Green Gas TASKFORCE

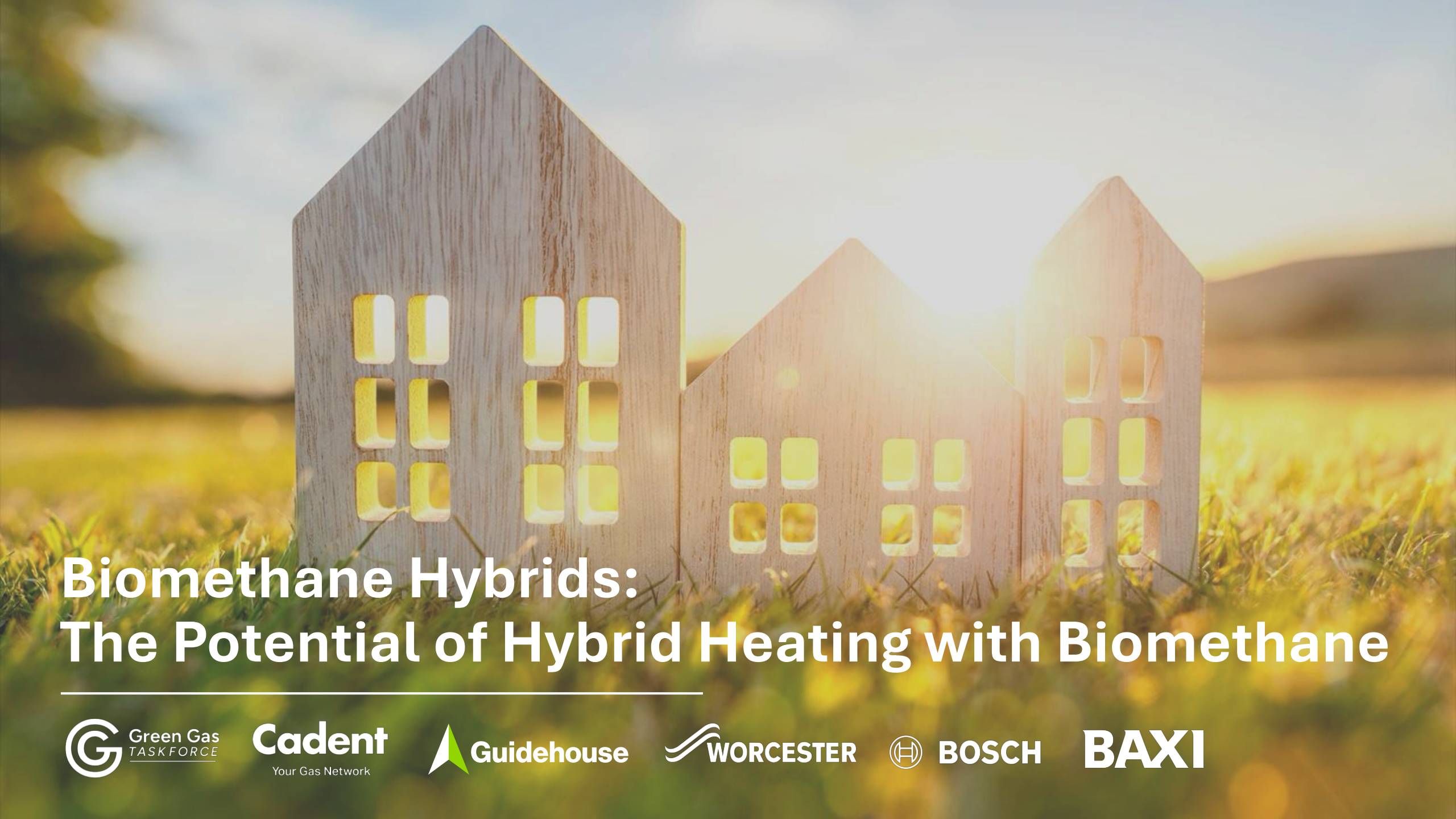
Green Gas Homes

Bio-Hybrids: A Clean Heat Solution

3 February 2026

Cadent

Your Gas Network



Biomethane Hybrids:
The Potential of Hybrid Heating with Biomethane

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Executive Summary

This report explores how biomethane hybrids (bio-hybrids) can support the decarbonisation of heating in Great Britain in a cost-effective way

This report examines the role of **biomethane-fuelled hybrid heating systems** in addressing the **significant challenge of heat decarbonisation in GB**, putting forward **data-driven and actionable policy recommendations** which would realise the full potential for GB.

Bio-Hybrid Set Up

Traditional boiler using biomethane

Electric heat pump

Managed by a **smart control**

Our Approach

Hybrid heating systems (hybrids) **combine an electric heat pump (HP) with an additional heating source**, typically a gas boiler, to provide reliable, low-carbon heating all year round. When the boiler runs on biomethane, a green gas, the system is referred to as a **bio-hybrid**.

Since hybrids **primarily rely on electricity** throughout the year, gas usage can be significantly reduced to a level where **biomethane is well suited to meet demand.**

Guidehouse have been engaged to explore the potential of bio-hybrids in addressing the significant challenge of decarbonising homes in Great Britain (GB) across **three key steps:**

1. **Policy landscape review** across GB, Denmark, France, Italy, and the Netherlands.
2. **Techno-economic modelling** of low-carbon heating solutions from today to 2050.
3. **Actionable policy recommendations** to help realise the value of bio-hybrids in GB.

Several comparable EU countries have implemented supportive policy mechanisms that are enabling growth for both hybrids and biomethane

		 High potential for hybrids and biomethane; limited growth at present	 Large and growing biomethane & HP markets	 Hybrids are ~40% of HP market; large & growing biomethane market	 Hybrids are ~50% of HP market; emerging biomethane market	 Leading biomethane market; district heating focus with limited HPs*
Hybrid Heating	Hybrid heating targets	Not explicitly included in national strategy/targets	Hybrids qualify in the low carbon heating mandate	Targets promote both hybrids and electric HPs	Targeting 1 million hybrids by 2030	Targeting 100% green district heating by 2030
	Hybrid heating consumer incentives	Excluded from the Boiler Upgrade Scheme	Grant coverage provided starting at £2.5k	Tax incentive scheme and subsidy support	Subsidy support and 0% interest loans available	Selective subsidy and tax-based mechanisms
	Hybrid heating market mechanisms	0.5 credits in the Clean Heat Market Mechanism	Low carbon heating for all new C&D properties	No supplier incentives or quotas	Hybrids as the standard for boiler replacement	Municipal planning with non-profit tariffs
Biomethane	Biomethane target	30 – 40 TWh by 2050 ambition	44 TWh/yr by 2030	60 TWh/yr by 2030	21 TWh/yr by 2030	13 TWh/yr by 2030, 100% green gas goal
	Biomethane production support	15 yr FiT under the Green Gas Support Scheme	Network connection & small project FiT support	40% capital grants plus a 15 yr FiT	15 yr FiT for production delta coverage	20 yr FiP and fossil gas delta coverage
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GOs – Guarantees of Origin **FiT** – Feed in Tariff **C&D** – Commercial & Domestic

*Due to Denmark's characteristic highly urbanised settlements, we have treated district heating as the Danish equivalent of hybrid heating given it effectively functions as one large hybrid unit integrating electricity and gas.

Bio-hybrids offer a cost-effective, clean heat solution, directly targeting difficult- and expensive-to-electrify building stock from today to 2050

Bio-hybrids offer the lowest cost clean heating solution for 30-47% of British residential buildings

Hybrids, and bio-hybrids, are the lowest cost solution available for low efficiency stock (EPC F, E) in all building types and for some moderate energy efficiency stock (EPC D) of select building types (e.g. detached houses). This is true today, and in 2030, 2040 and 2050.

Bio-hybrids deliver significant emissions reductions

Bio-hybrids offer a clean heating solution through the use of an electric heat pump paired with a boiler running on biomethane, a green gas, delivering 90-95% emissions reductions by 2030 and closer to 100% savings by 2050.

They are a complementary heating solution for difficult-to-electrify building stock

While electric heat pumps are the lowest cost clean heating solution for high efficiency stock (EPC A, B and C), a significant share of GB's building stock is relatively older with low-to-moderate efficiency, for which heat pumps are not the most cost effective.

Hybrids minimise the need for expensive upfront building upgrade costs

The costs of home efficiency upgrades are largely unaffordable to the majority of GB consumers. Over 80% of the 2050 building stock already exists today, and half of the current building stock is rated EPC D to F. Annual savings for the median GB household are £2,160 per year. At this rate, it would take at least 4 years to upgrade a home from EPC D to C, assuming a household is willing to invest 100% of savings in energy efficiency upgrades.

They also help mitigate the impact of limited heat pump uptake

Hybrids directly address the slow uptake and low consumer demand for full heat pump solutions and present a solution to the distressed boiler purchasing challenge. They offer a more cost-effective heating solution than heat pumps and – through the use of biomethane – a clean heat solution.

This study has informed seven policy recommendations to stimulate adoption of bio-hybrids and accelerate the decarbonisation of heat in GB

Enable rollout of bio-hybrids to decarbonise homes

1. **Acknowledge bio-hybrids formally as a clean heating solution** in the national heating decarbonisation strategy and its accompanying ambitious heat pump installation targets.
2. **Make hybrids eligible for grant support under the Boiler Upgrade Scheme** i.e. by offering consumers £2,500, accounting for the cost delta of installing a hybrid system versus a new natural gas boiler, and additional support if installed with a green gas tariff.
3. **Devise a means to make hybrids installed with a green gas tariff eligible for full supplier credits under the Clean Heat Market Mechanism** as a clean heating solution.
4. **Support certified training for all GB boiler installers on a) heat pump and hybrid installations and b) educating consumers on heating options** to upskill the supply chain and enable efficient low-carbon heating uptake nationwide.

Realise the value of biomethane and create a market for green gas

5. **Formalise stretching GB biomethane production targets** for 2030, 2040, and 2050 to facilitate a market for green gas.
6. **Mandate GB gas suppliers to offer consumers a green gas tariff** to guarantee a stable market for renewables and give consumers consistent access to clean heat.
7. **Ensure the future framework scheme supporting biomethane injection into the GB gas grid creates guaranteed, scalable offtake** for green gas, driving investment in new production and reducing carbon intensity (e.g. mandating minimum biomethane volume).

