of which was entrusted to 'Deplasse & Associés – PwC' by SPW-TLPE.

Methodology

The methodology adopted is structured as follows:



Part 1 - Current state of the heating sector based on renewable energy sources

Demand for and supply of heating and cooling

The source of information for establishing heating and cooling needs in Wallonia is the official energy audit for the year 2016 published in 2019 by SPW-Énergie, which corresponds to the **statistics** on energy consumption used for international reporting, to comply with European directives on energy and for regional policies in this area. The analysis is based on the **energy audit for the year 2016** since this is the most recent report since the mission was launched.

Heating

Heating **needs** and substitutable heating needs (share of the overall heating need corresponding to heating uses catered for by lower-temperature heating (50°C to 250°C)) are analysed for each sector of Wallonia's energy landscape (residential, services and industry). Consumption in agriculture and transport are excluded from the analysis. Agriculture represented less than 1% of energy consumption in Wallonia in 2016. Consequently, the share of such energy for heating and cooling purposes is negligible for the analysis. Heating and cooling needs are not applicable to transport. 37 575 GWh or nearly 30% of Wallonia's final energy consumption balance is therefore excluded from the analysis. In the case of industry, only energy consumption is covered, i.e. 39 674 GWh out of 44 539 GWh. Non-energy consumption refers to the use of fuel to manufacture products, such as natural gas used to make fertilisers.

The following points should be borne in mind:

In 2016, heating represented 63 217 GWh, or 50% of Wallonia's final energy consumption.

In 2016, energy **consumption** for heating purposes broke down as follows between the different sectors:

- Residential sector: 42%, or 26 508 GWh
- Service sector: 11%, or 7 022 GWh
- Industrial sector: 47%, or 29 724 GWh

In 2016, the main energy uses of the different technologies **that produce heating** were:

- Residential sector: heating represents 21 931 GWh, or 83% of heating consumption
- Service sector: heating represents 6 262 GWh, or 89% of heating consumption
- Industrial sector: process heating (high temperature represents 18 085 GWh, or 61% of heating consumption

In 2016, the main energy-related **vectors** that accounted for **all energy consumption** (not just the heating) of each sector, were:

- Residential sector: fuel oil (35%), natural gas (29%) and electricity (22%)
- Service sector: electricity (46%), natural gas (35%) and fuel oil (17%)
- Industrial sector: natural gas (35%) and electricity (25%)

In 2016, on average, the energy **yields** of the various heat-producing technologies were:

- Residential sector: 83.5%
- Service sector: 85.6%
- Industrial sector: 73%

Cooling

In 2016, cooling accounted for 2% of Wallonia's final energy consumption.

In 2016, energy **consumption** for cooling purposes broke down as follows between the different sectors:

- Residential sector: 36%, or 997 GWh
- Service sector: 33%, or 914 GWh
- Industrial sector: 31%, or 852 GWh

In 2016, the main **uses** of cooling were:

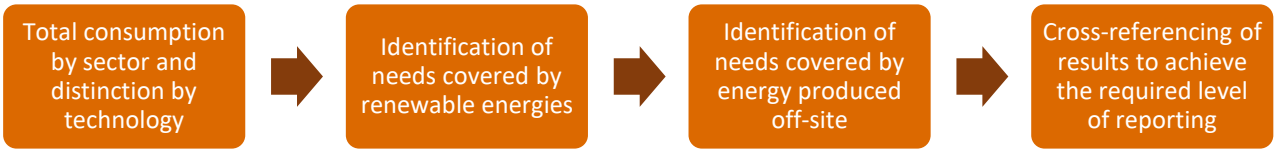
- Residential sector: refrigeration (88%) and air conditioning (12%)
- Service sector: air conditioning (58%) and refrigeration (42%)
- Industrial sector: refrigeration (85%) and air conditioning (15%)

In 2016, on average, the energy **yields** of the various cooling technologies were:

- Residential sector: 236%
- Service sector: 258%
- Industrial sector: 215%

Current supply of heating and cooling

A methodology in **4 steps** was used to estimate the current supply of heating and cooling. These steps are:



The above was done for the residential, service and industrial sectors. The results were as follows:

Sector	On-site heat production		Off-site heat production	
	Fossil (GWh)	RES (GWh)	Fossil (GWh)	RES (GWh)
Residential	22 652	3 789	0	66
Service	6 689	240	17	76
Industrial	23 062	6 579	0	83

Identification of sources of waste heat

The following installations potentially produce waste heat:

- **Thermal energy production installations** which can provide or can be retrofitted to provide waste heat with a total thermal input exceeding 50 MW.
- Heat and power **cogeneration installations** using technologies referred to in Part II of Annex I with a total thermal input exceeding 20 MW.
- Waste **incineration plants**.
- **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.
- **Industrial installations** with a total thermal input exceeding 20 MW which can provide waste heat.

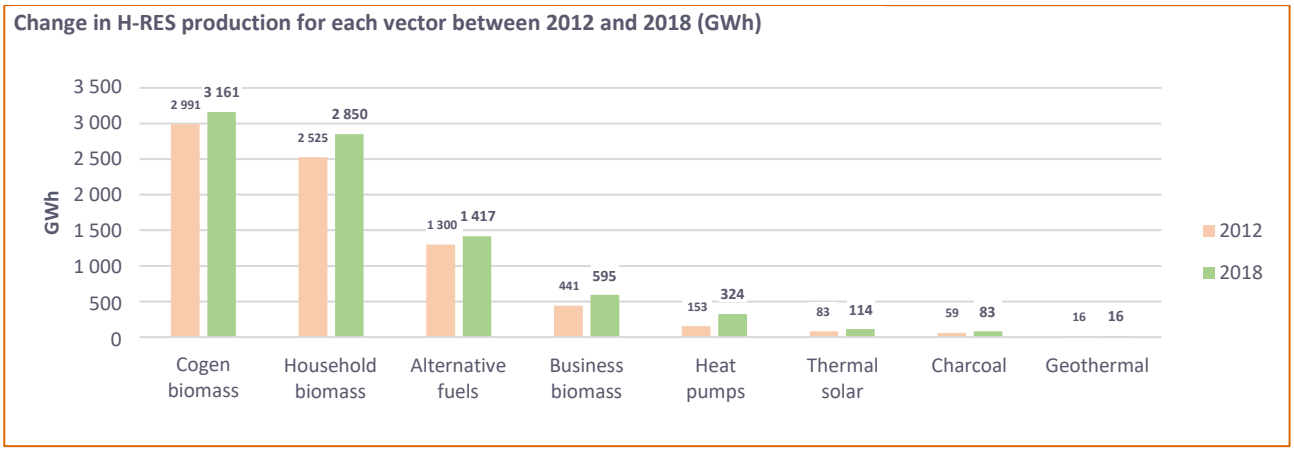
The **waste heat** from each of these types of installations can thus be quantified in GWh:

Type of installations	Recoverable waste heat (GWh)
Thermal electricity production installations (>50 MW)	0
Cogeneration plants (>20 MW)	336 (>20MW); 684 (<20MW)
Waste incineration plants	315
Renewable energy installations (excluding cogeneration) (> 20 MW)	0
Industrial waste heat	5 026
Total	**6 361**

More than 6 000 GWh of waste heat are therefore **lost** each year, i.e. around 10% of Wallonia's annual heat needs. At present, this heat is **not recovered.**

Renewable energy

In 2016, H-RES production reached 8 907 GWh, meeting more than **13.5% of overall heating needs in Wallonia**. By comparison, H-RES production in 2012 was 7 568 GWh, meeting 11.3% of heating needs in Wallonia. Between 2012 and 2018, the share of heating produced from renewable energy rose from 11.3% to 13.14% in Wallonia. This growth can be explained by an **overall reduction in heating needs** and by an **increase in the production capacity** for renewable energy sources. Installed capacity grew by an average of **3% each year** over the period 2012-2018, increasing the share of heat produced from renewable energy by **0.3 percentage point / year** on average. It is important to keep in mind that Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources imposes an increase of **1.1 percentage point / year**. The graph below describes the change in heat production from renewable sources between 2012 and 2018:



In addition, part of this production is conveyed by **heat network**:

	Distributed production	Share of total
District heating network - RES	220 GWh	92.9%
District heating network - Fossil	17 GWh	7.1%
District heating network - Total	237 GWh	100%

The following points should thus be kept in mind:

