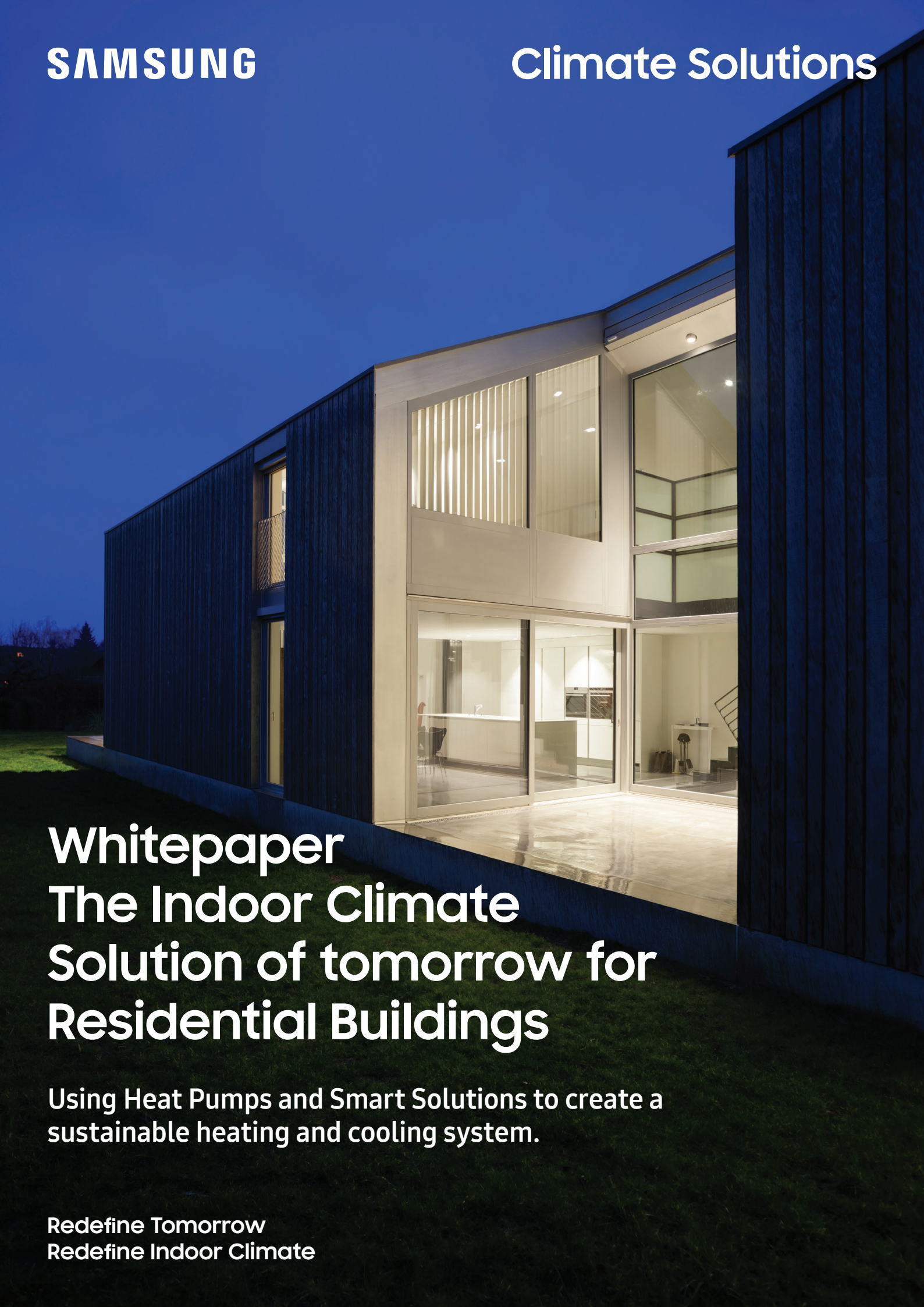
SAMSUNG

Climate Solutions



Whitepaper
The Indoor Climate Solution of tomorrow for Residential Buildings

Using Heat Pumps and Smart Solutions to create a sustainable heating and cooling system.

Redefine Tomorrow
Redefine Indoor Climate

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Abstract

Governmental bodies across the globe are introducing new policies to address the issue of climate change and its effect on the environment and impact on health. Global greenhouse gas emissions linked to burning fossil fuels for energy to be used for heating, electricity, transport and industry contribute to climate change. Driven by the ambition of the European Union and its member states to make a climate-neutral-economy (zero greenhouse gas emission) a reality by 2050, heating in buildings needs to be reviewed, revised, and integrated with digitalisation. In this whitepaper, we focus on both heating solutions and digitisation using smart connectivity.

The whitepaper introduces Samsung's ClimateHub - an innovative solution for heating, cooling and hot water supply. It integrates energy drawn from renewable sources with smart connectivity, offering the optimal indoor climate convenience. By way of a case study, the whitepaper talks of a recent partnership between Project Etopia and Samsung, who have joined forces to provide the UK market with access to a sustainable solution when building houses for the future.

Keywords

Fossil Fuels, Climate Change, Energy Efficiency, Sustainability, Renewable Energy, Climate Neutrality, Heat Pumps, Air/Water Heat Pumps, Heating Solutions, Eco Heating Systems (EHS), Integrated Systems, Digitisation, Smart Connectivity, Smart Solutions, Samsung ClimateHub, SmartThings, HP KEYMARK Certification

About Us

Since introducing its first air conditioner in 1974, Samsung Electronics has been redefining indoor climate comfort for tomorrow's society. For every space where people create memorable experiences together, be it commercial spaces or residential homes. At Samsung, we go beyond convention, through a relentless focus on pushing the boundaries of technology, innovation and design.

Samsung Electronics entered the European market of commercial air conditioning in 2005. Due to rapid growth and in support of its long-term commitment to the European market, Samsung Electronics Air Conditioner Europe B.V. (SEACE) was opened in 2017 in Amsterdam, the Netherlands. This European headquarters aims to harmonise the activities across more than 30 European countries. SEACE offers ongoing technical training in climate and smart building solutions; after sales and technical support for its industry partners; backed by Samsung's quality reputation and leading-edge innovation, including digital connectivity solutions. SEACE thrives to fulfil the needs of its European markets including for both the commercial and residential market with innovation cooling, heating, domestic hot water and smart building solutions.