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1. Introduction

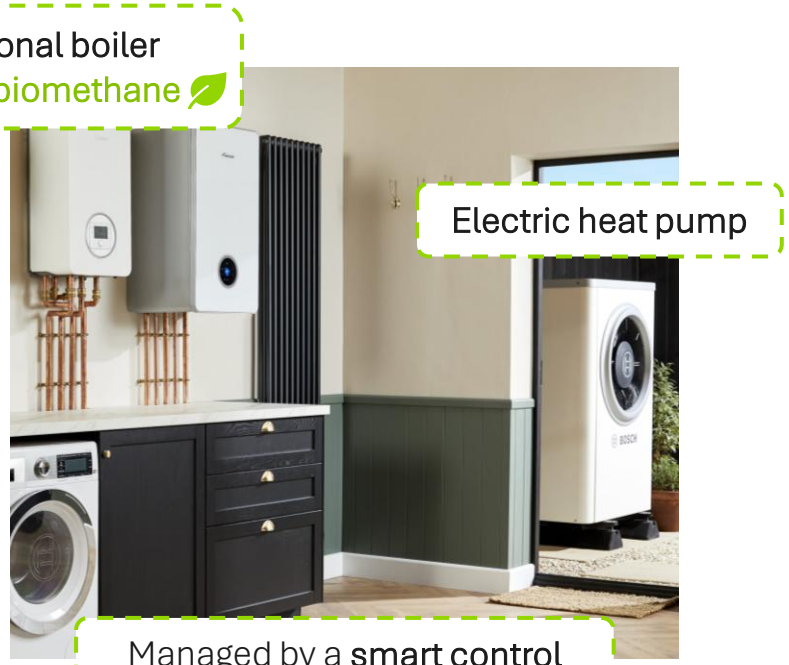
1a | Bio-Hybrids

1b | Approach

Biomethane hybrids (bio-hybrids) are clean heating systems comprised of a heat pump, a boiler using biomethane, and a control system

Bio-Hybrid Equipment Setup

Hybrid heating systems (hybrids) **combine an electric heat pump (HP) with an additional heating source**, typically a gas boiler, to provide reliable, low-carbon heating all year round.



Bio-hybrids offer a practical, deployable solution to decarbonise heating

- Hybrids can switch between energy vectors, managed by a central controller that optimises operation to either **minimise running costs or maximise carbon savings.**
- Hybrids can be offered to customers in **two ways**:

1. **Regular hybrids** include a boiler, hot water cylinder, and heat pump, with the control system optimising both space heating and hot water supply.
2. **Combination (combi) hybrids** include a boiler and heat pump, with the control system optimising for space heating and the boiler meeting 100% of hot water demand.

Decarbonising Heating with Hybrid Systems and Biomethane

- When the boiler runs on biomethane, a green gas, the system is referred to as a **biomethane hybrid** (or bio-hybrid).
- Since hybrids **primarily rely on electricity** throughout the year, gas demand can be significantly lowered compared to a traditional boiler, hence **biomethane is well-suited to meet this more reduced gas demand.**
- Bio-hybrids do not need to burn biomethane directly; what matters is that the household has a **green gas supply contract**, similar to how heat pump users are only net zero compliant when the technology is paired with a **renewable electricity contract**.

Bio-hybrids can deliver significant value to consumers, networks, biomethane producers & the environment; however, key barriers remain

Benefits of Bio-hybrids

1 Immediate emissions reductions today

Bio-hybrids can reduce carbon emissions by 90% today, with the potential to be net zero compliant in the future.[1]

2 Reduced energy bills for consumers

With the unique ability to switch intelligently between electricity and gas, hybrids can reduce consumer energy bills by up to 20%.[1] Hybrids also offer consumers familiarity and optionality (i.e. to retain gas for cooking.)

3 Encourage production of green gas

Bio-hybrids can stimulate biomethane demand, giving producers the confidence to commit to supplying and injecting green gas into the grid.

4 Maximise existing energy network infrastructure

Bio-hybrids minimise peak demand on the electricity grid while leveraging existing capacity of GB's gas network, a critical national asset.

Barriers to Adoption

1 Lack of policy certainty and clear backing

GB hybrid heating policy is fragmented; while hybrids are partially rewarded by the Clean Heat Market Mechanism, they are excluded from Boiler Upgrade Scheme support. Meanwhile, biomethane faces timeline and policy uncertainty, beyond the Green Gas Support Scheme.

2 Limited consumer awareness

Most domestic & commercial consumers are not familiar with hybrids as a potential heating solution, and most are also wary of change when it comes to home heating.

3 Supply chain limitations and decentralised production

Scaling bio-hybrids is hindered by supply chain constraints. Two-thirds of UK heat pumps are imported, and most installers lack hybrid/heat pump certification.[2] Further, most biomethane production facilities are limited in scale, raising costs and complicating grid connection.

1 | Guidehouse, Hybrid Heating Report, 2025

2 | Watt-Logic, The Need for Hybrid Heat Pump Solutions, 2024

This report explores how bio-hybrids can support the cost-effective decarbonisation of UK heating, from today towards 2050 and beyond

This report has **three key objectives**:

1. Explore the **hybrid heating and biomethane policy landscape** in leading European countries and compares it with the policy landscape in GB;
2. Conduct **techno-economic modelling** to understand the economic and emission savings potential of bio-hybrids, today and towards 2050; and
3. Recommend **policy, market mechanism, and incentives** for GB, based on learnings from European markets and techno-economic modelling results.

Policy Landscape Review

- Assess the **policy landscape for hybrid heating and biomethane** across four leading European countries:
  - France
  - Italy
  - Netherlands
  - Denmark
- Review the **policies, market mechanisms, and incentives** that enable or impede bio-hybrid adoption and **compare with the GB landscape.**

Techno-Economic Modelling

- Conduct a **techno-economic analysis** exploring the cost-effectiveness and emissions savings potential across domestic and commercial building types of **three clean heating solutions**:
  - Bio-hybrids
  - Bio-boilers
  - Heat pumps
- Explore the economics of **bio-hybrids vs. heat pumps** from **2030** to **2040 and 2050** and extrapolate results to the **national-level.**

Policy Recommendations

- **Synthesise findings** from the policy landscape review and techno-economic modelling.
- Identify **clear and actionable recommendations,** including **policy, market mechanisms and incentives** that can support the realisation of the economic potential of bio-hybrids.

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2. Policy Landscape

2a | GB policy

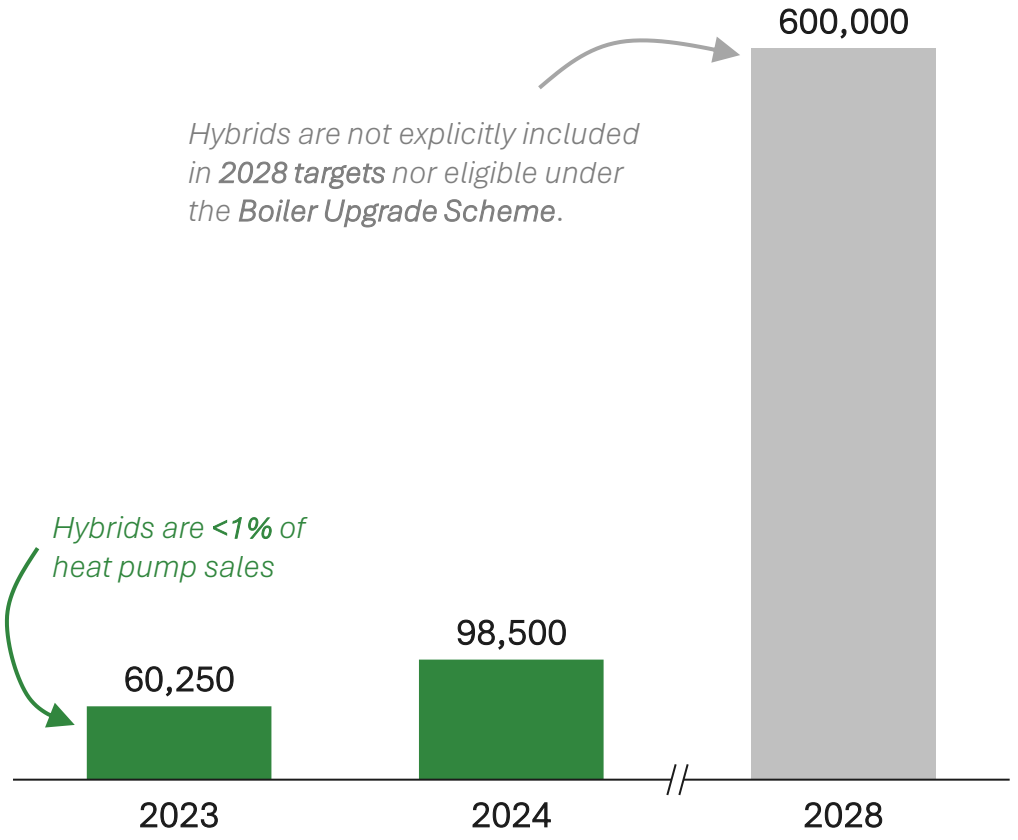
2b | International Learnings

GB heating policy needs to drive significant emissions reduction, impacting the 23 million British homes currently relying on gas heating

GB's Heating Decarbonisation Challenge

- In 2019, Great Britain (GB) became the **first major global economy** in the world to legislate a **binding net zero 2050 target.**
- As stated by Ofgem and many key industry players, **decarbonising heat is arguably the greatest challenge** facing the energy sector over the coming decades.
  - In 2023, **residential homes accounted for over one third of total British gas consumption** – more than any other sector, including power generation and industry.[1]
  - **85% of GB's residential building stock, approximately 23 million homes, rely on gas** for heating and hot water at present.[2]
  - Unlike the decarbonisation of the power sector, **decarbonising heat directly impacts consumers.**
  - With heat and comfort fundamental to both physical and mental wellbeing, **it is essential to consider how the transition will be experienced by consumers.**
  - At present, GB heating policy is **dominated by electric heat pumps**, with little support for hybrids (or bio-hybrids).

Annual Heat Pump Sales vs. 2028 Target



1 | National Audit Office, Decarbonising Home Heating, 2024

2 | DESNZ, Hydrogen Heating Overview, 2024

To create a market for bio-hybrids, Britain's policy landscape needs to evolve to incentivise both appliance and fuel

Potential Policy Incentives for Hybrid Heating Adoption

With **~1.7 million new natural gas boilers** installed in 2023 compared to **~100,000 HPs**, consumers need **awareness of the economic benefits** of hybrids and **incentivisation to transition** to a low carbon heating technology.[1]

- **Upfront capital support** for hybrid heating system retrofit and installation
- Ongoing schemes to provide **operational flexibility savings**
- Market-based **obligations on suppliers** to focus on low carbon heating technologies
- **Targets and strategy recognition** to give manufacturers and installers the confidence to invest and upskill

Potential Policy Incentives for Biomethane Production & Injection

The Green Gas Taskforce's recent study estimated there is sufficient GB feedstock to **sustainably produce 120 TWh of biomethane by 2050**.[2] To realise the value of the green gas, clear policy and regulatory support is needed to **incentivise increased production and grid injection**.

- **Stable and secure revenue support** for biomethane producers
- **Capital support for grid injection** to both local and national networks
- Access to **carbon capture, utilisation and storage** infrastructure
- **Targets and long-term strategy recognition** to give the feedstock industry, producers, and storage operators the confidence to invest

With policy incentives that **simultaneously encourage consumer adoption and secure a reliable biomethane supply**, the bio-hybrid market can scale.