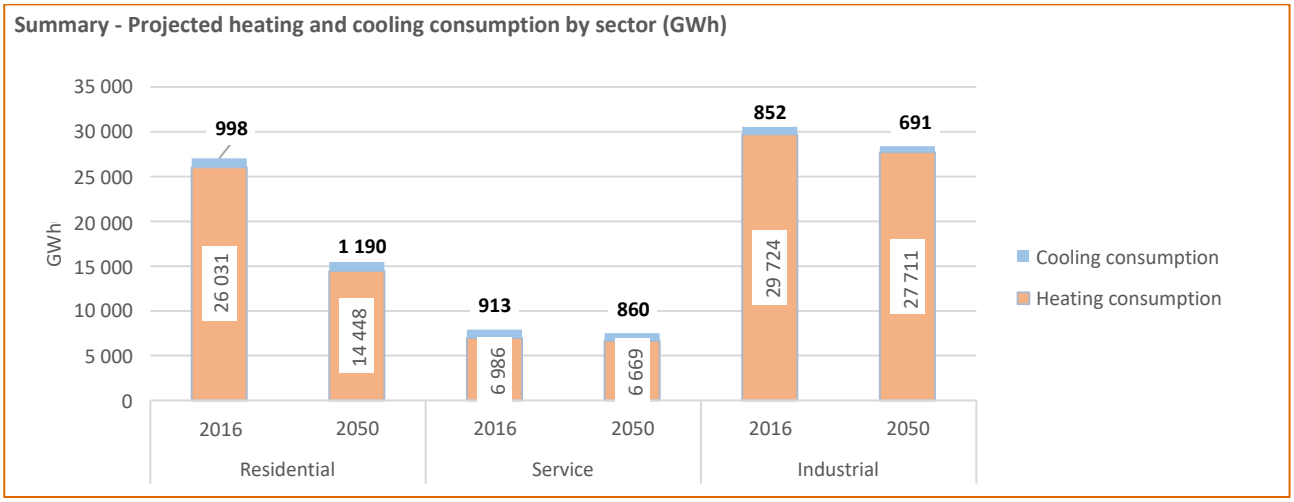
In 2016, the key figures for heat production from renewable energy sources are as follows:

- H-RES production amounts to 8 907 GWh, i.e. **13.5% of heating consumption**.
- The main source of energy is **biomass**, which provides 80% of H-RES (from biomass cogeneration (38%), household biomass (35%) and commercial biomass (6%)).
- The heating distributed by district heating networks in Wallonia mainly comes from renewable energy sources (nearly 93%).

Change in heating and cooling consumption

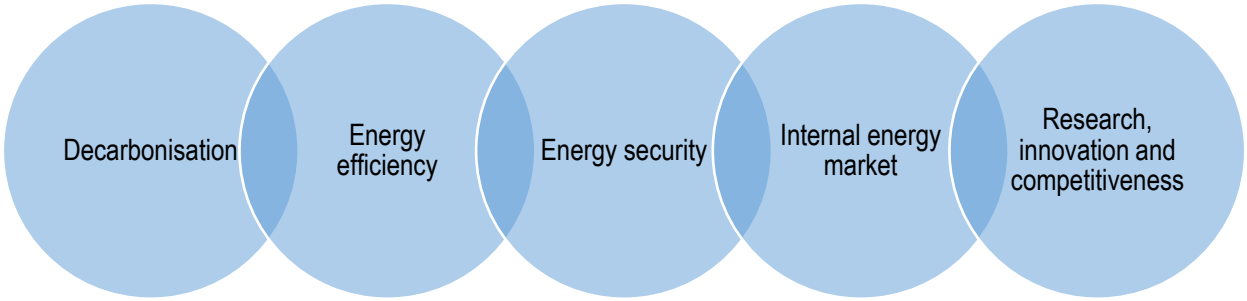
The change in heating and cooling consumption for the residential, service and industrial sectors was analysed. Those **estimates** are based on the evaluation of heat consumption in 2016 and incorporate the prospective change in various key parameters on the basis of existing projections (carried out by the Federal Planning Bureau, for example), the historical evaluation of certain parameters or strategic targets. It should be noted that the projections presented here do not include the potential impact of the COVID-19 health crisis (impact on the economy, the financial capacity of investors, public budgets, the prices of fossil fuels, etc.).

The graph below shows the expected change by 2050, based on the above analyses and the heating and cooling consumption for each sector.



Current heating and cooling policies

The policies currently in force in Wallonia for efficient heating and cooling have been structured around the **five pillars** of European energy policy:



The following **plans** and **strategies** were taken into account in compiling this information:

- The Air Climate Energy Plan 2016-2022, (PACE 2016-2022);
- Wallonia's Contribution to the National Energy Climate Plan 2030, 2019 (PWEC 2030);
- The Walloon strategy for the long-term energy renovation of buildings, 2017 (SWR);
- The Walloon plan for combating poverty, 2018 (PLCP);
- The refocused Employment-Environment Alliance - Multi-year plan 2016-2019, 2016 (AEER);
- The 2nd Sustainable Development Strategy, 2016 (SDD);
- The Marshall Plan 4.0, 2015 (PM4).

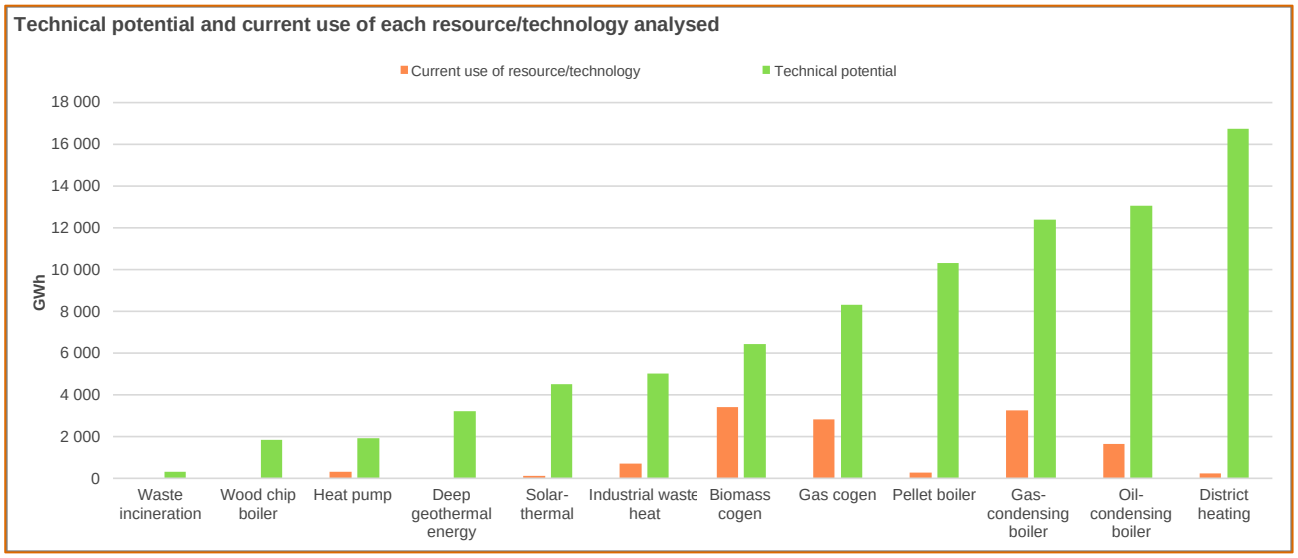
To add to / reinforce this set of measures, economic, legal and communication **recommendations** are provided in Part 4. The analyses summarised in Parts 2 and 3 will make it possible to identify which technologies should be encouraged by examining the information on their technical potential in Wallonia, as well as and the results of economic and financial analyses.

Part 2 - Possibilities for changing the supply of heat from renewable energy sources

Identification of technologies available to provide low-carbon energy in Wallonia

The following table presents the conclusions on the technical potential available in Wallonia for each technology or heat resource identified, as well as their current uses and share of the technical potential exploited.

Technologies/Resources	Current exploitation(GWh)	Technical potential (GWh)	Share of technical potential currently exploited
Production technologies			
Industrial waste heat	682	5 026	14%
Waste incineration	0	315	0%
Deep geothermal energy	16	3 226	0.5%
Solar thermal	114	4 486	3%
Gas cogeneration	2 799	8 314	34%
Biomass cogeneration	3 421	6 422	53%
Heat pump	323	1 914	17%
Pellet boiler	271	10 289	3%
Wood chip boiler	44	1 819	2%
Reference production technologies			
Gas-condensing boiler	3 233	12 393	26%
Oil-condensing boiler	1 634	13 044	13%
Distribution technologies			
District heating	237	16 712	1.4%



Part 3 - Economic analysis for certain standard consumption profiles

An **economic and financial analysis** was carried out in order to identify the most appropriate technologies for different consumption profiles which are representative of heating needs in Wallonia. They are, respectively:

Profile 1	An urban / peri-urban municipality
Profile 2	'Modest and healthy' blocks of flats designed on the basis of modernist reflections and theories (e.g. Etrimo/Amelinckx)
Profile 3	An industrial area
Profile 4	A municipality, houses, housing, industries, etc. located near the borehole of a geothermal well
Profile 5	An ecodistrict

To structure the analysis, each of the consumption profiles that are provided is associated with a base scenario and alternative scenarios. the **base scenario** describes the most **likely** technologies to meet the needs within each of the profiles considered. As mentioned in Directive 2012/27/EU, the baseline scenario will serve as a reference point. The **alternative scenarios** are based on solutions that meet the same needs, but in a **more effective** way. Technologies that are not really technically relevant have not been considered in the construction of the alternative scenarios.