Fossil fuels and their impact on the climate

Mining, drilling, and burning fossil fuels are increasingly impacting the environment and our health. A fossil fuel is formed by natural processes such as the anaerobic decomposition of dead and buried organisms, releasing energy in combustion, and is thus derived from non-renewable sources of energy. Oil, natural gas, and coal are collectively referred to as fossil fuels (Perera, 2017).[1]

The burning of fossil fuels for energy generates 85 % of all airborne respirable particulate pollution, serving as a human source of greenhouse gases and short-lived climate pollutants, that drive climate change (Perera, 2017)[1] and contribute to 7 million premature deaths worldwide every year (Malin, 2019).[2] About two thirds of global greenhouse gas emissions are linked to burning fossil fuels for energy to be used for heating, electricity, transport and industry. In Europe, too, the energy processes are the largest emitter of greenhouse gases, responsible for 78 % of total European emissions in 2015 (Energy and climate change, 2017).[3]

One of the key challenges of the twenty-first century is mitigating climate change, and energy production stands at the core of this challenge. The global climate is changing and is posing to be an increasing risk for ecosystems, human health and the economy (Energy and climate change, 2017).[3] Thus there is an urgent need to accelerate the use of energy produced from renewable sources. Renewable energy is instrumental to this transformation. Renewable energy is energy derived from natural resources that replenish themselves without depleting the planet's resources. These resources – such as sunlight, wind, rain, tides, waves, biomass and thermal energy stored in the earth's crust – are available in one form or another everywhere. They are virtually inexhaustible and cause little climate or environmental damage.

85 % of airborne respirable particulate pollution is generated by burning of fossil fuels[1] and contributes to 7 million premature deaths worldwide every year.[2]

Types of Energy Sources

Fossil Fuels

Oil Coal Natural Gas

Renewable Energy

Solar Wind Hydro Tidal Geothermal

Transition to Renewable Energy

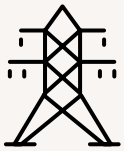
[1] Source: Perera, F., 2017. Pollution from Fossil-Fuel Combustion is the Leading Environmental Threat to Global Pediatric Health and Equity: Solutions Exist. International Journal of Environmental Research and Public Health, 15(1), p.16.
[2] Source: Malin, S., 2019. Fossil Fuels Are Bad For Your Health And Harmful In Many Ways Besides Climate Change. [online] Colostate.Edu. Available at: <https://source.colostate.edu/fossil-fuels-are-bad-for-your-health-and-harmful-in-many-ways-besides-climate-change/> [Accessed 6 October 2020].
[3] Source: European Environment Agency. 2017. Energy and climate change. [online] Available at: <https://www.eea.europa.eu/signals/signals-2017/articles/energy-and-climate-change> [Accessed 8 October 2020].

Increased Focus on Decarbonisation

Governmental regulations have a crucial role to play in implementing the much needed transition to cleaner energy. Global efforts to mitigate climate change culminated in the Paris Agreement in 2015, whereby 195 countries adopted the first-ever universal and legally binding global climate deal. The objective of the agreement— reducing the global average temperature increase to well below 2 °C while aiming to reduce the increase to 1.5 °C— can prove to be a challenge and cannot be accomplished without a significant redesigning of global energy production and consumption (Energy and climate change, 2017).[3]

The European Union has adopted binding climate and energy targets for 2020 and proposed more for 2030, in its attempt to transform into a low-carbon economy and cut greenhouse gas emissions by 80-95 % by 2050 (Energy and climate change, 2017).[3] The Paris Agreement also paved the way for The European Green Deal (European Commission, 2019)[4] – a set of policy initiatives by the European Commission – with a focus on:

> The European Union has adopted binding climate and energy targets towards cutting greenhouse gas emissions by 80-95 % by 2050.[3]



Energy
Decarbonise the energy sector.

Industry
Support industry performance towards green economy.

Buildings
Sustainable renovations thus cutting back on energy bills and energy usage.

Climate
Commitment to making Europe climate neutral by 2050.

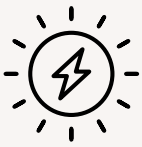
Mobility
Greener forms of private and public transport.

[3] Source: European Environment Agency. 2017. Energy and climate change. [online] Available at: <https://www.eea.europa.eu/signals/signals-2017/articles/energy-and-climate-change> [Accessed 8 October 2020].
[4] Source: European Commission. n.d. Actions Being Taken by The EU. [online] Available at: <https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu_en> [Accessed 7 October 2020].

The European Green Deal

The European Green Deal strategy aims to reform the existing European energy system into an efficient and integrated one, which will link energy sources and infrastructure to support decarbonisation and achieve the climate targets set for 2050 (European Commission, 2020).[5]

The European Green Deal goals for 2050[5]:



Accelerate the use of electricity produced from renewable sources.

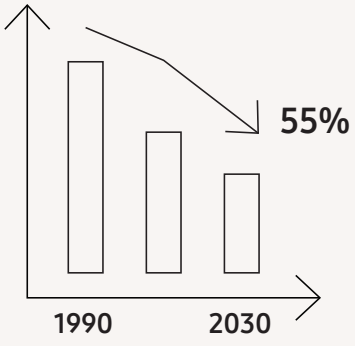
Adapt energy markets and infrastructure to an integrated energy system that supports digital energy services.

Creating a more circular energy system.

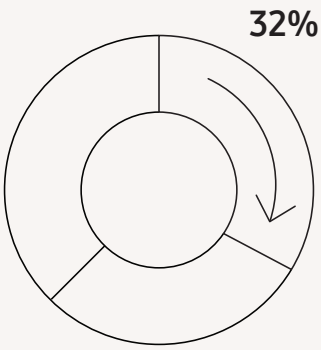
Promote renewable and low-carbon fuels for sectors that are hard to decarbonise.

Concrete intermediate targets for 2030 have been defined by the European Commission as part of the Green Deal as a stepping stone to the 2050 climate neutrality goal (State of the Union: Commission raises climate ambition and proposes 55 % cut in emissions by 2030, 2020).[6]

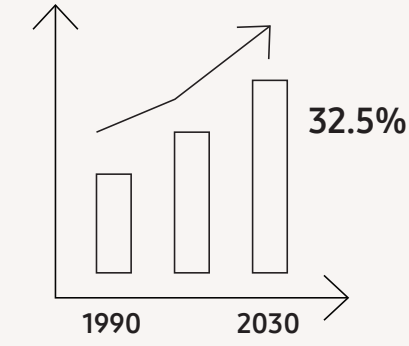
The intermediate targets for 2030[6]:



Reduce European greenhouse gas emissions by at least 55 % by 2030, compared to 1990 levels.