A previous report by the **Hybrid Heating Great Britain (HGGB)** consortium **explored incentive mechanisms** specific to driving the adoption of hybrid heating systems.
→ The following page builds on that analysis by exploring in more detail the main types of **incentive mechanisms for biomethane.**

1 | DESNZ, Boiler Standards Consultation, 2023

2 | Green Gas Taskforce, A Green Gas Future, 2025

Biomethane can be incentivised through incentive mechanisms that target both demand and supply

Demand-Side Incentives

Mandates and Certificates

Biomethane mandates set supply targets and obligations, covering both grid and non-grid injected gas. They often apply to **natural gas suppliers**, who must sell biomethane through existing markets, with costs passed to end-users.

Other support mechanisms include **Guarantees of Origin** (GOs) for labelling renewable energy, and **Renewable Transport Fuel Certificates** traded to meet renewable fuel quotas.

Non-financial

Government-driven obligation to achieve a specific proportion of biomethane within a sector.

Tax Incentives

Tax-related mechanisms are typically observed for **high-tax sectors** like road transport. Such incentives include **exemptions or reductions on energy products** and have seen particular success in Finnish and Swedish markets.

Additionally, expanded tax credits for biomethane projects enable developers to benefit from **investment tax credits** for qualified facilities, reducing the burden on producers.

£/MWh produced or consumed

Exemptions or reductions on energy products, such as carbon taxes or fossil fuel taxes.

Supply-Side Incentives

Feed-In Premiums and Tariffs

A **feed-in premium** (FiP) is a variable subsidy that covers the **difference between biomethane production costs and the market price of natural gas**, fluctuating with market dynamics.

In contrast, a **feed-in tariff** (FiT) provides a **fixed subsidy** per unit of biomethane produced, based on full production costs and unaffected by market prices, typically over a period of 10 to 15 years.

£/MWh produced

Assured payment for each unit of renewable energy produced, typically provided through long-term contracts.

Investment and CAPEX support

CAPEX support is a subsidy designed to lower the capital expenditure required for new biomethane production installations.

This **fixed payment** is provided during the plant's construction and is **independent of the amount of renewable energy produced**. This level of support is typically a fixed percentage of the total CAPEX investment and may be subject to a cap.

£/biomethane plant

Fixed investment upfront to support initial costs related to biomethane plant construction and grid connection.

Despite some progress, GB needs clear policy support to provide impetus to the market to support bio-hybrids adoption

Overview

- GB became the first major economy to implement a **binding net zero target**, aiming to be carbon neutral by 2050. To address the significant residential heating decarbonisation challenge, **policy to-date has focused on the adoption of electric heat pumps**.
- From a biomethane perspective, a recent independent study highlighted GB has the potential to produce **120 TWh of biomethane by 2050** from sustainable feedstocks, a significant increase from **7 TWh today**.[1] A new incentive mechanism is planned to be established to facilitate further biomethane grid injection.

<1%
of the current heat pump **market** is comprised of hybrids

7 TWh
of biomethane is **injected** into the gas grid today

Hybrid Heating Policy Incentives

The **Clean Heat Market Mechanism** places an **obligation on manufacturers** supplying gas and oil boilers in the UK to support low carbon heating through supplier credits, of which **hybrids receive 0.5 credits.**

Hybrids are **not currently recognised** in other key low carbon heat incentives, including **annual heat pump deployment targets** and the **Boiler Upgrade Scheme**, which offers grants to consumers installing electric heat pumps.

Biomethane Policy Incentives

Incentive Mechanisms:

The **Green Gas Support Scheme** (GGSS) was established in November 2021 to incentivise biomethane injection into the GB gas network. The scheme provides a **fixed payment through a FiT over 15 years** and is financed by the Green Gas Levy.

→ The Government recently **extended the GGSS to 2030**. The former mechanism supporting biomethane injection, the Non-Domestic Renewable Heat Incentive, closed in March 2021.

From 2030 onwards, the Government **aim to establish a new incentive** and are currently consulting on a future policy framework for biomethane production.

The **Renewable Transport Fuel Obligation** mandates a requirement for fuel suppliers to incorporate a share of renewable fuel, under which biomethane is eligible.

The **Green Gas Certification Scheme** (GGCS) issues tradeable **Renewable Gas Guarantees of Origin** to certify the injected biomethane.

1 | Alder BioInsights Feedstock Study 2025

EU country (France, Italy, Netherlands, Denmark) profiles are located in the Appendix.

Several comparable EU countries have implemented supportive policy mechanisms that are enabling growth for both hybrids and biomethane

		 High potential for hybrids and biomethane; limited growth at present	 Large and growing biomethane & HP markets	 Hybrids are ~40% of HP market; large & growing biomethane market	 Hybrids are ~50% of HP market; emerging biomethane market	 Leading biomethane market; district heating focus with limited HPs*
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GOs – Guarantees of Origin
FiT – Feed in Tariff
C&D – Commercial & Domestic

*Due to Denmark's characteristic highly urbanised settlements, we have treated district heating as the Danish equivalent of hybrid heating given it effectively functions as one large hybrid unit integrating electricity and gas.

EU countries offer best practices for GB to stimulate a market for biomethane hybrids and accelerate heat decarbonisation

Hybrid heating targets	In the Netherlands (NL), which has **similar housing stock to GB**, defining hybrid retrofit/installation targets **successfully drove market growth** by shaping policy and providing confidence to the supply chain.
Consumer Incentives	Tax incentives and grant-based programmes in Italy, France, and NL have **helped consumers overcome upfront cost barriers**, enabling homes to **both retrofit existing boilers and install new low carbon systems.**
Market mechanisms	Whilst GB's Clean Heat Market Mechanism is a leading policy, markets with strong heat pump growth, like France and NL, typically **offer equal incentives for all low-carbon heating technologies.**

Biomethane target	France, Italy, NL, and Denmark have all **successfully created a market for producers to address capacity gaps and increase green gas injection** through the establishment of biomethane production targets.
Biomethane production support	Countries such as Denmark leverage **fixed and variable FiPs,** as opposed to a tiered tariff system akin to the current Green Gas Support Scheme, to **incentivise scale and cost-effective GHG savings**.
Green gas tariff	France, Italy, NL and Denmark all have **several suppliers offering green gas tariffs** to consumers that are **backed by certifications and GOs**, empowering consumers to make green choices for their homes.
Mandated biomethane in gas blending	France and NL are implementing biomethane blending mandates to provide **long-term demand certainty and attract investment**. Ireland is also preparing to deploy this policy as it develops its market.

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3. Techno-Economics of Bio-Hybrids

3a | Methodology

3b | 2030 Results

3c | 2040 – 2050 Results

3d | Conclusions

This study performs a techno-economic analysis of bio-hybrids across different building types and efficiency levels, from 2030 to 2050

Methodology Approach

- This techno-economic analysis models the costs, performance and emissions of different heating technologies with the objective of enabling an effective evaluation and comparison of low-carbon heating alternatives.
- This analysis explores the deployment of **three heating decarbonisation solutions** across **five building types**, including domestic and non-domestic buildings.

Cost Inputs:

- The analysis focuses exclusively on **consumer costs**, including both capital and operational costs over the lifetime of the heating equipment.
  - **Capital**: Equipment costs and installation costs; and
  - **Operational**: Energy costs and maintenance costs.
  - The analysis assumes the adoption of variable electricity tariffs (e.g., on-peak, mid-peak, off-peak), similar to variable tariffs available today[1].
- The analysis **does not** consider the costs of building insulation upgrades to achieve higher building efficiency; for example, to upgrade a low efficiency building to high-efficiency.

Lifetime & Timeframe:

- The analysis models each heating technology over a **15-year timeline**, reflective of the typical lifetime of heating equipment, and covers installations in **2030, 2040 and 2050.**

Heating Technologies

- This analysis assesses **three (3) heating decarbonisation solutions**:
  1. Hybrid using biomethane
  2. Boiler using biomethane
  3. Standard heat pump
- **Appendix B** presents cost assumptions and emissions factors for biomethane and electricity.

Building Types and EPC Ratings

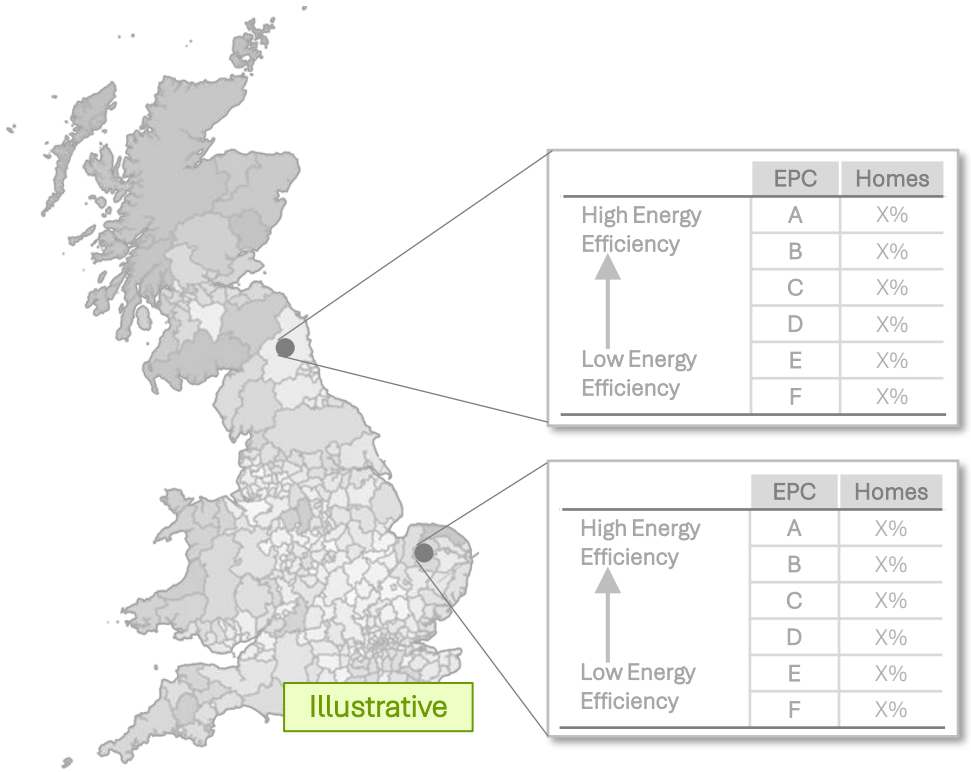
- The analysis models **four (4) residential** and **one (1) commercial** building types:
  1. Flats
  2. Terraced
  3. Semi-Detached
  4. Detached
  5. Commercial
- The analysis focuses on the **average efficiency level** for each building type. This is assumed to remain largely steady over time, as fabric upgrades require significant upfront investment from consumers or through government grants, and progress has been slowing in GB.
  - **Today**, the average **terraced, semi-detached and detached** British home is relatively poorly insulated, with an average EPC rating of D.
  - **Flats** are generally slightly more efficient, with an average EPC rating of C.

1 | Octopus Energy's Cosy and Agile Tariffs

The analysis also explores the potential role of bio-hybrids at a GB-level by extrapolating cost results nationally

National-Level Analysis Methodology

The analysis compares the **unit-level economics** of biomethane hybrids and heat pumps and extrapolates those results to all of **GB's 317 Local Authorities** (LAs).