The main conclusions by profile are:

Profile 1- Urban or peri-urban municipality with high energy density				
Scenarios	BS1 - Individual condensing boiler	AS1.1 - Gas cogeneration connected to DH and central gas-fired back-up boiler	AS1.2 - Solid biomass gasification cogeneration connected to DH and central gas-fired back-up boiler	AS1.3 - Waste heat distributed by DH and central gas back-up boiler
Main conclusions	1. All the alternative solutions studied that include **district heating** show **more efficient** discounted net costs than a decentralised and fossil solution. However, a long-term vision is needed to observe this advantage. However, without **support** for the production of 'green' heat, this vision cannot be reconciled with the short-term profitability requirements of a private project developer; 2. The recovery of **waste heat** is a competitive solution with the greatest positive impact on our carbon footprint; 3. **Cogeneration** gas remains more **efficient** from an economic point of view thanks to the flexibility of the technology in terms of power modulation and its lower cost. However, its impact in terms of CO_2 emissions is limited due to the use of fossil fuel. 4. In the long term, gas and biomass cogeneration (gasification) have the same profitability, but the **CO_2 impact** of the technology makes **biomass** the preferred technology. 5. From a CO_2 balance point of view, the **first resource** to be recovered is the **waste heat**, because this makes it possible to reduce CO_2 emissions more than fivefold compared to the baseline scenario. If this resource is not available, the use of **biomass** is the best **alternative**. Gas cogeneration remains an alternative that is suitable for the urban environment when the transport of biomass is not possible. In addition, cogeneration makes it possible to reduce CO_2 emissions through the production of 'green' electricity. This has a positive impact on the CO_2 balance; 6. The increase in carbon-based **fuel prices** improves the competitive positioning of technologies that use biomass or waste heat. This increase is also an indication of the importance of using primary technology as much as possible because it is often more profitable than secondary technology; 7. Self-consumption of the electricity produced, in the form of an **energy community**, significantly increases the attractiveness of scenarios that use cogeneration.			

Profile 2- Building stock (collective housing)				
Scenarios	BS2 - Gas condensing	AS2.1 - Centralised gas	AS2.2 - Solid biomass	AS2.3 - District heating with

	boiler decentralised for each building	cogeneration with centralised gas back-up and district heating	boiler with centralised gas back-up and district heating	injection of waste heat and gas back-up.
Main conclusions	1. All the **alternative** solutions studied show discounted net costs lower than those of the baseline scenario in the current context (in the very short term for scenarios integrating cogeneration and waste heat recovery and in the medium term for the scenario integrating a biomass boiler); 2. The recovery of **waste heat** is a competitive solution but it does not offer the greatest impact on our carbon footprint. ; 3. The **cogeneration** gas remains more **efficient** than biomass from an **economic** point of view thanks to its lower operating costs and the sale of electricity. This is mainly because the fuel is not 'standardised' biomass and may thus require more maintenance and monitoring. A better-**organised** biomass sector could partially reduce this problem; 4. The increase in the prices of' 'carbonaceous' fuels improves the competitive positioning of the alternative technologies under consideration. This increase also shows the importance of using primary technology as much as possible because it is often more profitable than secondary technology, especially for technologies operating on biomass or waste heat. ; 5. The **centralisation** of the heating technology makes it possible to reduce the price of fuel and make the solution more attractive than a decentralised solution. ; 6. Self-consumption of the electricity produced, in the form of an **energy community**, significantly increases the attractiveness of scenarios that use cogeneration. 7. The 'gas cogeneration' scenario makes it possible to slightly reduce the CO_2 produced compared to the baseline scenario because of the use of fossil energy, which emits CO_2. Alternative scenarios 2 and 3 make it possible to significantly reduce CO_2 emissions. We note the advantage of using RES fuel or waste heat which does not produce CO_2. ; 8. **Support** for green heat would equalise the cogeneration and biomass scenarios.			

Profile 3- Industrial site				
Scenarios	BS3 - Decentralised oil condensing boiler for each building	AS3.1 - Industrial waste heat distributed by DH and central oil-fired back-up boiler	AS3.2 - Solid biomass cogeneration connected to DH and central oil-fired back-up boiler	AS3.3 - Centralised biogas cogeneration (obtained by biomethanisation) with back-up oil-fired backup boiler
Main conclusions	1. The scenario '**waste heat**' (AS3.1) shows discounted net costs that are **lower** than those of the baseline scenario. Due to a significant CAPEX and OPEX charge for the installation and maintenance of a biomethanisation plant of sufficient critical size, scenario AS3.3 shows discounted net costs higher than the base scenario. Similarly, scenario AS3.2 does not have lower net costs than the base scenario. ; 2. In a situation where electricity costs increase sharply and fuel costs remain stable or increase slightly (maximum 6%), the scenario '**biomass cogeneration**' (AS 3.2) potentially presents discounted net costs **lower** those of the base scenario and those of the alternative 'biomethanisation' scenario (AS 3.3) thanks to cogeneration which makes it possible to produce electricity. ; 3. The AS3.3 '**biomethanisation**' scenario has higher discounted net costs than all the other scenarios. In addition, it benefits from a lot of subsidies but these do **not** allow it to be **competitive** compared to other technologies, especially in a context of low fossil fuel prices. Only maintaining the support mechanism for the production of renewable electricity (green certificates) throughout the life of the project can guarantee sufficient profitability. 4. The significant increase in the prices of carbon-based **fuels** improves the **competitive** positioning of technologies that use renewable energy such as waste heat or biomass; 5. The implementation of a 'CO_2' cost makes it possible to improve the positioning of technologies that use renewable energies such as waste heat or biomass. However, for the **biomass** (solid & biogas), this is not **enough** to reach a financial break-even point without green certificates. 6. The biomethanisation solution has the lowest CO_2 gain per euro invested. However, the analysis does not take into account the 'external' **profits** in terms of circular economy, soil quality and hence reduction in the use of fertilisers, etc.			

Profile 4 - Municipality with high energy density located in an area where deep geothermal energy is available		
Scenarios	BS4 - Decentralised gas/oil energy mix (individual boilers)	AS4.1 - Geothermal installations connected to DH and central gas back-up boiler
Main conclusions	1. Whatever changes in fuel and electricity prices are considered, the alternative scenario (**geothermal**) is still more **attractive** than the baseline scenario from a long-term economic point of view. 2. The minor role of fuels in the cost structure of the alternative scenario makes it very **inelastic** to the change in fuel prices. Moreover, an increase in the price of fuel makes the alternative scenario more and more profitable compared to the baseline scenario. ; 3. The implementation of a 'CO_2' cost makes it possible **to improve** the competitive positioning of geothermal installations. ; 4. The **alternative** scenario has a **better** carbon footprint with CO_2 emissions over **four** times lower. Remark: Despite all of these indicators which mitigate in favour of the deep geothermal scenario, it is useful to remember that deep geothermal energy only becomes more profitable than the baseline scenario after **16** years. This crucial detail demonstrates the financial **risk** incurred with this project in view of the initial investment required. In view of the results mentioned above, one avenue to consider which would make it possible to remove certain obstacles to geothermal energy could be the establishment of a **form** of **guarantee** on geothermal energy. Given the high investment costs, the risk of not accessing the expected geothermal resource and the lack of an insurance policy covering this 'natural' risk, such a guarantee system is considered necessary to create an investment climate that favours the production of renewable heat from deep geothermal energy.	

Profile 5 - Ecodistrict				
Scenarios	BS5 - Individual gas condensing boiler and installation of a gas distribution network	AS5.1 - Gas cogeneration connected to DH and central gas-fired back-up boiler	AS5.2 - Solid biomass boiler connected to DH and central gas-fired back-up boiler	AS5.3 - Individual heat pumps and decentralised condensing gas boiler
Main conclusions	1. In the short term, and from an economic point of view only, alternative scenario 3 (heat pumps) makes more sense than all the other scenarios. After ten years, all the scenarios show discounted net costs lower than this scenario and the gap widens after 15 years because of the **replacement** of all heat pumps. ; 2. The most **relevant** scenario, economically and environmentally, is that of the **biomass** boiler room and the district heating network. 3. The alternative scenarios AS5.1 (gas cogeneration) and AS5.2 (biomass boiler) show discounted net costs that are lower than those of the baseline scenario, taking into account the current **support mechanisms**. 4. The heat pump scenario consumes a lot of electricity and this makes it very sensitive to changes in the price of electricity, with a significant risk of **undermining** end consumers. 5. Scenario AS5.2, which consumes biomass, is not very sensitive to changes in the price of fossil fuel. Its sensitivity to variations in the price of electricity is identical to the baseline scenario and alternative scenario 2. 6. **Collective self-consumption** of electricity strengthens the competitive positioning of the AS1 scenario, integrating gas cogeneration; 7. The 'centralised **biomass** boiler room' scenario (AS5.2) has the strongest **impact** in terms of CO_2 saved per euro invested. 8. The **heat pump** investment (AS5.3) does not compete in the long run with the different scenarios in terms of net costs.			