Accelerate the energy transition by increasing the share of renewable energy in the European Union to at least 32 % by 2030.



Improve energy efficiency to at least 32.5 %, compared to 1990 levels.

[5] Source: 2020. Powering A Climate-Neutral Economy: An EU Strategy For Energy System Integration. [ebook] Brussels: European Commission, pp.4 - 17. Available at: <https://ec.europa.eu/energy/sites/ener/files/energy_system_integration_strategy_.pdf> [Accessed 7 October 2020].
[6] Source: European Commission Press Release. State of the Union: Commission raises climate ambition and proposes 55 % cut in emissions by 2030. [online] Available at: <https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1599> [Accessed 27 October 2020].

The Renovation Wave aims to renovate 35 million inefficient buildings in Europe by 2030 and at least double renovation rates in the next ten years.[7]

In order to reduce emissions by at least 55 % in 2030, and build the foundations for a climate neutral Europe by 2050, the European Union has estimated that it must reduce buildings' greenhouse gas emissions by 60 %, their energy consumption by 14 %, and the energy consumption of heating and cooling by 18 %. To realise this, the European Commission published their Renovation Wave Strategy in October 2020 (Renovation Wave: doubling the renovation rate to cut emissions, boost recovery and reduce energy poverty, 2020).[7] The Renovation Wave aims to renovate 35 million inefficient buildings in Europe by 2030, and therewith at least double renovation rates in the next ten years.

- Tackling energy poverty and worst-performing buildings.
- Renovation of public buildings such as schools, hospitals and public administrations.
- Decarbonisation of heating and cooling.

Driven by regulations and policies as stated in the European Green Deal, new solutions and innovations are necessary to reach a 2050 climate-neutral-economy (zero greenhouse gas emission). Heating in buildings, the way it is integrated and smart connectivity play an important role.

[7] Source: European Commission Press Release. Renovation Wave: doubling the renovation rate to cut emissions, boost recovery and reduce energy poverty. [online] Available at: <https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1835> [Accessed 27 October 2020].

Types of Heating Solutions

In order to accelerate progress towards climate neutrality and to fulfil the targets of the European Commission, heating solutions in buildings will play a crucial role. The typical types of heating solutions in use today are:

Furnaces: A furnace works by blowing heated air via ducts that, through air registers, distributes the warm air in buildings. Electricity, natural gas, or fuel oil may be used to power it. Furnaces flow directly into the atmosphere and waste about 30 % of the fuel energy just to keep the exhaust hot enough to rise safely through the chimney and thus cannot be considered an energy-efficient solution (Types of Heating Systems, 2020).[8]

Boilers: Boilers disperse heat through hot water, as it passes through radiators or other devices in buildings. The cooled water then returns to the boiler to be reheated. In general, residential boilers use natural gas or heating oil as fuel (Types of Heating Systems, 2020).[8]

Hybrids: A hybrid (or dual fuel) heating system incorporates a traditional gas or oil boiler with a renewable heating system. However, a hybrid heating system is not completely renewable as it still uses a boiler that is powered by fossil fuels (What is a Hybrid Heating System?, 2020).[9]

Heat Pumps: A heat pump is a mechanical compression cycle refrigeration system that supports reverse functionality and operation to either cool or heat a restricted space. Heat pumps are sustainable, as about 75 % of the energy that is used is renewable. The remaining 25 % of the energy used is generated by other sources like electricity. Furthermore, if this electricity is generated by renewable sources (Photovoltaic, Wind, Hydro), then the heat pump becomes 100 % renewable and CO_2-neutral (Gupta and Paranjape, 2020).[10]

> 75 % of the energy used by a heat pump is renewable, making it a very sustainable energy solution.[10]

There are different types of heat pumps: Air Source heat pumps that use the ambient energy in outside-air or exhaust-air, Water Source heat pumps that use energy stored in water, either surface or sea water, and Ground Source heat pumps that use energy stored in the ground for heating, cooling and preparation of hot water (Energy sources, 2020).[11]

Heat pumps are being recognised as the best prospect for renewable energy sourced heating to replace CO_2 generating methods. Within the scope of this whitepaper, we dive deep into Air Source heat pumps in detail, because it is the most feasible and therefore a popular solution today.

[8] Source: Smarterhouse.org. 2020. Types Of Heating Systems. [online] Available at: <https://smarterhouse.org/heating-systems/types-heating-systems> [Accessed 16 October 2020].
[9] Source: Boilerguide.co.uk. 2020. What Is A Hybrid Heating System?. [online] Available at: <https://www.boilerguide.co.uk/hybrid/hybrid-heating-system> [Accessed 23 October 2020].
[10] Source: Gupta, A. and Paranjape, N., 2020. Global Heat Pump Market Size By Product (Air Source, Ground Source, Water Source), By Application (Residential {Single Family, Multi Family}, Commercial {Educational Institutes, Healthcare, Retail, Logistics & Transportation, Offices, Hospitality}, Industrial), Industry Analysis Report, Regional Outlook, Application Potential, Price Trend, Competitive Market Share & Forecast, 2020 – 2026.
[11] Source: Ehpa.org. 2020. Energy Sources. [online] Available at: <https://www.ehpa.org/technology/what-type-of-hp-for-what-use/> [Accessed 18 October 2020].

Global Market Overview of Heat Pumps

Heat pumps are evidently the most sustainable option when it comes to heating solutions. For each kW of electricity consumed by a heat pump, about 4 kW of thermal energy is generated, corresponding to 300 % efficiency. According to the International Energy Agency, heat pumps could bring about a reduction of 50 % in the building sector's CO_2 emissions, and 5 % in that of the industrial sector. This means that 1.8 billion tonnes of CO_2 could be saved per year with the use of heat pumps within Europe (Key Facts on Heat Pumps, 2020).[12]

Statistics show a steady and rising growth in the demand for and sale of heat pumps. In 2019, year-on-year heat pump sales of all hydronic forms increased 4.5 % to an estimated 2.7 million units. The global picture shows that this growth is assisted predominantly by accelerating demand across Europe, where tighter building standards-related regulations are driving this market need.