	EPC	Homes
High Energy Efficiency	A	X%
	B	X%
	C	X%
	D	X%
	E	X%
Low Energy Efficiency	F	X%

	EPC	Homes
High Energy Efficiency	A	X%
	B	X%
	C	X%
	D	X%
	E	X%
Low Energy Efficiency	F	X%

Key Inputs & Assumptions

- The **cost comparison** of biomethane hybrids and heat pumps is performed across **each domestic building type**, from low efficiency to high efficiency buildings.
- These results are then applied to the mix of building types and efficiency levels for each LA. For example:

	EPC	Flats	Terraced	Semi-Det.	Detached
High Energy Efficiency	A	HP	HP	HP	HP
	B	HP	HP	HP	HP
	C	HP			HP
	D	HP			Bio-Hybrid
Low Energy Efficiency	E	Bio-Hybrid	Bio-Hybrid	Bio-Hybrid	Bio-Hybrid
	F	Bio-Hybrid	Bio-Hybrid	Bio-Hybrid	Bio-Hybrid

Illustrative

- These costs results are used to determine the **proportion of buildings** in each LA that are more cost-effective for biomethane hybrids than heat pumps.

Note: This analysis is **limited to residential buildings** since publicly available data from **GOV.UK**, reporting building stock figures by building type and efficiency level (EPC A to F), is only available for residential buildings, and not for commercial buildings.

The impact of a building's energy efficiency, which is influenced by a range of measures, is explored across five distinct building types

	Commercial	Flats	Terraced	Semi-Detached	Detached
Description	Commercial buildings vary widely in size. Usually, higher efficiency than residential stock.	Represents ~20% of residential stock, usually newer and higher efficiency, average 60 m^2.	Row houses, representing ~25% of residential stock, on average 90 m^2.	Represents ~30% of residential stock, and on average 95 m^2.	Standalone residential buildings, representing ~25% of residential stock, and on average 135 m^2.
Example					

Common EPC Range

High Energy Efficiency (EPC A to C)

Average Energy Efficiency (EPC D)

Low Energy Efficiency (EPC E to F)

Common Efficiency Measures[1]

- Installing solar panels
- Loft insulation
- Triple glazing windows
- Floor insulation
- Energy efficient lighting
- More eff. heating system
- Wall insulation
- Double glazing windows
- Incandescent lighting
- No or very poor insulation
- Very old or inefficient heating system
- Single glazed windows

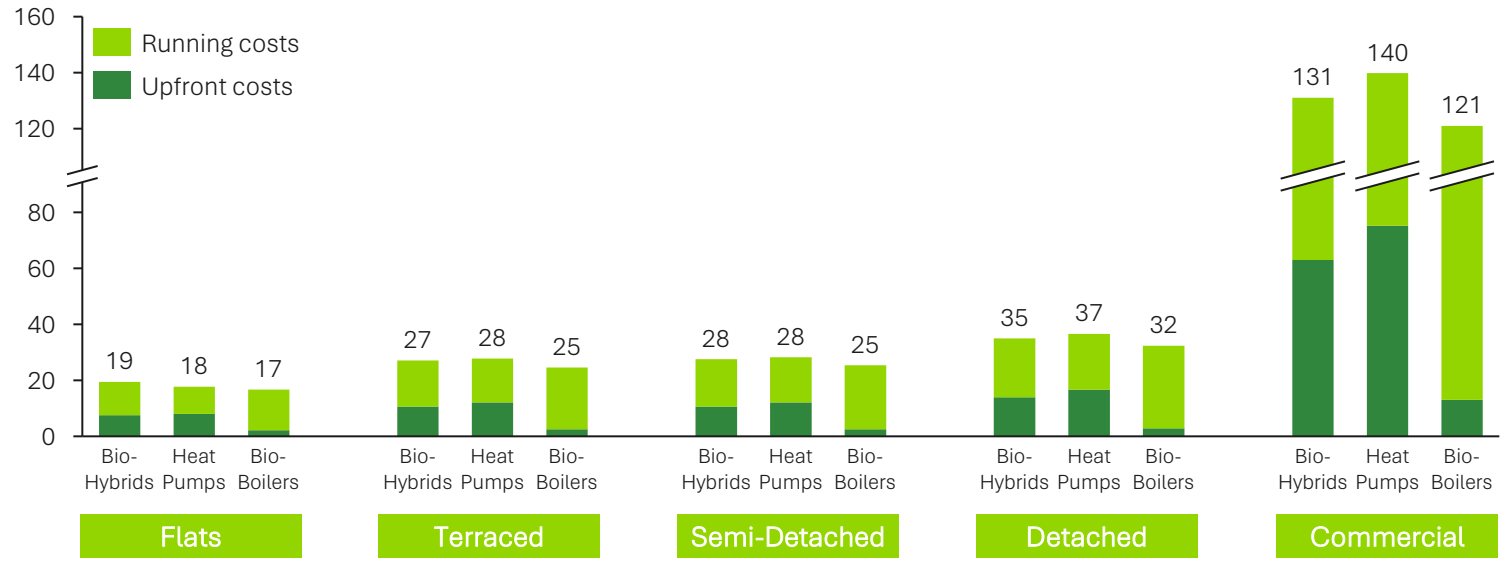
1 | Efficiency measures in no particular order

Bio-hybrids are cost competitive vs. heat pumps across all average efficiency buildings in 2030; but both are more expensive than bio-boilers

Total Lifetime Cost in 2030

- **Total lifetime costs for bio-hybrids and heat pumps are approximately equal** at average efficiency levels in 2030 for all building types. For flats, this is EPC-C, and for all other building types, this is EPC-D.
- **Biomethane boilers (bio-boilers) are more cost-effective** than both bio-hybrids and heat pumps, however, this does not consider the availability of biomethane supply. If all EPC D or lower domestic buildings used bio-boilers, **biomethane demand would be ~192 TWh, or nearly 1.6 times the 2050 biomethane potential** (120 TWh), therefore this is not feasible, and bio-boilers are not considered in the rest of the analysis.

Total Lifecycle Costs (000s GBP per bldg.) in 2030



Bio-Hybrids vs. Heat Pumps

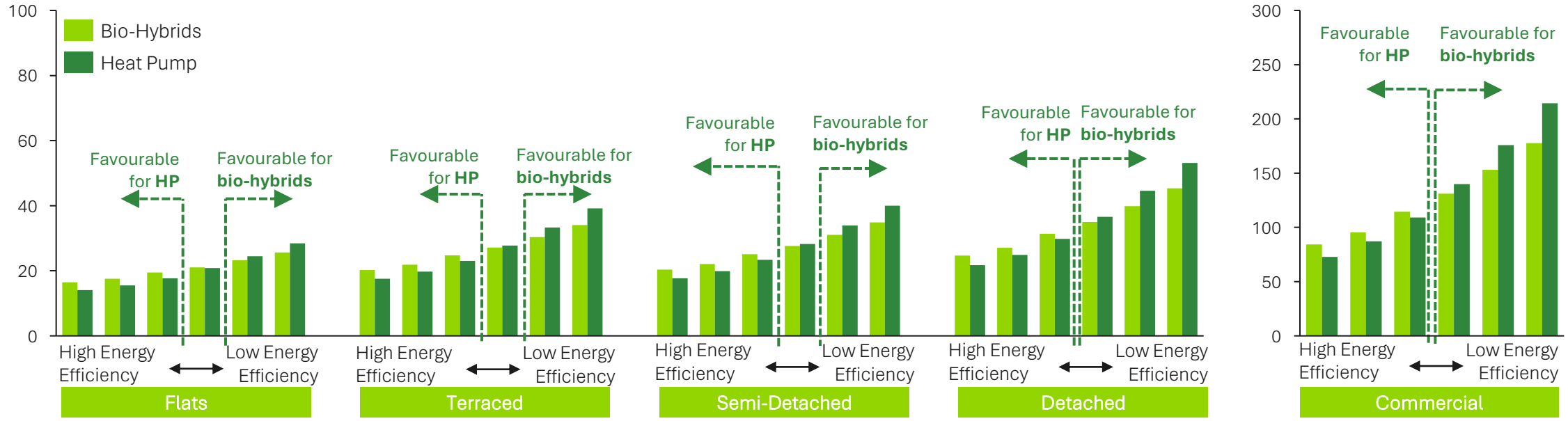
- Across all **residential building types**, total costs for bio-hybrids and heat pumps are approximately equal, with **cost differences of less than 2-6%.**
  - In **flats**, the cost difference between bio-hybrids and heat pumps is minimal, with slightly **more cost-effective results for heat pumps**.
  - In **terraced, semi-detached** and **detached** homes, costs are also roughly equivalent, however, with slightly **more cost-effective results for bio-hybrids.**
  - Similarly, in **commercial buildings**, the cost difference between bio-hybrids and heat pumps is also minimal, at 6%; also with slightly **more cost-effective results for bio-hybrids.**
- Across all building types, however, **bio-boilers are more cost-effective** than both bio-hybrids and heat pumps, at approximately **6-14% lower costs.**

In 2030, bio-hybrids are more cost-effective in low energy efficiency buildings, while heat pumps outperform in higher energy efficiency stock

Cost Comparison of Bio-Hybrids vs Heat Pumps in 2030

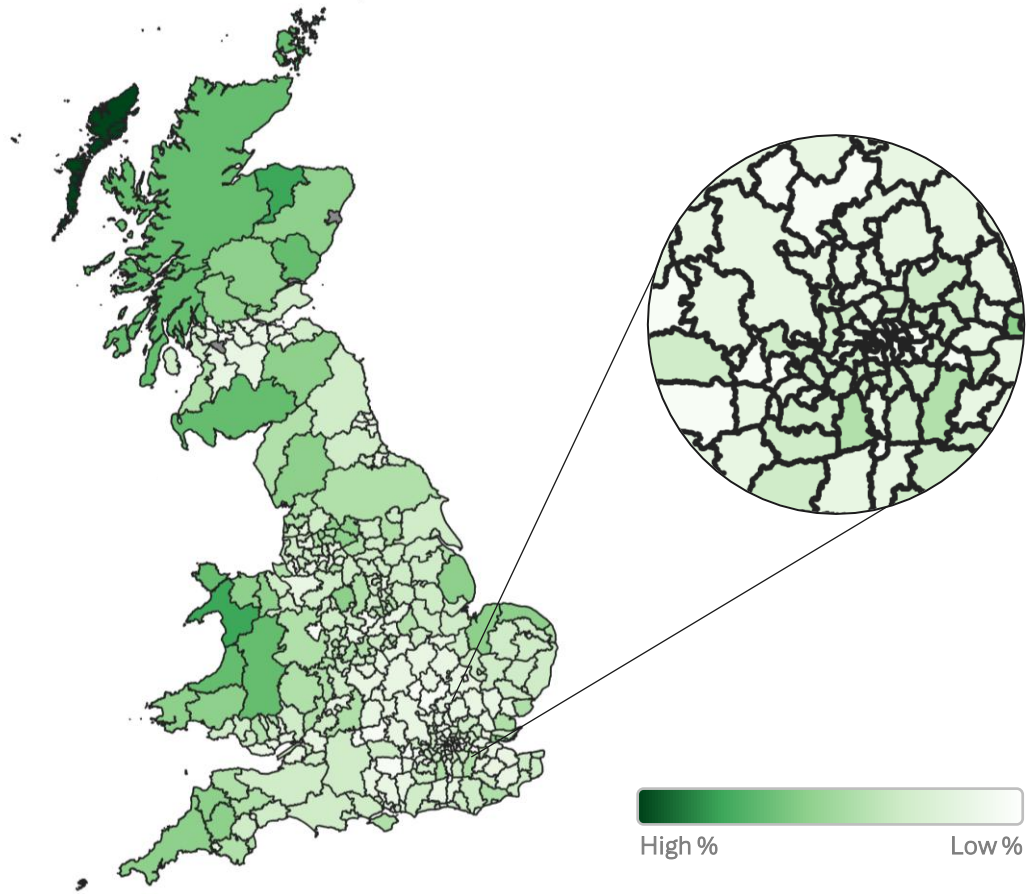
- **Bio-hybrids are more cost-effective in low energy efficiency buildings** (EPC F, E) in all building types, and in moderate energy efficiency buildings (EPC D) in some building types (e.g. detached homes, commercial buildings).
- Meanwhile, **heat pumps are more cost-effective in high energy efficiency buildings** (EPC A, B, C) in all building types, and in moderate energy efficiency buildings (EPC D) for flats.