Part 4 - Measures to be implemented to promote heat from renewable energy sources

On the basis of previous analyses, 29 measures were identified for promoting renewable heat. Those **measures** concern the technologies identified in part 3 and have varying degrees of priority.

No	Name of measure	Concerning
1	Issue implementing decrees on the organisation of the thermal market and on thermal energy networks	Global RES
2	Allow the establishment of renewable energy communities (heat and electricity)	Global RES
3	Take district heating networks into account in the calculation of the EPB	District heating network
4	Subsoil decree	Geothermal energy
5	Stop all subsidisation of fossil fuels in connection with Wallonia's objectives	Global RES
6	Support the recovery of RES and waste heat	RES heat
7	Set up an online platform, by sector of activity (residential, service, industry), to facilitate procedures necessary to realise a project	Global RES
8	Develop AMURE and UREBA aid	Global RES
9	Maintain and adapt investment aid (UDE)	Global RES
10	Encourage maintenance of the performance of RES production facilities	Global RES
11	Provide a financing mechanism adapted to a long lifespan for district heating/cogeneration equipment	District heating network
12	Review the depreciation period of DHNs for accounting purposes	District heating network
13	Incorporate local or neighbourhood study requirements for DHNs and renewable energy in the context of major construction projects	District heating network
14	Creation of a guarantee fund for the decontamination of excavated soil	District heating network
15	Development of a cartographic system (GIS) identifying heating needs, district heating networks and technical installations	District heating network
16	Extension of the duties of the industry facilitator by including a waste heat recovery component	Waste heat
17	Creation of a guarantee fund against the industrial risk associated with waste heat recovery projects	Waste heat
18	Promotion of the development of installations supplying district heating networks (deep geothermal energy, mining geothermal energy and shallow open system geothermal energy)	Geothermal energy
19	Modification of the permit system for open systems in shallow geothermal energy and biomass gasification	Geothermal energy, biomass

No	Name of measure	Concerning
20	Measures to reduce the geological risk associated with deep geothermal projects	Deep geothermal installations
21	Professionalisation of the 'Cogeneration', 'District heating network', 'Geothermal energy' and 'Biomass' sectors	Global RES
22	Integration of a facilitator/expertise system directly into the administration - with field staff	Global RES
23	Establishment of an effective system for monitoring underground installations	District heating network
24	Organisation of an ash collection and treatment / recovery process	Solid biomass
25	Promotion of quality biomass with low emissions of fine particles (possibly of Walloon origin)	Solid biomass
26	Planning of the phase-out of fuel oil and natural gas	Global RES
27	Analysis of the benefits of developing solar thermal installations that supply district heating networks	District heating network
28	Setting up of a recovery policy for Solid Recovered Fuels (SRF)	Global RES

The proposed measures do not compromise the plans already approved by the Government. Where it is possible to implement those plans and also take the measures proposed below into account, the measures will be included (for example, via a circular, for projects that have not yet been finalised, etc.).

Measures in progress	
Measure sheet # 1	**Issue implementing decrees on the organisation of the thermal market and on thermal energy networks**
Type of measure	Legal (short-term)
Objective	In general, to transpose European obligations relating to metering and information on billing and pricing. More specifically, to deal with thermal energy networks subject to certain obligations when energy is sold to one or more consumers.
Potential participants	SPW TLPE – WG
Technology(ies) concerned	District heating network
Findings Chap. 10	The profitability of a district heating network is subject to many risks, in particular with regard to the resale of thermal energy. There is a need for a clear legal framework.
Proposed actions	• Establish a legal framework for district heating networks • Transpose the provisions of the Directives of the Clean Energy for All Europeans package to comply with standards in terms of metering, customer information, the right to disconnect and the guaranteeing of this right and with regard to thermal energy networks with sale.
Strategy link	PWEC 2030 (district heating networks are a relevant option for recovering renewable heat) PACE 2016-2022 (support measure for green heating, in particular through district heating networks)

Measures in progress	
Measure sheet # 2	**Allow the establishment of renewable energy communities (heat and electricity)**
Type of measure	Legal (medium-term)
Objective	To encourage collective self-consumption of electricity and heating
Potential participants	SPW TLPE – CWAPE – WG – WP
Technology(-ies) concerned	Cogeneration, district heating networks
Findings **Chap. 10**	The development of a 'heating' energy community has real potential to deliver a local and societal economy project, for example by also integrating fuel production. Sensitivity analyses have demonstrated the value of recovering RES electricity at a fair price for the development of cogeneration systems linked to a district heating network. The calculation of the rate at which green certificates are granted takes into account a significant portion of self-consumed electricity, which is valued at a higher price than that of resale on the market. A high self-consumption rate is only rarely achieved in a district heating network because the production of heat is shared between consumers, but the current electricity framework does not allow it. This obstacle will be partially lifted with the establishment of energy communities. Many district heating networks do not include cogeneration because this investment is economically unviable due to the low cost of buying back electricity injected into the network. The other possibilities for recovering electricity (supply licence or resale to an aggregator) are too complex to implement for medium-sized projects. The forthcoming implementation of 'electricity' energy communities will resolve this issue under certain specific conditions (fossil cogeneration excluded, cogeneration must be owned by the EC, only new installations). Other means of recovering this electricity must thus be considered.
Proposed actions	• Public contract in progress relating to technical and legal support to promote the development of different forms of energy sharing in Wallonia • Implement regulatory provisions governing the sale of thermal energy to one or more consumers • Transpose Article 22 of the RED II Directive under which Member States must ensure that final customers, in particular household customers, are entitled to participate in a renewable energy community while maintaining their rights or obligations as final customers, and without being subject to unjustified or discriminatory conditions or procedures (…). • Incorporate the specific case of renewable district heating networks into current discussions on the implementation of energy communities and on the implementation of the 'peer-to-peer' mechanism (REDII Article 2(18)).
Strategy link	Link with the PWEC 2030 ('Framework for the deployment of decentralised sources aiming at maximising collective well-being, in particular via collective self-consumption schemes') and the PACE 2016-2022 ('Creation of favourable conditions for the development of renewable energy communities')

Measures in progress	
Measure sheet # 3	**Taking district heating networks into account in the calculation of the EPB**
Type of measure	Communication (short-term)
Objective	To make district heating networks attractive to property developers
Potential participants	SPW TLPE
Technology(ies) concerned	District heating network, cogeneration
Findings Chap. 10	As regards new subdivisions of single-family houses, many new dwellings are equipped by default with a heat pump. However, analysis has shown that this type of equipment is not the most profitable in the long term, neither economically nor environmentally. Historically, for the calculation of their EPB (energy performance), buildings connected to a district heating network were negatively impacted by an energy factor by default. The implementation of a district heating network for new homes, which must comply with the EPB requirement, was therefore almost impossible. A new tool allows the performance of district heating networks to be more objectively considered.
Proposed actions	• Communicate on the existence of the EPB tool for district heating networks • Establish a link between the district heating network EPB declarations and the reporting to the Administration provided for in the 'Decree/WGD on Thermal Energy' currently being validated
Strategy link	Link with measure 14 of Chapter 8 ('Continue to strengthen (EU) energy standards in compliance with European directives') and measure 17 ('Implement the building passport') based on PACE 2016-2022, the PWEC 2030, AEER and SWR

Measures in progress	
Measure sheet # 4	**Subsoil decree**
Type of measure	Legal (short-term)
Objective	Global regulations for the exploration and exploitation of Walloon subsoil resources
Potential participants	SPW TLPE – SPW ARNE – WG – WP
Technology(ies) concerned	Geothermal energy
Action	The purpose of the project is to establish a clear and precise framework of activities and installations aimed at exploring and exploiting the resources of Walloon subsoil. The objective of this project is to determine a clear legal framework for geothermal energy intended to attract investors who are reluctant to enter the market because of the current legal vacuum. The SPW TLPE is therefore in favour of their integration into the draft subsoil decree to avoid any redundancy and ensure complementarity and legal certainty. It was also logical to consider the provisions on geothermal energy as part of environmental law given that exploitation cannot be carried out without the required environmental permit and in view of the possible effects of this activity, particularly at the time of drilling, on groundwater bodies. In addition, the interaction between the exploitation of geothermal energy and the other possible uses of subsoil had to be addressed in a coherent framework. The options proposed by the subsoil resource codification project ensured that a common core could be established for 'strategic' resources, making it possible to grant to the explorer and/or operator candidate the exclusivity needed to secure investments, thereby promoting private sector initiatives, which are essential in this area. This is all the more important as it will improve the public authorities' knowledge of the Walloon subsoil and its potential, including with respect to energy.
Strategy link	PWEC 2030, PNEC 2030 and PACE 2016-2022 (the geothermal component is addressed in these strategies by removing the obstacles to its development through a clear legal framework)