Many European Union member states offer financial support for heat pumps to incentivise the replacement of traditional boilers; this has been one of the major factors for growth in countries like France, the United Kingdom, the Netherlands and Italy. Increased installation of hybrid heat pump-boiler systems is another mark of a steady move away from fossil fuels (BSRIA global heat pump market 2019, 2020).[13] According to EHPA (European Heat Pump Association) as well as BSRIA's forecast, European Heat Pump market will be doubled in short period (by 2023). Air-to-Water heat pumps (a type of Air Source heat pump) will account for 44 % of total energy consumption by 2050 (figure1).

> The use of heat pumps could bring about a reduction of approximately 1.8 billion tonnes of CO_2 within Europe.[12]

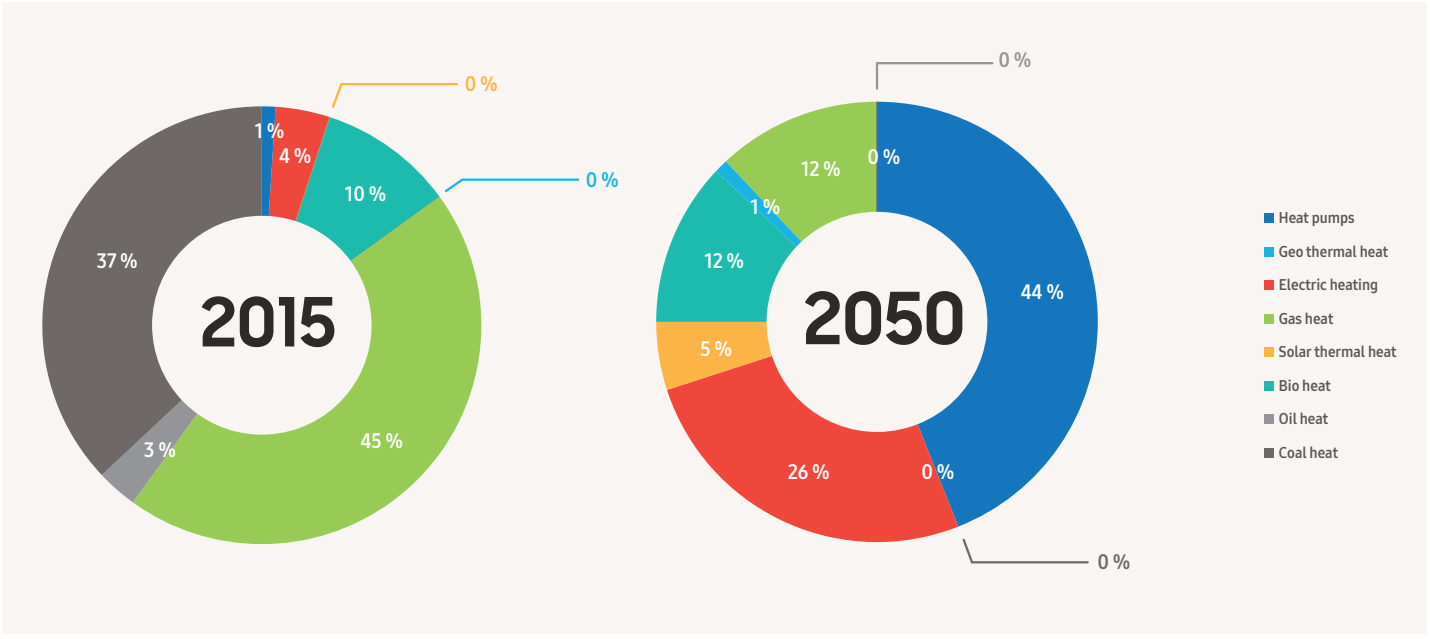


Figure 1. Growth trend in the European Heat Pump market (Source: Energy Watch Group Report 2019)

[12] Source: Ehpa.org. 2020. Key Facts On Heat Pumps - EHPA. [online] Available at: <https://www.ehpa.org/technology/key-facts-on-heat-pumps> [Accessed 12 October 2020].
[13] Source: Designingbuildings.co.uk. 2020. BSRIA Global Heat Pump Market 2019. [online] Available at: <https://www.designingbuildings.co.uk/wiki/BSRIA_global_heat_pump_market_2019#Report_covers_22_countries> [Accessed 12 October 2020].

Introducing Air Source Heat Pumps

As briefly explained, the Air Source heat pumps use the ambient energy in outside-air or exhaust-air for heating, cooling and preparation of hot water.

There are two types of Air Source heat pumps:

Air-to-Air Heat Pumps: These heat pumps take heat from the outside air and then transfer it directly via a fan system to heat a room in an indoor space.

Air-to-Water Heat Pumps: Air-to-Water heat pumps takes heat from the outside air and transfers it to a water-based system. The created heat can be used for space heating or as a hot water supply for the house. An Air-to-Water heat pump has an important advantage — they produce renewable energy, as the ground and air are technically heated by the sun (Gosheva, 2020).[14]

Air-to-Water heat pumps are either designed as a Mono Unit or Split Unit. While both have outdoor units, the main point of difference is that the heat exchanger is in the outdoor unit for Mono Units whereas for Split Units the heat exchanger is located in the indoor unit. An Air-to-Water heat pump may either be installed outside, or inside the building (Forsén, 2005).[15]

The two units of Split Air-to-Water heat pump are connected by refrigerant pipes. The outdoor unit extracts the heat from the air and passes this heat energy to the refrigerant in the system. The refrigerant is compressed up to a high temperature and is circulated to the indoor unit which has a heat exchanger which takes the high temperature heat from the refrigerant and passes it to the water that circulates to the heating and hot water system (figure 2).