Total Lifecycle Costs in 2030 (000s GBP per bldg.)
for *Bio-Hybrids vs. Heat Pumps*



Bio-hybrids are more cost-effective than heat pumps in 30-45% of GB homes, which would require feasible levels of biomethane production

Share of Homes (%) where Bio-Hybrids are more cost-effective vs. Heat Pumps



Key Takeaways from National Analysis

Potential Biomethane Demand:

- Bio-hybrids are the most cost-effective low carbon heating solution in 30%-45% of homes depending on boiler age and condition[1].
- If 30% of homes deployed a hybrid with biomethane, this would result in a biomethane demand approximately **33 TWh for home heating, or 32% of the 2050 biomethane potential**[2]. For 45% of homes on bio-hybrids, this increases to 50 TWh.

Regional Variation:

- Bio-hybrids are the **most cost-effective in low-efficiency** stock, and in some **moderate efficiency** stock. Local Authorities with a high share of low efficiency building stock are typically found in regions with aging housing stock.
- Bio-hybrids are particularly cost-effective in **Scotland and Wales**, where aging housing stock with poor insulation is common.
    - Further, **rural regions** with older properties and colder climates favour biomethane hybrids.
- **Heat pumps are predominantly cost-effective in urban areas**, primarily in England, where housing tends to be newer and rated EPC C or above.
    - Dense urban centres and areas with strong grid infrastructure support heat pump adoption.

1 | See Appendix B, page 46, for further details of assumptions in each scenario.

2 | This excludes potential demand from commercial buildings as robust data for commercial building stock was not available.

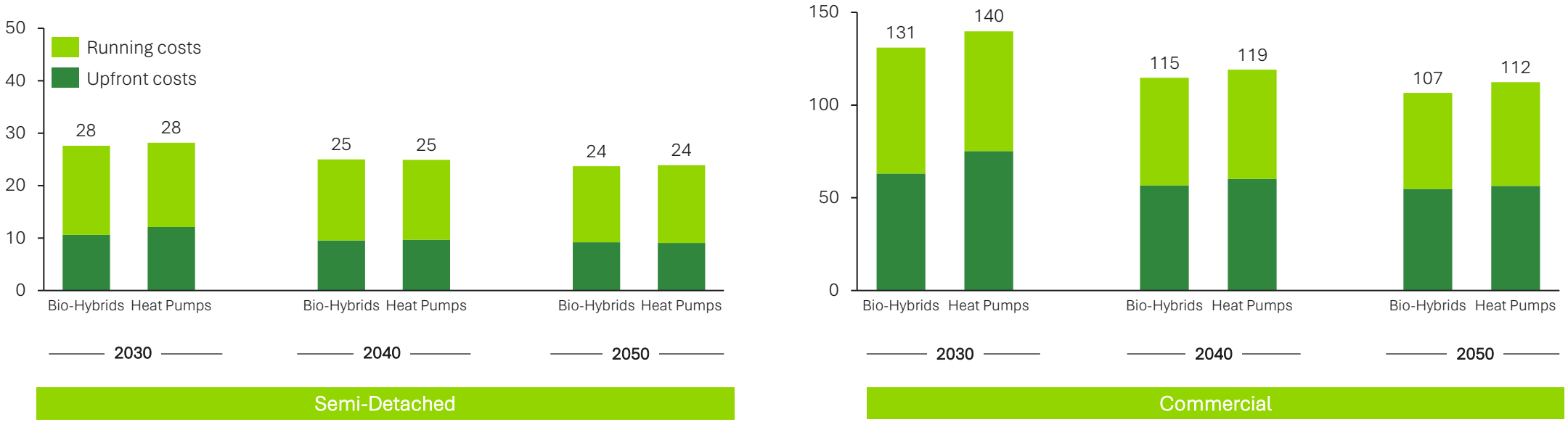
In the long-term, the economics of bio-hybrids become more attractive towards 2040 and 2050, together with heat pumps

Total Lifetime Cost from 2030 to 2050

- **Lifetime costs decline significantly over time** across all building types and heating technologies, **decreasing by 15-30% from 2030 to 2050**. This is mostly due to expected decreases in electricity and biomethane prices which result in lower running costs. There is also small decrease in upfront costs of heat pumps and hybrids.

  → This page presents cost results for **semi-detached homes** and **commercial buildings at EPC D**. Costs results across other building types and energy efficiency levels show equivalent trends.

Total Lifecycle Costs (000s GBP per bldg.) from 2030 to 2050 for *Semi-Detached* and *Commercial* buildings

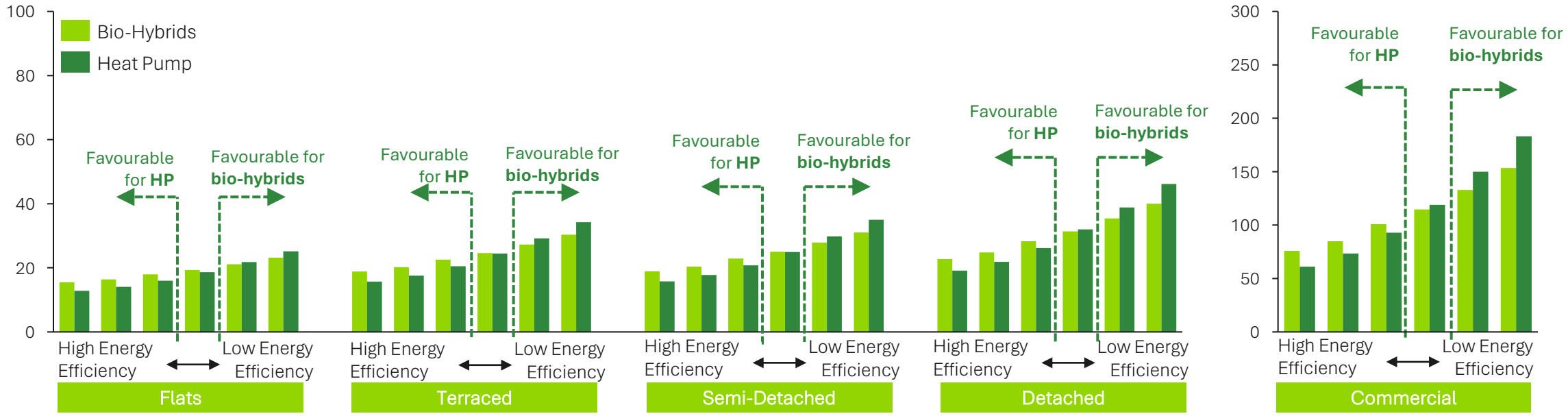


In 2040, bio-hybrids continue to be more cost-effective in low energy efficiency building stock, but the gap with heat pumps narrows slightly

Cost Comparison of Bio-Hybrids vs Heat Pumps in 2040

- **Bio-hybrids are more cost-effective in low energy efficiency buildings** (EPC F, E) in all building types, and in moderate energy efficiency buildings (EPC D) in some building types.
- Meanwhile, **heat pumps are more cost-effective in high energy efficiency buildings** (EPC A, B, C) in all building types, and in moderate energy efficiency buildings (EPC D) for flats.

Total Lifecycle Costs in 2040 (000s GBP per bldg.)
for *Bio-Hybrids vs. Heat Pumps*

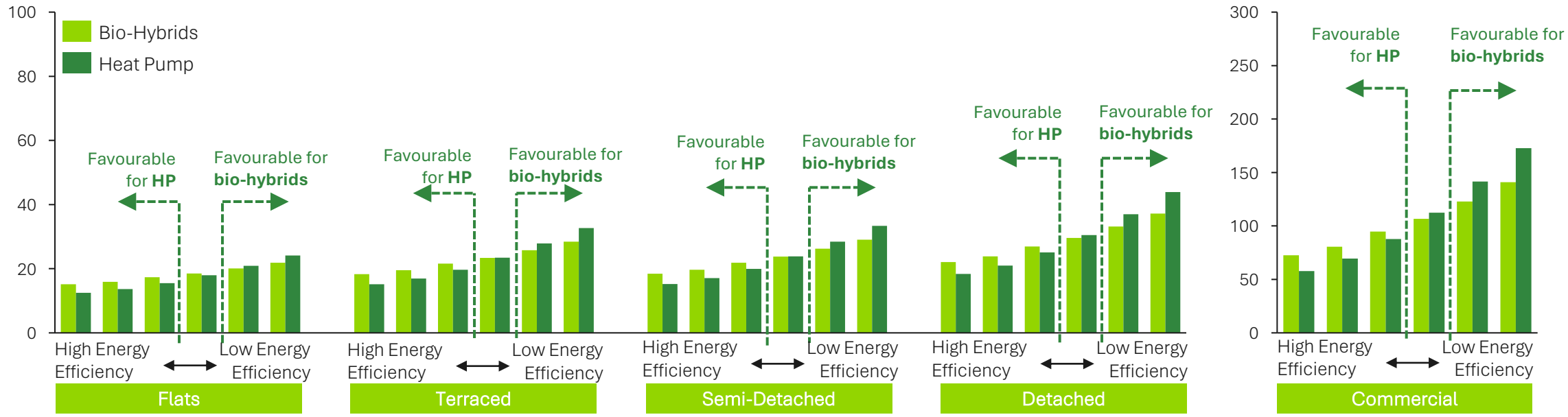


By 2050, bio-hybrids remain cost-effective compared to heat pumps in most low energy efficiency building stock

Cost Comparison of Bio-Hybrids vs Heat Pumps in 2050

- **Bio-hybrids are more cost-effective in low energy efficiency buildings** (EPC F, E) in all building types, and in moderate energy efficiency buildings (EPC D) in some building types.
- Meanwhile, **heat pumps are more cost-effective in high energy efficiency buildings** (EPC A, B, C) in all building types, and in moderate energy efficiency buildings (EPC D) for flats.