Priority measures	
Measure sheet # 5	**Stop all subsidisation of fossil fuels in connection with Wallonia's objectives**
Type of measure	Economic
Objective	To eliminate aid that promotes the competitiveness of fossil fuels
Potential participants	SPW TLPE - CWaPE - SPW-Économie - WG - WP - Federal level (non-regionalised powers, e.g. taxation)
Technology(ies) concerned	All RES technology
Findings Chap. 10	• Fossil energy 'heating' projects generally benefit from a more advantageous payback time in the short term. They do not need any financial support. • Support for the production of electricity from fossil fuels (natural gas) via Green Certificates is marginal on the VAACN. • The Walloon Region is aiming for its public housing stock to reach a carbon-free 'A-rated' energy performance by 2040; the remaining residential buildings are expected to achieve this by 2050, while for the service sector, the ambition is to strive for buildings with a zero annual energy and carbon balance for heating, domestic hot water, cooling and lighting by 2040.
Proposed actions	• Creation of a registry to identify all fossil fuel subsidies • In connection with the discussions and phase-out of the use of fossil fuels, modify the WGDs concerned by eliminating this aid to fossil fuels by 2025 at the latest, provided that there are sustainable alternatives, or by transforming it into aid for renewable energy • Eliminate the aid already identified where there are alternatives • Given the long lifespan of some of the subsidised projects and the WG's desire to achieve 100% renewable energy by 2050, encourage all projects that have not yet been finalised to opt for a carbon-free energy source.
Strategy link	PACE 2016-2022 PWEC 2030 (Link with measure 4 of Chapter 8: 'Encourage the population to switch to less polluting fuel')

Priority measures	
Measure sheet # 6	**Support the recovery of RES and waste heat**
Type of measure	Economic
Objective	To increase the share of heat recovered from renewable and/or waste sources
Potential participants	SPW TLPE - CWaPE - Walloon Union of Enterprises - WG
Technology(ies) concerned	All RES heat production technologies
Findings Chap. 10	Support for electricity production without specific support for heating distorts the short-term competitiveness of RES technologies, in particular the recovery of waste energy. However, industries do not invest in technologies with a payback period of more than 3 years and therefore lack any incentive to use their waste heat beyond their own needs.
Proposed actions	• Evaluate the appropriateness of extending the discussions on Sector Agreements beyond 2023 to include the issue of heating, including for the service sector. • Continue and extend the establishment of a registry of renewable heat production in Wallonia • Set up a registry of waste heat in Wallonia: technical potential, connection with heating and cooling needs that can be substituted nearby • Develop a certification system for the renewable or sustainable nature of heat production installations (via Guarantees of Origin - 'Heating' WGD in the process of being approved) • Develop support mechanisms for the recovery of RES or waste heat to make it at least as profitable as heat produced directly by fossil fuels: aid for setting up installations, financial support for heat energy recovered and used (via LGOs). • Develop subsidy mechanisms adapted to the payback time of the technology investment and reduce the risk for private investors • Develop communication activities around the subject of renewable heating aimed at industry, project owners and the general public, possibly with the designation of a SPOC at the administration level • Ensure the sustainability of funding for RES support by setting up independent funding for electricity consumption. No longer allow installations to be dimensioned without considering heat recovery. • Condition the allocation of subsidies on technical, ecological and performance factors over the long term.
Strategy link	PACE 2016-2022 PWEC 2030 (Support for green heating, in particular through district heating networks)

Measures with significant impacts	
Measure sheet # 7	**Set up an online platform, by sector of activity (residential, service, industry), to facilitate procedures necessary to realise a project**
Type of measure	Administrative simplification
Objective	Centralisation of information and procedures
Potential participants	SPW TLPE – EWBS – Renowatt
Technology(ies) concerned	All RES technologies
Findings Chap. 10	• RES projects are subject to a series of administrative obligations during their implementation and lifetime, unlike 'fossil' projects. • These obligations are managed by different departments and entities, which creates additional complexity • A framework is necessary for RES sectors but the impact must be limited as much as possible on the development of projects (cost, complexity and duration of the procedures)
Proposed actions	After considering the procedures, set up an online platform containing: • A single, consolidated source of information on procedures for project owners • A single tool for monitoring the administrative procedures of the various services (SPW TLPE, Cross-functional Biomass Committee (CTB), Permits and Authorisation Department (SPW-ARNE, SPW-Économie, etc.) • A single tool to process study-type and investment-type grant applications based on a 'virtuous' workflow: Audit -> Study -> Investment -> operating support. (Functional tools are already available on the market and would allow rapid deployment) • A single tool for collecting information on the operation of RES equipment (encoding Green Certificates, monitoring of emissions, energy consumption and performance [assessment, Thermal Energy Decree, etc.], monitoring of sustainability [REDII Directive], etc.) Strengthen synergies between existing tools and services within the Walloon Region (AMURE, UDE, UREBA, Infrasport, Sowalfin, SRIW, Renowatt, etc.). Work on communication and mutual recognition of the services offered.
Strategy link	PWEC 2030 and PACE 2016-2022 (Remove administrative and regulatory barriers to promote renewable energy)

Measures with significant impacts	
Measure sheet # 8	**Develop AMURE and UREBA aid**
Type of measure	Economic
Objective	To support the development of RES in Wallonia, in particular improving the quality of projects studied within the framework of AMURE and UREBA aid to better target projects to be subsidised for investment.
Potential participants	SPW TLPE - SPW EER (Department of Investment Programs (DPI)) - WG
Technology(ies) concerned	District heating network, cogeneration
Findings Chap. 10	Problems highlighted by the analysis
Proposed actions	• With some exceptions (for example for certain types or sizes of investments), require that a (pre-)feasibility study be carried out by an auditor approved by Wallonia for any investment aid relating to thermal energy production systems. This study should highlight the relevance of the project in achieving Wallonia's environmental objectives. • Impose the unified audit methodology proposed by the Walloon Region on its website for carrying out studies and audits (currently proposed but not imposed) in order to make the analyses comparable. • Extend the possibility of subsidising feasibility studies beyond companies with sector agreements, in particular so that SMEs can benefit from them • Support the creation of specifications and site monitoring by independent consultancy offices for certain particularly complex RES projects (Cogeneration, Biomass, Geothermal Energy, district heating network) • Stop subsidising studies for sectors relating to fossil fuels (e.g. replacement of boilers, gas cogeneration). • Impose and subsidise the implementation of annual performance audits for RES production equipment, with reporting to the Administration (for example reporting under the 'Thermal energy' Decree). For projects with operating subsidies, link this subsidy to carrying out the audit and maintaining performance (tolerance ranges to be agreed). • Stop all fossil fuel subsidies by 2025 at the latest, provided that there are sustainable alternatives or transform them into support for renewable energies • Analyse the subsidisation rules for investments between UDE Energie and UREBA aid, and ensure the consistency of the mechanisms. • Strengthen synergies between existing tools and services within the Walloon Region (AMURE, UDE, UREBA, Infrasport, Sowalfin, SRIW, Renowatt, etc.). Work on communication and mutual recognition of the services offered.
Strategy link	PACE 2016-2022 AEER SWR (Link with measures 27, 28 and 29 of Chapter 8: 'Optimising the system of aid for energy studies for SMEs/VSEs, local authorities and the non-profit sector'; 'Launch a new programme for the renovation of exceptional UREBA public buildings' and 'Create a financing mechanism to promote the energy efficiency of buildings in the public sector and the non-profit sector (interest-free loan)'

Measures with significant impacts	
Measure sheet # 9	**Maintain and adapt investment aid (UDE)**
Type of measure	Economic
Objective	To promote energy investments
Potential participants	SPW TLPE - SPW-Economie - Investment Programs Department (DPI) - WG
Technology(ies) concerned	All
Findings Chap. 10	As long as fossil fuel prices are low, RESs will remain heavily dependent on investment support. District heating networks are eligible for UDE investment aid, but only SME-type project owners are eligible. A large company that has waste heat therefore does not benefit from any support for recovering this heat. There is no support for connecting residential buildings to a district heating network. However, diversity of consumption profiles is what makes this type of project profitable. The contribution rates are fixed and no longer correspond to the reality of the market.
Proposed actions	• Review the lump sum amounts of eligible additional costs and incorporate a specific category for RES district heating networks. • Provide a mechanism for rapidly reviewing lump sums in order to follow market trends. • Condition the subsidy on the profitability of the technology (rule out unprofitable projects even over the lifetime of a machine) • Provide the necessary resources for on-site monitoring of subsidised projects, 2 or 3 years after their start-up. Make use of performance audits, carried out via AMURE or UREBA auditors, for example, to guarantee the sustainability of the funds invested by Wallonia • Establish high ceilings for subsidisation by technology to avoid over-financing non-mature technologies, which may benefit from other research aid. • Provide a subsidy for connection to any efficient district heating network (possibly conditional on the energy vector being RES and deemed relevant for the municipality in question). This allowance was previously in place (http://forms6.wallonie.be/DGO4_Energie_v17.07.01/formulaire31.pdf) The allowance is requested by the district heating network manager responsible for connecting the new consumer. • Study the possibility of opening the UDE allowance system to real estate companies for H-RES projects with a district heating network and to large companies for waste heat recovery.
Strategy link	PWEC 2030 PACE 2016-2022 (Link with measure 1 of Chapter 8: 'Maintain investment allowances for installations that use renewable energies')