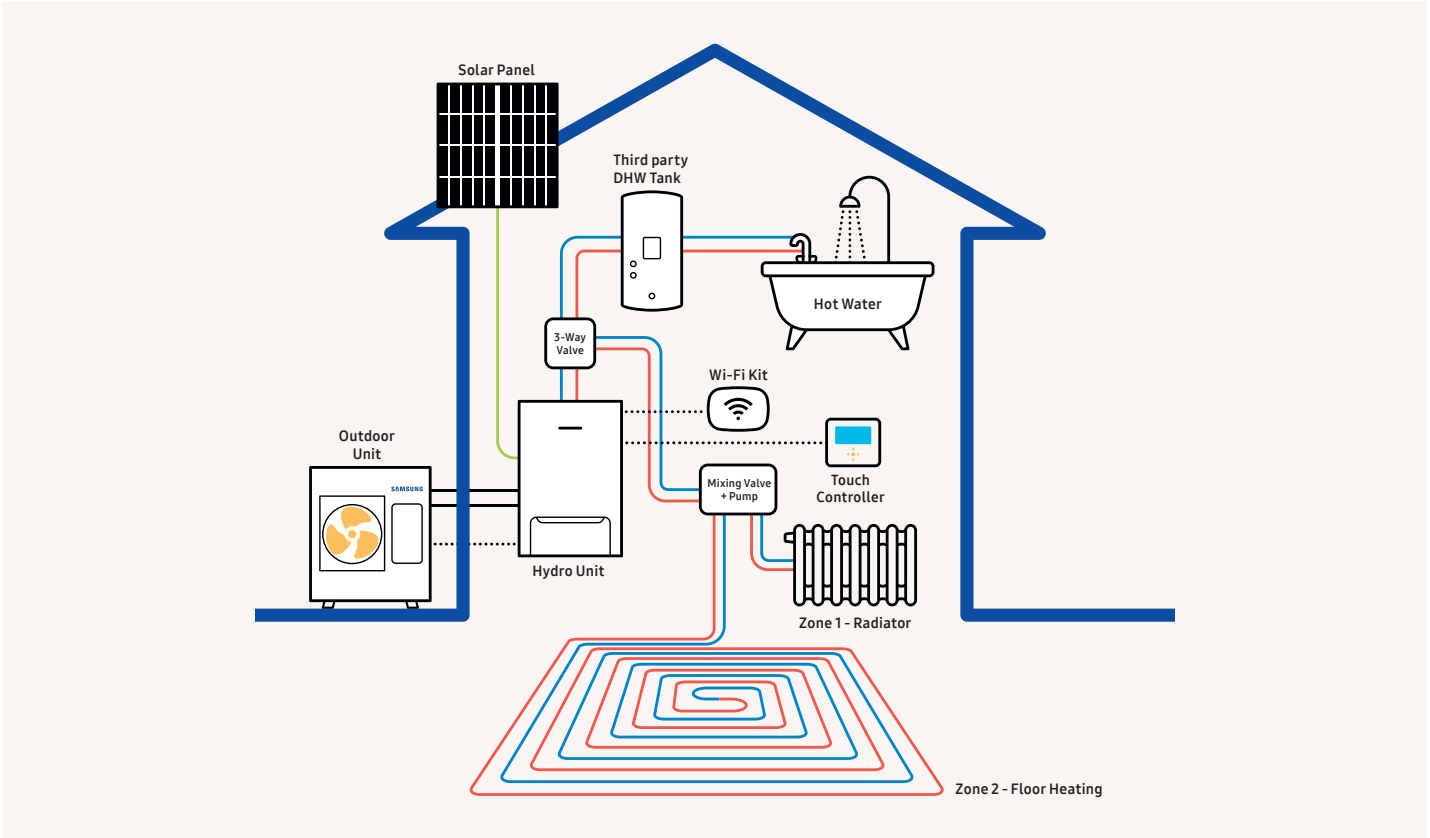


Figure 2. Example of a Split Air-to-Water Heat Pump[16]

[14] Source: Gosheva, R., 2020. How Does An Air To Water Heat Pump Work?. [online] Greenmatch.co.uk. Available at: <https://www.greenmatch.co.uk/heat-pump/air-to-water-heat-pump#pros-and-cons> [Accessed 8 October 2020].
[15] Source: Forsén, M., 2005. Heat Pumps Technology and Environmental Impact. [ebook] European Heat Pump Association, p.12. Available at: <https://ec.europa.eu/environment/ecolabel/about_ecolabel/reports/hp_tech_env_impact_aug2005.pdf> [Accessed 5 October 2020].
[16] DHW stands for Domestic Hot Water. Schematic drawing is for illustrative purpose only.

In addition to Mono and Split Air-to-Water heat pumps, there are integrated solutions for heating and cooling which can use both Air-to-Water and Air-to-Air technologies i.e. integrating into a single solution the Air-to-Air heat pump system and the Air-to-Water heat pump system. The main feature is the TDM (Time Division Multi) control system, which is able to make the best use of the combination of both types of Air Source heat pumps in order to reach full operation of the system in a short period of time. Such integrated heat pumps provide both water and air that has been heated or cooled by a single outdoor unit.

The Air-to-Air system achieves a stable indoor ambient temperature fast, while the air-to-water system delivers hot water to radiators, under-floor heating and sanitary systems (figure 3).

This cost-effective and sustainable technology is contained in one external unit, so it is ideal for environments where space is limited. Furthermore, to make the heat pumps compact the heat exchanger and the domestic hot water tank, situated indoors, are combined into a compact and modular Tank Integrated Hydro Unit.