Total Lifecycle Costs in 2050 (000s GBP per bldg.)
for *Bio-Hybrids vs. Heat Pumps*

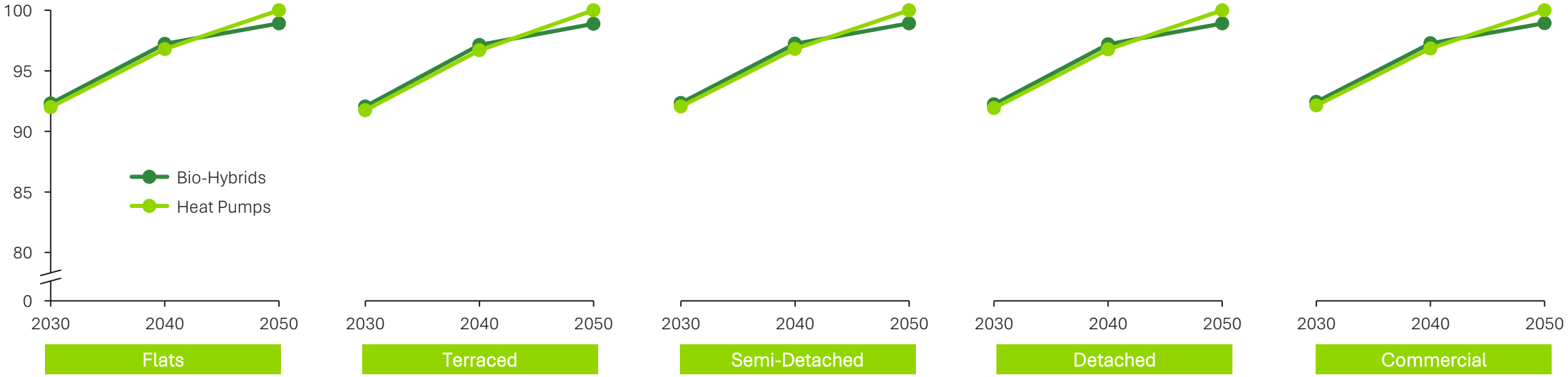


Bio-hybrids offer a clean whole systems heating solution, both now and to 2050, through the effective use of renewable electricity and green gas

Emissions Reduction Results

- **Both heat pumps and bio-hybrids deliver substantial emissions savings** vs. natural gas boilers, starting at around 92% in 2030 and close to 100% savings by 2050.
- By 2050, **heat pumps** become a fully decarbonised heating technology, with 100% emissions savings vs. natural gas, while **bio-hybrids** become almost fully decarbonised, with 99% emissions savings achieved through **both the heat pump and boiler components running on renewable energy**.
- The values captured here include **embodied emissions for biomethane**, but not for renewable electricity. They also do not include the potential for **net-negative emissions** that can be driven by the use of biomethane.

Emissions Savings vs. Natural Gas Boilers (%), 2030-2050, across all Building Types



Lower energy efficiency households would need to spend 100% of their savings for at least four years to make their homes heat pump-ready

The Energy Efficiency Breakdown Across GB

Approximately **half of GB's residential building stock is of a low-to-moderate energy efficiency**, with EPC ratings of D – F.[1] This equates to almost **15 million homes.**

	EPC A	EPC B	EPC C	EPC D	EPC E	EPC F
% Share	1	17	35	35	10	2

- According to the Chartered Institute of Building, **at least 80% of GB buildings that will be occupied in 2050 have already been built.**[2]
- To achieve net zero emissions, these homes will all need retrofitting with **low carbon heating systems and/or energy efficiency improvements** by 2050.
- With the GB building stock **among the least efficient in Europe**, many households are trapped in fuel poverty. Cost of living pressures and Government retiring schemes such as the Energy Company Obligation mean **many homes are likely to remain at EPC D and below in 2050.**
- Achieving a just energy transition that leaves no consumer behind will require leveraging **all viable solutions.**

The Cost of Upgrading a Home's Energy Efficiency

Heat pumps work best for homes at **EPC C or above.** However, the costs of energy efficiency upgrades are largely unaffordable for the majority of GB consumers.[3] This study explored this cost using **two key assumptions:**

- Annual savings for the median GB household are **£2,160.**[4]
- A household will spend **100% of their savings** on energy efficiency home upgrades.

4 years of savings would be required to upgrade a **one-bedroom flat** from **EPC D to EPC C.**

6 years of savings would be required to upgrade a **detached house** from **EPC D to EPC C.**

8 years of savings would be required to upgrade an **average GB home** from **EPC F to EPC C.**

Combining the energy efficiency upgrade cost with the cost of an electric heat pump, **fully electrifying a detached EPC D house** would cost **~£17,500**, including support through the Boiler Upgrade Scheme.

1 | All EPC data sourced from the most recent GOV.UK and data.gov.scot publications
2 | Chartered Institute of Building, Heating Our Homes, 2023
3 | EPC upgrade cost data sourced from the 2025 English Housing Survey and Habito analysis
4 | NimbleFins, Average Household Savings and Wealth UK, 2025

Bio-hybrids offer a cost-effective, clean heat solution, directly targeting difficult- and expensive-to-electrify building stock from today to 2050

Bio-hybrids offer the lowest cost clean heating solution for 30% of British residential buildings

Hybrids, and bio-hybrids, are the lowest cost solution available for low efficiency stock (EPC F, E) in all building types and for some moderate energy efficiency stock (EPC D) of select building types (e.g. detached houses). This is true today, and in 2030, 2040 and 2050.

Bio-hybrids deliver significant emissions reductions

Bio-hybrids offer a clean heating solution through the use of an electric heat pump paired with a boiler running on biomethane, a green gas, delivering 90-95% emissions reductions by 2030 and closer to 100% savings by 2050.

They are a complementary heating solution for difficult-to-electrify building stock

While electric heat pumps are the lowest cost clean heating solution for high efficiency stock (EPC A, B and C), a significant share of GB's building stock is relatively older with low-to-moderate efficiency, for which heat pumps are not the most cost effective.

Hybrids minimise the need for expensive upfront building upgrade costs

The costs of home efficiency upgrades are largely unaffordable to the majority of GB consumers. Over 80% of the 2050 building stock already exists today, and half of the current building stock is rated EPC D to F. Annual savings for the median GB household are £2,160 per year. At this rate, it would take at least 4 years to upgrade a home from EPC D to C, assuming a household is willing to invest 100% of savings in energy efficiency upgrades.

They also help mitigate the impact of limited heat pump uptake

Hybrids directly address the slow uptake and low consumer demand for full heat pump solutions and present a solution to the distressed boiler purchasing challenge. They offer a more cost-effective heating solution than heat pumps and – through the use of biomethane – a clean heat solution.

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4. Recommendations

This study sets out seven policy recommendations to stimulate adoption of bio-hybrids and accelerate the decarbonisation of heat in GB

Enable rollout of bio-hybrids to decarbonise homes

1. **Acknowledge bio-hybrids formally as a clean heating solution** in the national heating decarbonisation strategy and its accompanying ambitious heat pump installation targets.
2. **Make hybrids eligible for grant support under the Boiler Upgrade Scheme** i.e. by offering consumers £2,500, accounting for the cost delta of installing a hybrid system versus a new natural gas boiler, and additional support if installed with a green gas tariff.
3. **Devise a means to make hybrids installed with a green gas tariff eligible for full supplier credits under the Clean Heat Market Mechanism** as a clean heating solution.
4. **Support certified training for all GB boiler installers on a) heat pump and hybrid installations and b) educating consumers on heating options** to upskill the supply chain and enable efficient low-carbon heating uptake nationwide.

Realise the value of biomethane and create a market for green gas

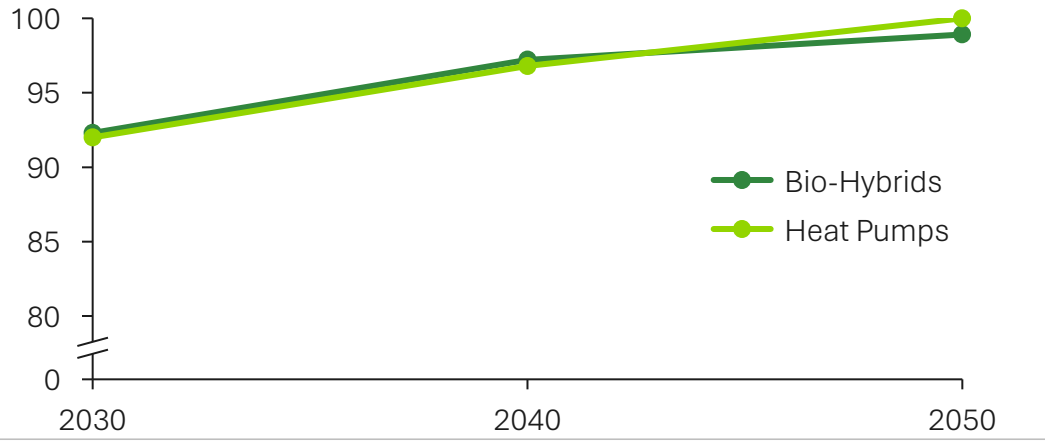
5. **Formalise stretching GB biomethane production targets** for 2030, 2040, and 2050 to facilitate a market for green gas.
6. **Mandate GB gas suppliers to offer consumers a green gas tariff** to guarantee a stable market for renewables and give consumers consistent access to clean heat.
7. **Ensure the future framework scheme supporting biomethane injection into the GB gas grid creates guaranteed, scalable offtake** for green gas, driving investment in new production and reducing carbon intensity (e.g. mandating minimum biomethane volume).

Recognition of bio-hybrids as a clean heating solution will stimulate the market to invest in the technology

Recommendation #1: Acknowledge Clean Heat Status

- **Bio-hybrids can offer a clean heating solution** through the use of biomethane. By 2030, biomethane hybrids can achieve a 90-95% reduction in emissions vs. natural gas, and **closer to 100% savings by 2050.**
- This is not dissimilar to heat pumps, which will also become a fully decarbonised heating technology by 2050, as the electricity grid decarbonises.
- However, policy and regulation **do not currently recognise** bio-hybrids' emissions reduction potential as equivalent to electric heat pumps.

Emissions Savings vs. Natural Gas Boilers (%), 2030-2050



Recommendation #3: Full CHMM Supplier Credits

- Acknowledgement of bio-hybrids in **national strategy and targets, and in the Clean Heat Market Mechanism,** can help accelerate their adoption. Formal recognition of bio-hybrids as a clean heat solution signals government support for their long-term role in heat decarbonisation.

Potential Scope of Bio-Hybrid Acknowledgement

Explicit Integration into Strategy and Roadmaps: DESNZ's residential heating decarbonisation strategy and delivery and investment roadmaps should explicitly acknowledge bio-hybrids as a compliant clean heating option for homes unsuitable or unwilling to adopt a full heat pump solution.

Inclusion in National Targets: Bio-hybrids should be explicitly incorporated into national heat pump delivery targets to help close the gap towards the ambitious 2028 goals.

Consultation on the Clean Heat Market Mechanism (CHMM): The CHMM should evolve to allow for suppliers installing bio-hybrids with a green gas tariff to receive full credits, equivalent to electric heat pumps. This could be initiated with a consultation to industry.