Measures with significant impacts	
Measure sheet # 10	**Encourage good maintenance of RES production facilities**
Type of measure	Economic
Objective	To provide financial support for the development of efficient installations
Potential participants	SPW TLPE – CWaPE – WG
Technology(ies) concerned	District heating network, cogeneration
Findings Chap. 10	RES installations are economically and environmentally more efficient when the entire service life of the installations is taken into account. Achieving savings objectives thus depends on maintaining high performance production tools. There is currently no framework, no aggregation and no support for quality maintenance of RES installations subsidised by Wallonia.
Proposed actions	• Support/mandate the implementation of a performance audit of COGEN, RES and DHN installations to ensure long-term performance and the organisation of reporting to Wallonia. Conducting this audit would make it possible to define the amount of aid (for investment and/or operation) or even to spread it out and reduce the risk of a financial bubble. • Organise financial support based on the performance of the installations receiving support: need to establish precise criteria that can be verified by field staff. Field staff can be the energy auditors already recognised by Wallonia for the AMURE and UREBA schemes.
Strategy link	PWEC 2030 PACE 2016-2022 (These strategies focus on improving the energy performance of installations)
Indicators	Average efficiency observed by certification bodies during installation performance audits

Measures with significant impacts	
Measure sheet # 11	**Provide a financing mechanism adapted to a long lifespan for district heating/cogeneration equipment**
Type of measure	Economic
Objective	To facilitate the financing of DHNs and Cogen RESs
Potential participants	SRIW – BEI – SPW TLPE – WG
Technology(ies) concerned	District heating network, cogeneration
Findings Chap. 10	RES district heating networks are always more attractive in the long term, financially and environmentally, but in the short term their competitiveness is weak due to the high CAPEX required and the risks associated with supplying heating. A mechanism is thus essential to smooth out CAPEX investments over the long life of the equipment and to reduce the risks associated with the disappearance of any participants in the district heating networks.
Proposed actions	• Facilitate the third-party investor system within the framework of RES district heating/cogeneration projects • Set up financing systems over periods adapted to the lifespan of district heating networks • Establish conditions for accessing financing set by Wallonia involving management of the development of the Walloon infrastructure network specific to heating • Consider setting up a network social support system: Inter-district heating network solidarity factor (the most profitable finance the least profitable) • Consider the financing of district heating networks (transmission infrastructure) by local authorities, as for gas and electricity.
Strategy link	PWEC 2030 PACE 2016-2022 (In order to allow district heating networks to be economically competitive with respect to traditional technologies, a financing mechanism must be set up)

Measures with significant impacts	
Measure sheet # 12	**Review the depreciation period of DHNs for accounting purposes**
Type of measure	Legal
Objective	To match the financial profitability of DHNs from an accounting point of view with reality
Potential participants	SPW TLPE - Federal (Finance FPS) - institute of auditors - WG
Technology(ies) concerned	District heating network
Findings Chap. 10	Given that district heating networks have a minimum lifespan of 50 years, project assessments covering a period of 30 years are disadvantageous when considering the financial burden of district heating networks.
Proposed actions	• Organise a consultation with the federal authorities and the institute of auditors to make them aware of the depreciation period of DHNs which should be taken into account (50 years) • Take into account the IAS 16 standard indicating that accounting depreciation depends on the effective life of the asset (it should be 50 years as for gas networks). • Indicate in the decree or 'Thermal energy' WGD the lifespan of the DHNs to be taken into account for depreciation (in the same way as the gas & electricity methodologies include the lifespan of the various fixed assets)
Strategy link	PWEC 2030 PACE 2016-2022 (With a view to supporting green heating, district heating networks must be able to become competitive with respect to traditional technologies)

Measures with significant impacts	
Measure sheet # 13	**Incorporate local or neighbourhood study requirements for DHNs and renewable energy in the context of major construction projects**
Type of measure	Legal
Objective	To take advantage of major construction projects to pool the costs linked to the opening of roads. To do this, it is necessary to have previously studied the potential of district heating networks at municipal or district level
Potential participants	SPW TLPE and Municipalities (POLLEC) - WG
Technology(ies) concerned	District heating network
Findings Chap. 10	Wallonia has numerous areas that are suitable for the installation of a district heating network but which are not exploited.
Proposed actions	• Incorporate a study carried out independently on district heating networks and renewable energy sources during the construction or renovation of thermal energy production systems in public buildings, thermal energy production systems in buildings with a high and constant consumption or during the construction of new subdivisions; • Incorporate a study carried out independently on district heating networks and renewable energy sources during road works or extension of the gas network, including when passing in front of service-sector buildings or industries; • Incorporate a study carried out independently on district heating networks and renewable energy sources as part of the 2025-2030 public housing renovation plans, the future envelope available for building public housing and neighbourhood renovation projects. • As far as possible, on the basis of the renovation plans submitted by the SLSPs, also consider the creation of district heating networks as part of ongoing renovations to public housing under the 2020-2024 plan; • Consider an expansion of co-financing for carrying out (pre-)feasibility studies at SLSPs. Depending on the situation, these studies listed above will be supported by the owner of the renovation or construction project. • While municipalities are drawing up their various plans relating to energy and decarbonisation, evaluate the suitability of an efficient district heating network in those municipalities by directly involving the municipal urban planning services.
Strategy link	PWEC 2030 PACE 2016-2022 (With a view to supporting green heating, this technological solution must be studied when possible)

Measures with significant impacts	
Measure sheet # 14	**Creation of a guarantee fund for the decontamination of excavated soil**
Type of measure	Communication and funding
Objective	To avoid passing the cost of any soil pollution on to the owners of district heating network projects.
Potential participants	SPW TLPE – SPW ARNE – WG
Technology(ies) concerned	District heating network
Findings Chapter 10	The Soil Decree (1/03/2018) currently provides for a soil analysis in all district heating network projects that require soil excavation. In the event of pollution from an unknown source, it is up to the project owner to assume the decontamination costs. A significant fixed additional cost has therefore been charged to all scenarios comprising a district heating network. Note that in some regions, this additional cost can represent up to 30% of the cost of the district heating network.
Proposed actions	• Identify Wallonia's tools for analysing the level of soil pollution at the level of district heating networks, draw up practical information sheets on using those tools, and communicate on them. • Study the possibility of setting up a guarantee fund for the decontamination of excavated soil via the Interregional Soil Remediation Commission • Analyse stakeholder interest in this type of fund and possible public-private partnerships for setting it up • Carry out an economic study identifying the costs incurred by the project due to the risk of soil pollution, including the costs related to the management and traceability of excavated soil: type of treatment according to the type of pollution, consequences for the financial status of projects in order to ensure a certain proportionality
Strategy link	N/A

Measures with significant impacts	
Measure sheet # 15	**Development of a geographic information system (GIS) identifying heating needs, district heating networks and technical installations**
Type of measure	Communication
Objective	To improve the recording, particularly location recording, of technical installations related to heating and its transmission
Potential participants	SPW TLPE – SPW ARNE – SPW SG (geomatics department)
Technology(ies) concerned	All
Findings Chap. 10	The promotion of RES technology via incentives requires good visibility of the market, its liabilities and its development. The collection of information for this report was a very complex process.
Proposed actions	Creation of a database, including the recording of geographical locations, with input from • Energy audits • Sector statistics from the SPW TLPE (Gas & Electricity Markets Department) • Environmental permit data for installations related to heating and its distribution • Existing registries • Studies carried out by or for the public service • Subsidised studies carried out by approved auditors in Wallonia
Strategy link	PWEC 2030 PACE 2016-2022 (In order to allow district heating networks to be set up and therefore to maximise the use of green heating, it would seem logical to develop a mapping system)

Measures with significant impacts	
Measure sheet # 16	**Extension of the duties of the industry facilitator by including a waste heat recovery component**
Type of measure	Technical
Objective	To improve communication and the development of waste heat recovery. Field support from the industry facilitator would make it possible to respond to or raise the variety of issues specifically affecting companies and thus facilitate this intra- and inter-company optimisation.
Potential participants	SPW TLPE - Industry / Business Facilitators - WG
Technology(ies) concerned	District heating network
Findings Chap. 10	The potential for waste heat recovery is significant and lucrative. However, it has not been exploited to date, in particular because achieving profitability takes longer than 3 years.
Proposed actions	• Develop technical publications for the recovery and use of waste heat • Identify exploitable incentives to promote waste heat • Appoint a competent point of contact to answer questions from industrial operators, in particular on the subject of waste heat recovery • Propose technical options for estimating recoverable waste heat and carrying out the recovery
Strategy link	PWEC 2030 PACE 2016-2022 (The objective is to be able to set up support mechanisms for the use of waste heat)