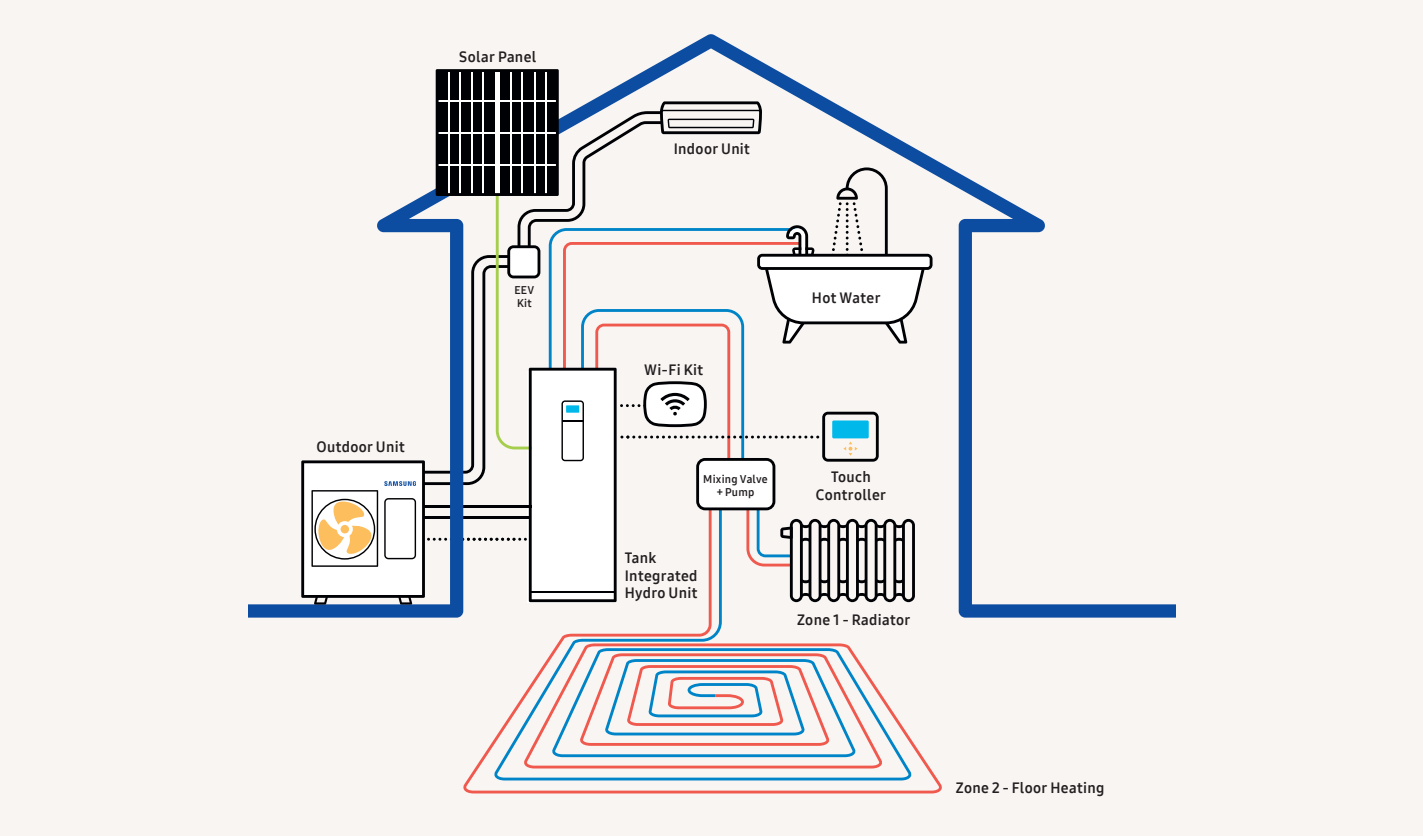
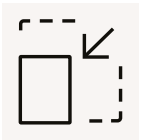


Figure 3. Example of an integrated Heat Pump system for heating and cooling.[17]

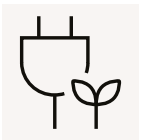
Whereas heat pumps in general will play a considerable role in reaching the sustainability targets set out by the European Union, the Air Source heat pumps also bring certain advantages to the end user as they (Gosheva, 2020)[14]:



Are easy to install, being compact and relatively small in size.

Are ecological as they produce energy by processing air.

Provide financial benefits (in the form of government subsidies).



Reflect twice the energy efficiency of an oil or gas system.

Generate more energy than the electricity they consume to operate.

[14] Source: Gosheva, R., 2020. How Does An Air To Water Heat Pump Work?. [online] Greenmatch.co.uk. Available at: <https://www.greenmatch.co.uk/heat-pump/air-to-water-heat-pump#pros-and-cons> [Accessed 8 October 2020].
[17] Schematic drawing is for illustrative purpose only.

Introducing Samsung Eco Heating Systems

As discussed in the previous sections, heating solutions can be optimised to reduce climate impact, increase energy efficiency and bring new advantages for all types of buildings. Samsung supports the ambition set out by the European Green Deal towards achieving the climate targets for 2050 with its Eco Heating Systems (EHS). The Samsung Eco Heating Systems include EHS Mono, EHS Split, EHS TDM Plus, ClimateHub Mono, ClimateHub Split and ClimateHub TDM Plus.

The Samsung ClimateHub TDM Plus is an integrated solution for heating, cooling and hot water supply, designed to offer optimal indoor home climate convenience (figure 4).

Samsung ClimateHub TDM Plus provides more sustainable energy heating, hot water and cooling for residential applications, with an Ozone Depletion Potential (ODP) of zero and a low Global Warming Potential (GWP). The use of the 2-zone control can be used to optimise the temperature in two separate zones. Samsung's ClimateHub TDM Plus has a Seasonal Coefficient Of Performance (SCOP) A+++ energy efficiency ranking.[18] It heats well at low temperatures, using R32 refrigerant and works reliably even in a cold climate.

The Samsung ClimateHub TDM Plus offers:

Compact Design: A compact Tank Integrated Hydro Unit which contains the heat exchanger, domestic hot water tank and a control unit.

Smart Grid Ready and PV enabled: The PV feature checks the status of the solar panels and reduces network electricity usage. Smart Grid helps to utilize economical and sustainable power supply.

Smart Connectivity: The touch controller enables users to manage different temperature settings per zone with energy consumption monitoring. With the Wi-Fi Kit, different aspects of the system can be managed, including controlling and monitoring up to 16 indoor units through the Samsung SmartThings App.[19] The concept of Smart Connectivity is further described in the next section.

Figure 4. Samsung ClimateHub TDM Plus

[18] Air-to-Water Condition: (Heating) Water In/Out 30°C/35°C, Outdoor Air 7°C[DB]/6°C[WB]; (Cooling) Water In/Out 23°C/18°C, Outdoor Air 35°C[DB].
[19] Samsung SmartThings application account and Wi-Fi connection are required. Separate Wi-Fi Kit is required. Requires iOS 10.0 or later & Android 5.0 or later. Samsung SmartThings is supported in the following languages: English (US, UK, Indian), Chinese, Korean, French, German, Italian, Spanish and Portuguese.

Certification

Samsung ClimateHub and other Samsung Eco Heating Systems are certified by the HP (Heat Pump) KEYMARK. This is a voluntary, independent, European certification mark (ISO type 5 certification) for all heat pumps, combination heat pumps and hot water heaters.
It is based on independent, third-party testing and demonstrates compliance with product requirements as set in the Heat Pump KEYMARK scheme rules and with efficiency requirements as set by Ecodesign.

It provides a robust tool to ensure quality and aims at supporting heat pumps as a trusted technology for a decarbonised European heating and cooling sector by guaranteeing the quality of the products in a simple and cost-effective way (The HP KEYMARK certification: a success story, 2020).[20] This certification is recognised in a number of European countries which include France, Germany, the United Kingdom, Slovakia and Czech Republic.