Commercial Incentives: Development of green gas-optimised hybrid bundles and digital verification tools should become commercially attractive as a result, supporting wider gas grid decarbonisation.

Financial support for bio-hybrids in the Boiler Upgrade Scheme and access to green gas tariffs can accelerate adoption of clean heating

Context & Challenge

- The Government offers grant support for clean heating under the **Boiler Upgrade Scheme (BUS)**, providing **£7,500** for electric heat pump installations.
- However, despite BUS funding for HPs, **gas boilers continue to dominate the market**, with installations outnumbering HPs by **more than 15 to 1**.[1]
- **Nearly 60%** of heating system replacements occur when the existing heating systems, usually a boiler, **fails or is near failure.**[2] In most cases, this leads to the installation of new gas boilers, with homeowners simply looking for a fast solution to a problem. Homeowners **are not willing to wait** up to the 2 weeks needed for heat pump installation without heating. In turn, this locks-in **fossil fuels for at least a decade**.
- Hybrids can be installed **easily and with minimal disruption** compared to HPs, as the boiler can be installed first to restore heating, with the heat pump component following later.

Recommendation #2: Eligibility for BUS Support

DESNZ should:

- Introduce **£2,500** for hybrids in the BUS to align with boiler costs, enable **up to three times the emissions reductions per pound of public spending** than a heat pump
- Consult on allowing **bio-hybrids to qualify for the full £7,500** grant when installed with evidence of a **green gas tariff**

Recommendation #6: Green Gas Tariffs

- With biomethane molecularly identical to natural gas, to achieve full emissions benefits, **bio-hybrids must be paired with certified green gas**, potentially through **green gas tariffs.**
- **Green gas tariffs** can help hybrid heating systems deliver **verified decarbonisation** and support a stable market for biomethane.

Green Gas Tariff Design

A green gas tariff could include:

- **Official Green Gas Tariff Definition:** DESNZ should publish a formal definition of what qualifies as a green gas tariff.
  - This would likely operate similarly to renewable electricity tariffs today, with households paying a small energy bill premium to cover certified green gas procurement.
- **Universal Access to Green Gas Tariffs:** GB suppliers should be mandated to offer green gas tariffs to consumers to eliminate postcode-dependent availability and allow choice of low-carbon heating.
- **Verified Carbon Performance for Bio-Hybrids:** A digitalised verification system could be designed to confirm green gas usage.
  - This would enable consumers access to the total £7,500 BUS grant, creating a strong incentive for adoption.

1 | BSEE, Evolution of the UK Hot Water and Heating Market, 2025

2 | DECC, Homeowners' Willingness Report, 2013

To see sustained progress, it is critical to address supply chain constraints and increase awareness of low-carbon heating options

Context & Challenge

- The scale-up of all low-carbon heating solutions, including heat pumps and hybrids, is hindered by **supply chain constraints** and a **lack of consumer awareness** of the options available.
- The successful deployment of bio-hybrids will likely be impacted by the same issues limiting success in the electric heat pump market:
  - Approximately **two-thirds of heat pumps installed in GB today are manufactured abroad**, highlighting a significant lack of domestic capacity in the supply chain.[1]
  - The Heat Pump Association estimates that **122,000 full-time heat pump installers** will be required by 2035 to meet government targets, with current numbers sitting at **~10,000**.[2]
  - Baxi's 2025 installer survey reveals **60%** of installers expect **no drop in gas boiler demand** over the next decade, while **nearly half** have adopted – or plan to adopt – hybrid installations.
  - Supply chain constraints are fundamentally driven by a **lack of demand** for heat pumps and **limited awareness** of hybrid systems.

Recommendation #4: Installer Certification & Consumer Awareness

- Government support of **large-scale upskilling** of the supply chain can accelerate adoption of all low-carbon heating solutions.

Priority Activities

Standardised Training and Upskilling: A certified, standardised training module should be developed for heat pump and hybrid installations, aligned with the Microgeneration Certification Scheme (MCS).
- This should include a complementary module to equip installers with the skills to explain options to consumers during face-to-face interactions.

Financial and Industry Support: Government should provide financial assistance and targeted investment to help boiler installers upskill for heat pump and hybrid installations.
- For example, encouraging Original Equipment Manufacturer (OEM)–installer partnerships may fast-track training and reduce cost burdens for SMEs and self-employed installers.

Consumer Advice Framework: Creating a nationwide consumer advice framework that clearly outlines all heating options and positions hybrids as a viable choice at the point of boiler breakdown would empower consumers to make informed choices.

1 | BSEE, Evolution of the UK Hot Water and Heating Market, 2025

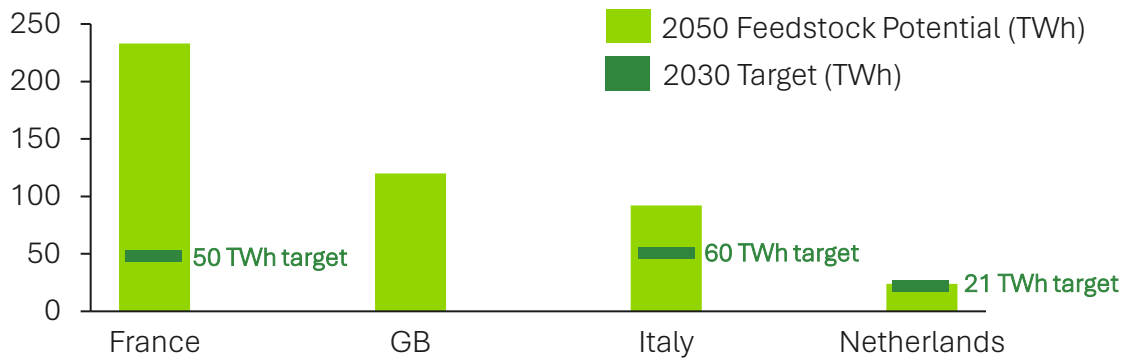
2 | Heat Pump Association, Projecting the Future Domestic Heat Pump Workforce, 2024

Formalisation of biomethane production targets to 2050 and creation of a supportive framework scheme can stimulate a market for green gas

Recommendation #5: Biomethane Production Targets

- To unlock the magnitude of GB's sustainable **biomethane potential of 120 TWh by 2050, clear and targeted biomethane policy** is required.
- At a national level, bio-hybrids may be more cost-effective than heat pumps across approximately **30% of domestic buildings, which could drive 33 TWh of biomethane demand.** To realise the economic potential of bio-hybrids and incentivise production, **DESNZ should formalise biomethane production targets for 2030, 2040 and 2050.**
- Several comparable EU countries have set **ambitious production targets**, driving sector growth and national decarbonisation.

Feedstock Potentials and Biomethane Production Targets

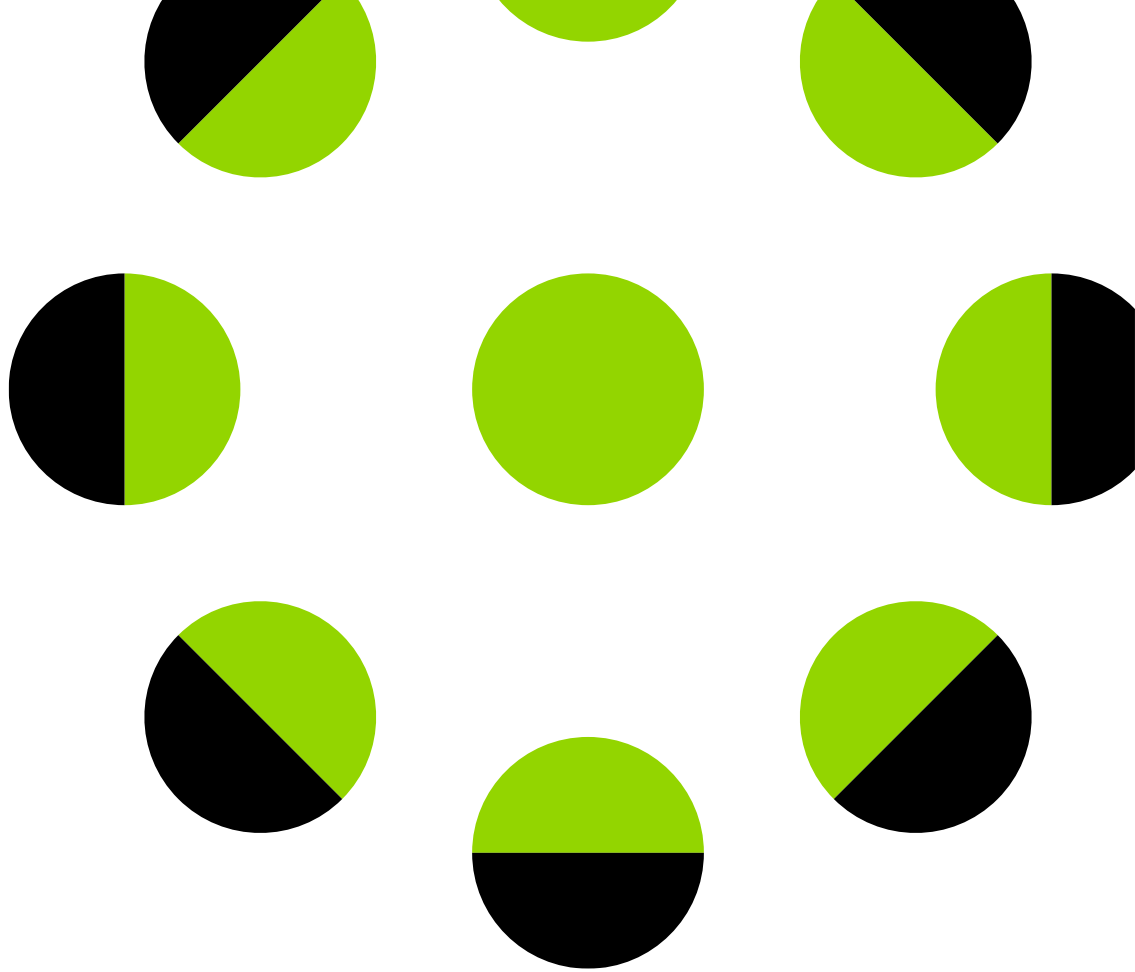


Recommendation #7: Future Biomethane Support Scheme

- The future framework supporting biomethane injection into the UK gas grid should create **guaranteed, scalable offtake for green gas**, driving investment in new production and reducing carbon intensity.
- Scalable offtake for biomethane can be created by mandating demand in gas blending. **Lessons can be learned from comparable EU countries**, where governments are driving demand by **mandating minimum biomethane injection volumes or other market-based mechanisms.**

Country	Policy	Results
	From 2026, France will **mandate biomethane blending** into the French grid, with **4.2% by 2028.**	✓ Accelerates the decarbonisation of heat ✓ Secures biomethane production ✓ Reduces carbon intensity of the gas grid ✓ Supports national decarbonisation targets
	From 2027, Dutch Government plan to achieve **15.6 TWh of biomethane through a blending obligation** to retail gas suppliers.	
	From 2026, Ireland will introduce a **mandatory 1.5% biomethane blend** for gas used in **heating**, increasing to **3% in 2027**.	

outwit complexity™



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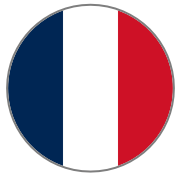
Appendix

A | Policy Landscape EU Country Profiles

B | Modelling Assumptions and Inputs

Country Profile | **France**



Overview

- France is a global leader in heat pump deployment, with a total heat pump stock **exceeding 6.5 million**.[1] With **hybrids qualifying under the 'low carbon heating systems' definition and mandate**, they play a key role in buildings that are older or more difficult to electrify.
- The Energy Transition for Green Growth Act set the objective for **renewable gas to represent 10% of the country's total gas consumption by 2030**. The French biomethane sector has seen rapid growth over recent years with **11.6 TWh injected today**, showing the **highest year-on-year growth** across Europe.