Measures with significant impacts	
Measure sheet # 17	**Creation of a guarantee fund against the industrial risk associated with waste heat recovery projects**
Type of measure	Financial incentive
Objective	To reduce the risks relating to waste heat recovery projects
Potential participants	SPW TLPE – WG – WP
Technology(ies) concerned	Waste heat recovery installations
Findings Chap. 10	Waste heat recovery projects have great potential because they allow industrial energy to be harnessed at a cost much lower than fossil fuels. The exploitation of this resource, in suitable areas, makes it possible to cover almost all of the area's heating needs. However, the depreciation period of such a recovery project is incompatible with the financial and time constraints of an industry. This incompatibility generates an industrial risk which has held back the development of such projects.
Proposed actions	• Examine setting up a guarantee fund or other mechanism to reduce the industrial risk associated with the recovery of waste heat. • Analyse stakeholder interest in this type of fund and possible public-private partnerships for setting it up • Define measures to cover the risks of losing key economic stakeholders associated with district heating networks (producer, consumer).
Strategy link	PWEC 2030 PACE 2016-2022 PM4 (In connection with measure 42 'Support self-production of energy' through its objective 'Analyse and adapt regulations relating to self-production of energy and the expansion of Renewable Energy (RE) for the industrial sector (including finalising the reforms already underway). ')

Measures with significant impacts	
Measure sheet # 18	**Promotion of the development of installations supplying district heating (deep geothermal energy, mining geothermal energy and shallow open system geothermal energy)**
Type of measure	Financial
Objective	To develop district heating networks supplied by geothermal resources
Potential participants	SPW TLPE - SRIW - BEI - SPW ARNE (Geological Survey of Wallonia) - WG
Technology(ies) concerned	Open system deep geothermal, mining geothermal and shallow geothermal installations
Findings Chap. 10	Geothermal projects (deep, mining and shallow) have great local and long-term potential for exploiting energy contained in the subsoil at a cost much lower than fossil fuels. The use of this resource, in suitable areas, makes it possible to cover almost all of the area's heating needs.
Proposed actions	• Develop knowledge of geothermal resources (heat from geothermal fluid) in the Walloon subsoil, which are still very poorly understood, and define areas for the exploitation of geothermal resources • Set up pilot projects in Wallonia (mainly mining geothermal energy in three coalfields, i.e. Mons, Charleroi and Liège) and shallow geothermal energy with open systems. • Develop subsidy mechanisms adapted to the payback time of the technology investment and reduce the risk for private investors
Strategy link	PWEC 2030 (district heating networks are a relevant option for recovering renewable heat) PACE 2016-2022 (support measure for green heating, in particular through district heating networks)

Measures with significant impacts	
Measure sheet # 19	**Modification of the permit system for open systems in shallow geothermal energy and biomass gasification**
Type of measure	Legal
Objective	To facilitate the development of: - Shallow geothermal energy, for open systems; - The biomass gasification sector.
Potential participants	SPW TLPE – SPW ARNE – AWAC – DPA
Technology(ies) concerned	Open system shallow geothermal installations Biomass gasification cogeneration plants
Findings Chap. 10	Very little of the potential of shallow geothermal energy and biomass gasification is being exploited in Wallonia. Geothermal energy: this is restricted by the class 1 permits issued for carrying out injection tests (section 41.00.04), which require an impact study. The procedure is too long, too expensive and complicated for projects and above all undermines their profitability. Biomass gasification: this is restricted by the default application of section 40.20.01.02 for environmental permits, applicable to any gas, fossil fuel or renewable producer, with or without storage. This section imposes a class 1 permit for an equivalent of 50 kWe, which destroys the profitability of the project due to the high cost of the environmental study and the additional procedures required for this type of permit.
Proposed actions	Overall, set up a technical committee between the SPW TLPE and ARNE and AWAC administrations to assess the various changes to be made to the legislation in force. As part of the general revision of environmental permit sections, pay particular attention to the obligations that apply to open system shallow geothermal projects and biomass gasification, in order to limit the obligations to what is appropriate for such projects. Regarding biomass gasification in particular, create specific permit sections, as for biomethanisation, so that gasification does not fall by default into an unsuitable section in terms of technological risk. Regarding open system shallow geothermal energy, • Identify favourable areas for the development of open system shallow geothermal energy, in order to specify the real potential of these projects to the DPA; • It would be advisable to have a single licensing process that would make the issuance of an operating licence conditional on the production of a comprehensive and high quality hydrogeological study to determine the impacts of the system and its long-term sustainability.
Strategy link	N/A

Measures with significant impacts	
Measure sheet # 20	**Measures to reduce the geological risk associated with deep geothermal projects**
Type of measure	Financial - Guarantee fund to mitigate geological risk (determination of underground geothermal resources)
Objective	The geological risk with regard to determining geothermal resources is a significant risk which is partly out of the hands of project owners. Given the high investment costs at the start of a project, the risk of not accessing the expected geothermal resource and the lack of an insurance policy covering this 'natural' risk, one of the options being studied is to set up a guarantee fund system, or join an already existing guarantee system, in order to create an investment climate that favours the production of renewable heat from deep geothermal energy.
Potential participants	SPW TLPE – WG – WP
Technology(ies) concerned	Deep geothermal installations
Findings Chap. 10	The CAPEX needed to build a deep geothermal installation depends to a large extent on the risk taken by the project owner for the initial drilling. The expected geothermal resource depends on the flow rate and the temperature resulting from the borehole. The risk is therefore linked to these two parameters and their impact on the project to exploit the resource. The risk is certainly high during the initial development phases of a project, but it gradually reduces after completion of the first exploratory drilling. It is this initial drilling that will confirm whether or not there is a geothermal resource at the targeted location, and hence the success of a deep geothermal project.
Proposed actions	• Work on gaining a better understanding of the thermal resources (heat from geothermal fluid) of Walloon subsoil via geophysical surveys, feasibility studies and exploratory prospecting. • Study different options to guarantee the financial risk associated with initial drilling, including the implementation of a Walloon guarantee. • Analyse stakeholder interest in this type of fund and possible public-private partnerships for setting it up
Strategy link	PWEC 2030 PACE 2016-2022 (A regional guarantee fund will be set up for technologies with a high risk but attractive return [e.g. geothermal energy])

Measures with moderate impacts	
Measure # 21	**Professionalisation of the 'Cogeneration', 'District heating network', 'Geothermal energy' and 'Biomass' sectors**
Type of measure	Technical
Objective	To energise the market by improving and recognising the technical skills of participants in the sector
Potential participants	SPW TLPE - WG - Walloon training centres
Technology(ies) concerned	All
Findings Chap. 10	The profitability of RES technologies is very sensitive to the correct sizing of installations. Massive deployment of these technologies requires a large number of serious, well-trained participants on the market, which is not the case today.
Action	• Recognise or organise training/information sessions for project owners • Through AMURE and UREBA authorisations, recognise the skills of experts trained in the areas of cogen/district heating/geothermal/biomass • In collaboration with training operators, in particular skills centres, work to set up cross-border partnerships for the organisation or recognition of specialised training • Produce handbooks or course materials for installers (more sustainable than training) • Raise awareness of the importance of maintenance, follow-up and monitoring • Focus these tools on technical and financial aspects, including formalisation of the profitability calculation methodology to allow the comparison of projects and avoid 'commercial' studies. • Set up a certification/labelling system for RES operators
Strategy link	AEER SWR PACE 2016-2022 (Link with measures 18 'Promote the sustainable buildings handbook' and 41 'Raise awareness, train and certify professionals')

Measures with moderate impacts	
Measure sheet # 22	**Integration of a facilitator/expertise system directly into the administration - with field staff**
Type of measure	Technical
Objective	Centralisation of know-how
Potential participants	SPW TLPE - Wallonia energy portals - Renowatt
Technology(ies) concerned	All
Findings Chap. 10	Projects related to heat recovery, RES heat production and the installation of district heating networks are complex from a technical and financial point of view. Significant funds are required to deploy these technologies and the funds available are limited. Wallonia therefore requires a neutral and effective arbitration tool to advise project owners as best as possible and to prioritise any injection of public funds.
Proposed actions	• Set up a facilitator system within the administration, including centralisation of requests and distribution to the experts concerned (who may be external); • Set up different response lines depending on the complexity of the request; These two stakeholders would have the task of answering any questions asked and providing information, as well as offering the possibility of sending professionals to carry out field visits.
Strategy link	PWEC 2030 PACE 2016-2022 SWR (Provision of facilitator services)