[20] Source: Heatpumpkeymark.com. 2020. The HP KEYMARK Certification: A Success Story. [online]
Available at: <https://www.heatpumpkeymark.com/index.php?id=34&L=0&tx_news_pi1%5Bnews%5D=1368&tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=98a12c35d63377dd32172b3791fd8b8e> [Accessed 13 October 2020].

Introducing Smart Living and Connectivity

The European Union's Strategic Energy Technology plan includes smart homes as one of the ten action areas. It aims to create technologies and services that provide smart solutions to energy consumers (Hargreaves and Wilson, 2017).[21] The 'Smart' Home market constitutes of networked devices and related services that enable home automation for private end users (Business to Consumer). These smart devices are connected directly or indirectly via a so-called gateway to the Internet. Their main purposes are the control, monitoring and regulation of functions in a private household (Smart Home Digital Market Outlook, 2020).[22]

A smart home provides increased interactivity between the living space and its inhabitants, blending the physical with the digital. Connecting items such as smart devices and home products change the way people live. It incorporates home automation through appliances thereby improving convenience, energy efficiency and security (PwC Luxembourg, 2014).[23] What makes smart, connected products different is not the Internet, but the changing nature of products, the expansion of capabilities and applications, the data generated and the way they interact seamlessly with our daily lives (Porter and Heppelmann, 2014).[24]

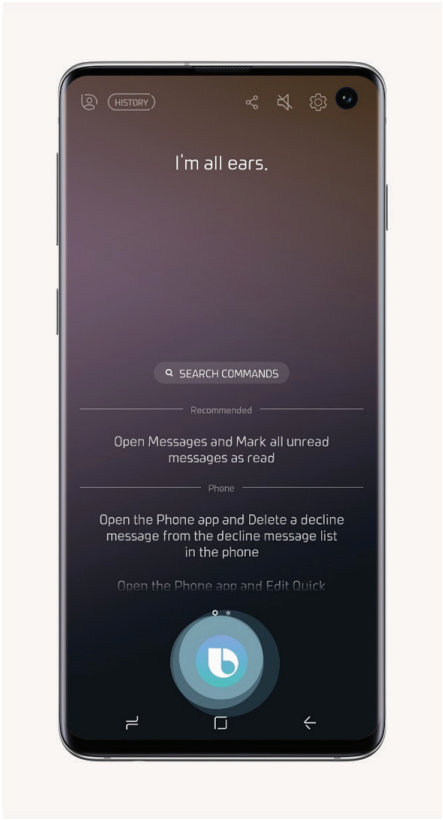
[21] Source: Hargreaves, T. and Wilson, C., 2017. Perceived Benefits and Risks of Smart Home Technologies. Human–Computer Interaction Series, pp.35-53.
[22] Source: Statista.com. 2020. Smart Home. [online] Available at: <https://www.statista.com/outlook/279/144/smart-home/netherlands> [Accessed 30 October 2020].
[23] Source: PwC Luxembourg, 2014. Smart Living: Smart Construction Products And Processes. [online] European Union, pp.2-3. Available at: <https://ec.europa.eu/docsroom/documents/13407/attachments/2/translations/en/renditions/native>[Accessed 19 October 2020].
[24] Source: Porter, M. and Heppelmann, J., 2014. How Smart, Connected Products Are Transforming Companies. Harvard Business Review, 11.

Smart Connectivity

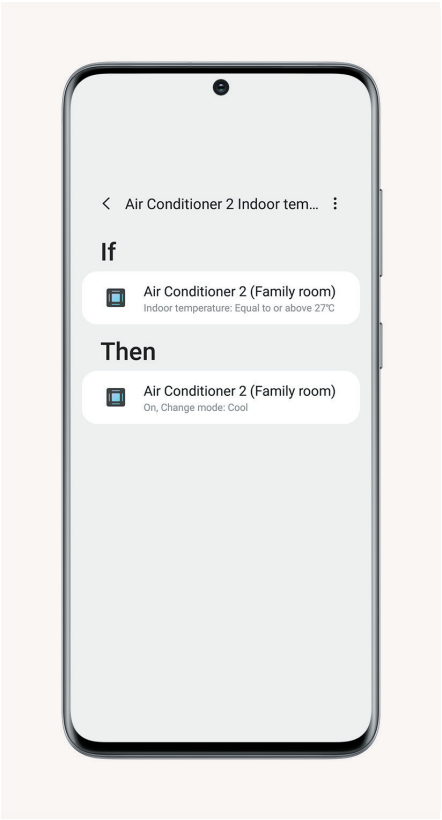
Connected Living embodies Samsung's vision for seamless and intelligent solutions. Capturing market and consumer needs has resulted in extending the portfolio towards making connected living possible with the use of Samsung devices using the bespoke SmartThings platform. SmartThings is a global open scalable platform which includes; Samsung smart devices, SmartThings devices (like sensors, cameras, outlets) and third party devices. Via the SmartThings platform, people are able to integrate their indoor climate solution with all kinds of other Samsung smart products to create a smart home or business for enhanced convenience and enriched lifestyles.

The Samsung ClimateHub systems can be managed remotely by using the SmartThings app on a smartphone, enabling users to turn different aspects of the system on and off and control and monitor its functions with ease. The SmartThings platform provides an integrated hub-like functionality, enabling users to control all their SmartThings compatible devices through a single platform, providing a consolidated connected living experience for residents.

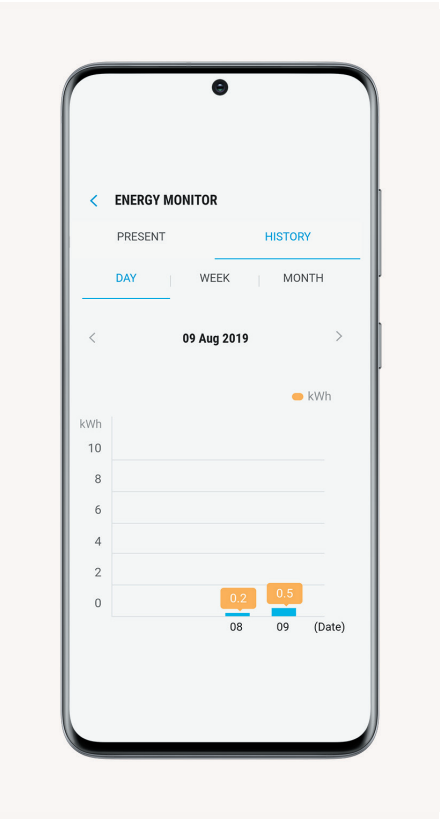
The SmartThings app[25] offers several features:



Bixby Voice Recognition
Bixby voice is an intelligent voice assistant that can be controlled through a smartphone with Bixby app, offering the convenience of managing the temperature remotely.



Personalised Climate Environment
Allows the room temperature to be automatically set at the desired level when the user approaches within a pre-set distance from the building.



Energy Usage Monitoring
Energy usage can be monitored regularly.

[25] Samsung SmartThings application account and Wi-FI connection are required. Separate Wi-Fi Kit is required. Requires iOS 10.0 or later & Android 5.0 or later. Samsung SmartThings is supported in the following languages: English (US, UK, Indian), Chinese, Korean, French, German, Italian, Spanish and Portuguese.

Case Study - Project Etopia and Samsung

Project Etopia, a UK-based building company, believes that the future of building is smart. That's why they partnered with Samsung for heat pump technology in newly built houses.

The climate crisis poses challenges for all aspects of everyday life, including the way we live. In order to secure a greener future, heating sources will have to become more electrically powered. In the UK alone, over 25 million homes use gas boilers which will, at some point, need to be replaced by future-proof solutions (Samsung signs partnership with Etopia to deploy heat pumps to the residential market, 2020).[26] Additionally the Future Homes Standard, after its introduction in 2025, will require new built homes in the UK to be future-proofed with low carbon heating and world-leading levels of energy efficiency (The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings, 2019).[27] Yearly, 400,000 new homes are scheduled to be built in the UK alone. Equipping these new built houses with energy efficient heating sources, could result in an increased number of heat pumps being installed in the UK.

[26] Samsung.com/uk. 2020. Samsung signs partnership with Etopia to deploy heat pumps to the residential market. [online] Available at: < https://www.samsung.com/uk/business/climate/etopia2020/> [Accessed 27 October 2020].

[27] Source: gov.uk/government/consultations. 2019. The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings. [online] Available at: < https://www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings> [Accessed 17 November 2020].

Samsung's Eco Heating System (EHS) TDM Plus can be controlled remotely using Smart Connectivity via Samsung SmartThings.

All-In-One solution

Project Etopia and Samsung have joined forces to provide the UK market with access to a sustainable solution. Over the next five years 6,000 of Project Etopia's new built houses in the UK will be equipped with Samsung's Eco Heating System (EHS) TDM Plus heat pump technology for air water heating, domestic hot water and air-air cooling. This sustainable solution based on renewable resources is Samsung's response and undertaking towards a Climate – neutral economy.

Smart Connectivity

The ability to utilise renewable energy sources was one of the reasons why Project Etopia decided to partner with Samsung. Samsung's Eco Heating System (EHS) is already in use at Project Etopia's class-leading pilot project at the BRE innovation park in Watford, UK, where it has been engineered to be more than energy positive. The real value add for Project Etopia was that Samsung's heat pump system can be controlled remotely, using Smart Connectivity via Samsung SmartThings. As a whole, it offers energy and environmental control that has a positive impact on both cost savings and lifestyle. Samsung's technologies are integrated and aim to be versatile enough to apply to any kind of building including schools, homes and commercial to lay the blueprint for the smart cities of the future.

[26] Source: Samsung.com/uk. 2020. Samsung signs partnership with Etopia to deploy heat pumps to the residential market. [online] Available at: < https://www.samsung.com/uk/business/climate/etopia2020/> [Accessed 27 October 2020].

[27] Source: gov.uk/government/consultations. 2019. The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings. [online] Available at: < https://www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings> [Accessed 17 November 2020].

Conclusion and Recommendation

Guided by ongoing campaigns and regulations, global efforts to mitigate climate change are already underway with extensive focus on the burning of fossil fuels and the harmful effects it produces on nature and human health alike. Alternatives in the form of renewable energy are being increasingly recognised as a needed change. Hence, it is prudent to improve the ways in which energy is derived and used – both in commercial as well as well domestic spaces.

Global markets are participating towards achieving the goals set out in the European Union Green Deal towards contributing to a climate-neutral economy. Switching from traditional modes of heating to more sustainable heating solutions, like heat pumps, are emerging rapidly as a potential and viable solution across the European Union. Alongside that, using advanced digital technology to upgrade to smart connectivity is the most efficient step forward on the path to improving convenience while saving energy – both in the short and long term.

Samsung is constantly innovating, educating and supporting its partners to help drive the much-needed change to cleaner and greener energy, while also improving indoor climate comfort and wellbeing. With its vision for seamless and intelligent solutions at the core, Samsung's innovations in the field of heating solutions and integrated systems are designed to be future-proof. Samsung's ClimateHub TDM Plus offers the answer to those looking for an integrated solution for heating, cooling and hot water supply. To further enhance the experience of living in comfort and convenience, remote management and smart connectivity is facilitated via the SmartThings platform.

Samsung's products and solutions are increasingly proving that by relying on human intelligence and sustainable technological innovation both comfort and convenience can be achieved. Therein lies the hope of yet another step towards achieving the collective climate goal.

Project: Atico en el Retiro (Spain)
Project Architecture: ÁBATON
Interior Design: BATAVIA
Photography: Belén Imaz

More information

If you are interested in receiving more information, please contact your Samsung representative. To learn more about Samsung Climate Solutions, please visit: samsung.com/climate

The primary purpose of this whitepaper is to provide current and potential clients with pertinent information regarding relevant indoor climate topics, Samsung's vision and, to a lesser extent, product offering, in order for them to be able to make a thoroughly informed decision. The present whitepaper is drawn up by way of informational purposes only and does not constitute a binding offer of contract upon Samsung. Samsung has drafted this whitepaper to the best of its knowledge but does not make or give any claim or warranty for the accuracy, completeness, reliability or fitness for particular purpose of its content and the products, features and services described. Samsung expressly rejects any liability, whether express or implied, arising from, or connected to, the information presented in this whitepaper. Any specifications in this whitepaper are subject to change without prior notice.

Learn more about Samsung Climate Solutions at:
www.samsung.com/climate

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