Measures with moderate impacts	
Measure sheet # 23	**Establishment of an effective system for monitoring underground installations**
Type of measure	Technical and communication
Objective	To allow the plans of underground installations to be made available by all stakeholders concerned within a reasonable time frame
Potential participants	SPW TLPE – asbl Powalco – asbl KLIM-CICC – WG
Technology(ies) concerned	District heating networks
Findings	To set up a district heating network, road works are necessary. A precise plan of the location of underground installations would therefore help to set up any such networks and reduce the CAPEX. • **The Powalco platform is not up to date (for the oldest underground installations)** However, according to the decree on underground installations, the stakeholders referred to in Article 8 are required to register with the platform (managers of roads, pipes, cables). In addition, they must respond within 15 days to requests, but only in the event of possible coordination. • **Insufficient geographical scope of files** It should be possible to obtain data covering more than one area only. For example for an entire city. As an area could potentially be selected, it should be possible to obtain data for an entire city. • Project owners are not sufficiently aware of this tool and therefore fewer underground installations are likely to use it
Action	• Organise the exchange of feedback between project owners and the Powalco platform • Incorporate district heating network infrastructure into the Powalco platform • Check if the mapped areas are large enough to select all relevant underground installations throughout an entire district heating network (1 - 10 km) • Define reasonable deadlines for declaring additional underground installations
Strategy link	PWEC 2030 PACE 2016-2022 (Link with support for green heating conveyed by a district heating network; the location of underground installations must be known before this type of solution can be envisaged)

Measures with moderate impacts	
Measure sheet # 24	**Organisation of an ash collection and treatment / recovery process**
Type of measure	Legal and economic
Objective	To increase the economic and environmental attractiveness of recycling ash as bio-based material To allow ash to be returned to the forest
Potential participants	SPW TLPE – SPW ARNE - Valbiom – Febhel – DNF – FRW – CRAW – WG
Technology(ies) concerned	Technologies using biomass as an energy vector
Findings **Chap. 10**	Ash from the combustion of biomass, whether or not the latter is polluted, is currently considered waste intended exclusively for technical landfill. This can represent a significant cost in the OPEX of projects, with the risk of improper and uncontrolled disposal in agricultural or forest areas.

Proposed actions	• Study the possibility of setting up a recovery system based on the recovery system for sewage sludge (exogenous materials) in line with the fertiliser regulation and with legislation on by-products that are no longer considered waste. To do this:
	  ○ Estimate the potential of the ash recovery resource (gross, net, plausible) in Wallonia (production, content, quality), establish its location and set up a register of installations that generate ash;
	  ○ Clarify the classification of ash produced from different categories of wood waste (WGD of 28 February 2019 implementing Article 4a of the Decree of 27 June 1996 on waste as regards the recognition of by-products;
	  ○ Study the potential uses and applications for this resource and highlight the opportunities to be exploited and the obstacles (economic, environmental, legal) to be eliminated;
	  ○ Estimate the energy-related and environmental repercussions in Wallonia.
	• Adopt the implementing decree of the forestry code to allow the return of unpolluted ash to the forest
	• Facilitate access to qualitative laboratory analyses of ash with a view to its recovery
	• Facilitate the procedures for returning clean ash to the soil, create synergies between stakeholders (exchange platform, link with existing cartography of the trophic state of soils (http://geoportail.wallonie.be/ - https://www.fichierecologique.be/#!/, etc.)
	• Communicate on the environmental benefits of returning unpolluted ash to agriculture, horticulture or forests

Strategy link	Implementation of a biomass strategy (CTB)

Measures with moderate impacts	
Measure sheet # 25	**Promotion of quality biomass with low emissions of fine particles (possibly of Walloon origin)**
Type of measure	Economic
Objective	To facilitate the development of local biomass production while guaranteeing its quality
Potential participants	SPW TLPE – Walloon Economic Office for Wood - Febhel - EDORA – TWEED – FRW – AWAC - ISSeP – WG
Technology(ies) concerned	Solid biomass installations
Findings Chap. 10	The combustion of biomass is often criticised due to its flue gas emissions. This barrier to the roll-out of the technology is not always properly understood, especially in service-sector and industrial installations. However, by using quality biomass, it is possible to better control the parameters of flue gases, including fine particles. Standard (ISO - 17225) and certification tools exist (DIN +, ENplus, Goodchips, etc.). The wood chip industry is subject to strong pressure from market prices to the detriment of quality. This is mainly due to a lack of understanding among consumers, first and foremost public authorities. Good quality fuel is available on the market, but is going largely unnoticed.

Proposed actions	• Provide project owners (public and private) with tools and training to understand, assess and monitor the quality of the biomass purchased.
	• Work on the role model function of public authorities by supervising public supply contracts:
	  ○ Price cannot be the only award criterion
	  ○ Impose deliveries by unit of energy (kWh) instead of volume (stacked cubic meter)
	  ○ Carry out local qualitative monitoring of projects
	• Work in collaboration with the Health FPS on the Royal Decrees on 'pellets' (RD of 5/04/2011 - C-2011/24112) and 'heating' (RD of 24/11/2010 - C-2010/24412)
	• Set up an incentive mechanism for the certification of producers
	• Set up an incentive mechanism for the use of certified biomass by consumers

Strategy link	PWEC 2030 PACE 2016-2022 (Link with measure 8 of Chapter 8 'Better characterise and reduce particulate emissions from heaters supplied with solid fuels and improve their energy efficiency')

Measures requiring further analysis	
Measure sheet # 26	**Planning of the phase-out of fuel oil and natural gas**
Type of measure	Legal
Objective	Planning of the phase-out of fuel oil and natural gas
Potential participants	SPW TLPE - CWAPE - Distribution network managers - WG
Technology(ies) concerned	All
Proposed actions	• Benchmark the strategies used in other countries/regions (including Flanders) to phase out fossil fuels • Determine the preferred method for phasing out fossil fuels (stopping sales of installations, stopping connections, stopping sales of the vector) • Differentiate by sector • Determine a phasing out time line • Objectively analyse from an energy point of view, for areas not currently supplied with gas, the benefits of creating a district heating network • Identify the potential of reusing the existing gas network for renewable gases (biomethane, hydrogen, etc.)
Strategy link	PWEC 2030 PACE 2016-2022 (Link with measure 4 of Chapter 8 'Encourage people to switch to less polluting fuel')

Measures requiring further analysis	
Measure sheet #27	**Analysis of the benefits of developing solar thermal installations that supply district heating networks**
Type of measure	Subsidisation - Mechanism
Objective	To develop district heating networks and a supply sourced from solar thermal installations
Potential participants	SPW TLPE – SRIW – BEI – WG
Technology(ies) concerned	Solar thermal installations
Findings Chap. 10	Given the low consumption from district heating networks during the summer, a supply using 'fuel' resources entails considerable losses. By using a resource such as solar energy, these losses can be eliminated, thereby substantially improving the efficiency of district heating networks.

Proposed actions	• Study different possible subsidy mechanisms:
	  • Define potential beneficiaries
	  • Determine how the subsidies will be funded
	• Condition the allocation of subsidies on technical, ecological and performance factors
	• Analyse the appropriateness of an obligation for district heating networks to draw a share of their heat supply from renewable sources

Strategy link	PWEC 2030 PACE 2016-2022 (Solar thermal is a potential source of renewable heat that can be exploited by a district heating network. The benefits of this type of installation thus need to be assessed)

Measures requiring further analysis	
Measure sheet # 28	**Setting up of a recovery policy for Solid Recovered Fuels (SRF)**
Type of measure	Economic
Objective	To develop the SRF sources present in Wallonia with a view to reducing dependence on fossil fuels
Potential participants	SPW TLPE – AWAC – SPW-ARNE - DSD – WG
Technology(ies) concerned	District heating network, cogeneration
Findings Chap. 10	At present, it is only possible for large installations to use solid recovered fuels (SRF) because permits insist on very specific combustion parameters and hence significant investments. Due to this high CAPEX, profitability is only guaranteed with high-capacity installations. Heat recovery is often problematic due to an insufficient number of consumers nearby. Other types of waste, currently exported on a large scale, can be recovered via smaller-capacity installations and are thus more compatible with district heating networks. SRF (solid recovered fuel) is one waste to be analysed among others. SRFs are currently subject to a landfill or incineration requirement under conditions not technically feasible from units geared towards energy recovery.
Action	• Identify the potential for SRF: consultation of existing statistics to identify the potential of SRF for energy recovery, and the impact of this on landfill. • Consultation of local stakeholders to identify the obstacles and opportunities relating to the development of the sector (environmental, legal, etc.) • Identify the measures and mechanisms needed to develop the SRF sector (waste sorting, conditioning, transport, etc.) • Implementation of measures allowing SRF to be recovered as an energy vector and used for supplying energy to companies (financial aid, subsidies, tax aid, etc.)
Strategy link	PACE 2016-2022 (Measures to regulate and recover green waste) PWEC 2030 (Recovery of certain types of waste for biomethanisation).