~3%

of the current heat pump market is comprised of hybrids

44 TWh

of biomethane production is targeted annually by 2030

Hybrid Heating Policy Incentives

- France **mandates low-carbon heating systems for all new residential and commercial properties**, with **hybrids qualifying** as an eligible technology.
- The **Coup de Pouce Chauffage** bonus scheme awards a **minimum of €2.5k** to consumers replacing a gas boiler with a hybrid heating system.
- **Zero-interest loans** under the **Eco-PTZ** scheme provide financial support to consumers installing heat pumps, including hybrids, or insulation upgrades.

Biomethane Policy Incentives

Incentive Mechanisms:

- **FiT schemes** have been in place since 2011 to incentivise biomethane injection. These were revised in 2023 to account for changes in electricity supply costs and have been reformed such that **only projects below 25GWh/yr have unlimited access.**
- Larger projects **exceeding 25GWh/yr** must compete under a **Contracts for Difference (CfD) scheme**, with each CfD running for **15 years**.
- **Biogas Production Certificates** set a **minimum biomethane incorporation rate** for all natural gas suppliers, with the minimum obligation increasing annually and a **financial penalty** associated with not meeting the minimum rate. The certificates are valid for **5 years** and can be traded or purchased from producers.
- Since 2021, **GOs of new projects are auctioned by the state** and ensure end consumers can verify the origin.
- **Local grants** are available to support funding and investments in biogas and biomethane projects.
- DSOs and TSOs contribute **up to 60%** of network connection costs.

1 | European Heat Pump Market Report, 2025

Country Profile | **Italy**

Overview

- Italy is a mass market for hybrid heating systems, with installation numbers exceeding **130,000** in 2022.[1] Hybrids constitute **~40%** of the heat pump market at present, largely driven by **strong financial incentives** and the **versatility of hybrids** in adapting to the country's varying regional weather conditions.[2]
- There is **strong growth in Italy's biomethane production capacity and grid injection**, driven by an ambitious annual production target of **60 TWh/yr by 2030** coupled with several supply and demand incentive schemes.

~40%

of the current heat pump market is comprised of hybrids

60 TWh

of biomethane production is targeted annually by 2030

Hybrid Heating Policy Incentives

Italy's **Ecobonus tax rebatement scheme** incentivises consumers to make home improvements that improve efficiency through **reductions of up to 50% in tax**. Hybrids and electric heat pumps are **both supported** under Ecobonus, with a maximum deduction of **€30k.**

Conto Termico 3.0 offers consumers a **direct contribution** to the bank for the installation of an **electric heat pump or hybrid system**, covering up to **65%** of the upfront cost.

Biomethane Policy Incentives

Incentive Mechanisms:

Decree issued to support **biomethane production from 2022 to 2026**, offering incentives for new plants and the reconversion of biogas plants. The decree includes a **40% capital contribution on eligible investment costs and a 15-year incentive FiT** on net biomethane production.

Italy has a system of quotas that set a **biofuel integration rate for fuel suppliers of 10%, including 2% biomethane.** These targets are supported by the purchase of certificates of supply for consumption (CICs).

Installations earn CICs based on production levels, with **advanced biomethane receiving double the value and a 20% bonus granted for compression or liquefaction** infrastructure.

Within the National Recovery and Resilience Plan, the Italian Government announced **€193m** of dedicated funding for biomethane projects, including new plant construction and sustainable practices at existing plants.

The European Investment Bank loaned **€264m** for the construction of **240km of new pipelines to integrate biomethane production plants** to the grid.

Mandatory quotas for renewable energy in transport, including biogas, have been increased from **10% to 16% by 2030**.

1 | European Heat Pump Market Report, 2025

2 | HHIC 2022

Country Profile | **Netherlands**

Overview

- The Netherlands are the global market leader for hybrid heating systems, with around **55,000 units installed in 2023 increasing from 26,000 in 2022**.[1] This growth was a direct result of the 2022 Building Livings Environment Decree, which **mandated hybrids as the replacement for a gas boiler from 2026**. This was loosened in 2024 to **avoid forcing any single technology on consumers**.
- As a key part of its energy transition goals, biomethane is **rapidly advancing in the Netherlands**. This is driven by a **21 TWh/yr 2030 production target**, a combination of FiPs and user incentives, and the incoming blending mandate.

~50%

of the current heat pump market is comprised of hybrids

21 TWh

of biomethane production is targeted annually by 2030

Hybrid Heating Policy Incentives

- The Dutch **SDE Subsidy for Sustainable Energy** supports the purchase of hybrid heating systems for owner-occupied homes, covering **~30% of the upfront costs.**
- The **Dutch National Heat Fund Loan** offers financing with a **0% interest rate** for low- and middle-income households. Major Dutch banks have pledged a combined **€200m** to support the loan this year.
- The Netherlands are targeting the installation of **1 million hybrids by 2030.**

Biomethane Policy Incentives

Incentive Mechanisms:

- The **SDE++ Scheme** provides a **variable FiP** to bridge the gap between biomethane production costs and market pricing. The scheme covers the non-profitable portion of costs for **12-15 years** through grants collected through a **competitive tender process**.
- **Gas network operators share connection costs** with biomethane producers to split ownership and incentivise grid injection.
- VertiCer manage **GOs**, which can be **traded both nationally and across the border**, meeting EU ETS eligibility requirements.
- Renewable fuel quotas for transportation were set at **18.9% in 2023, rising to 28.4% in 2024 and 29.4% in 2025**, with compliance achieved through **HBE certification.**
- Projects involving biofuel production can apply for **tax rebatements** under the **Energy Investment Deduction Scheme.**
- **2027** will see the introduction of the **Green Gas Blending Obligation Act**. This will require gas suppliers to purchase **Green Gas Units** to meet **mandatory biomethane blending targets.**

1 | EHI Heating Market Report 2023

Country Profile | **Denmark**

Overview

- Denmark is characterised by its population of highly urbanised settlements, creating ideal conditions for decarbonisation via **district heating networks**. In effect, this is like a **single, integrated hybrid heating system** with **renewable electricity working with biomethane** to deliver low-carbon heat at scale.
- With **8.1 TWh** biomethane injected to the gas grid by the end of 2024, green gas accounts for **32% of total Danish gas consumption**. Growth in the biomethane sector is expected to continue with Denmark **targeting 100% biomethane in the grid by 2035.**

~70%

of heat demand from buildings is supplied by district hybrid heating

13 TWh

of biomethane production is targeted annually by 2030

Hybrid/District Heating Policy Incentives

- Denmark aims to achieve a 70% carbon emissions reduction by 2030, of which **district heating will contribute 44%.**
- Denmark supports district heating companies with **subsidy support** through the District Heating Pool to help households with the cost of conversion to **heat pumps and hybrids running on green energy (e.g., wind, biogas).**
- However, the Heat Pump Subsidy, covering 15% of costs for heat pump installation, is **only eligible for electric heat pumps.**

Biomethane Policy Incentives

Incentive Mechanisms:

In 2024, Denmark replaced its old FiT support with a new **€1.7 billion FiP scheme** running until 2030. **Competitive tenders** financially reward biomethane producers through an **additional price on top of that of natural gas** over a fixed **20 year** period.

Biomethane is awarded tax exemptions through the CO_2 tax and a **reduced consumption tax rate** on fuels blended with biofuels. These schemes are currently under review by Danish government.

Investment grants are available for new producers, providing **15% CAPEX coverage** for green projects, including biomethane.

GOs are managed by the Danish national transmission operator, Energinet. Plants recorded in Energinet's register may **sell GOs to member countries of the European Renewable Gas Registry** (including Italy, France, the Netherlands, and the UK) and under the EU ETS.

There are **minimum quotas for biofuel use** with **biomethane counted twice** due to being classified as an advanced biofuel. Suppliers must meet a minimum quota of **7.6% biofuels** since 2024, with a minimum of **0.3% advanced biofuels**. Financial penalties apply for failure to meet these quotas.

Cost assumptions and emissions factors for biomethane and electricity

Factor	Unit	2030	2040	2050
Biomethane Price	£/kWh	0.090	0.072	0.060
Biomethane Emissions	g CO_2e/MJ	4.3	1.2	3.4
Bio-Hybrid Electricity Price	£/kWh	0.015	0.013	0.012
Heat Pump Electricity Price	£/kWh	0.020	0.018	0.017

The analysis assumed a combination of electricity tariffs that are readily available today (e.g. Octopus Cosy, Octopus Agile). The ability of bio-hybrids to run on biomethane during periods of peak demand enable reduced electricity costs compared to heat pumps through a variable tariff.

Heating system cost assumptions for heat pumps and bio-hybrids, 2030

Property Type	Heat Pump Cost (£)	Bio-Hybrid Cost (£)*
Flats	8,000	7,500
Terraced	12,100	10,600
Semi-Detached	12,100	10,600
Detached	16,700	14,000
Commercial	75,150	63,000

The analysis assumed a cost reduction in the heat pump component of each heating system of 20% by 2040 and 25% by 2050. This was based on a report by the UK Energy Research Centre[1].

1 | Decarbonising Home Heating: an Evidence Review of Domestic Heat Pump Installed Costs, UKERC, 2023

*These costs include the cost of both a new boiler and new heat pump for the hybrid heating system

Average household gas demand assumptions by efficiency level

EPC Rating	Gas Demand (kWh/year)	
	With Gas Boiler[1]	With Bio-Hybrid
D	11,733	3,520
E	16,000	4,800
F	20,800	6,240

For bio-hybrids, the analysis assumed a 70%-30% split in heat pump to bio-boiler usage to estimate the biomethane demand.

1 | Average gas consumption by EPC values were derived from National Energy Efficiency Data-Framework data and energy bill data

Sensitivity testing shows bio-hybrids could be more cost-effective than heat pumps in 30% to 65% of GB homes

Scenario	Assumptions	Results
Base scenario New boiler	Assumes the household has to purchase both a new boiler and a new heat pump when installing a bio-hybrid. • **Total upfront cost example:** £10,600 for a semi-detached house	Bio-hybrids are more cost-effective than heat pumps in **30%** of GB homes
Scenario #1 Existing boiler with replacement	Assumes the household uses their existing boiler when installing a bio-hybrid, avoiding a £2k upfront capital cost. However, accounting for 50% of capital cost (£1k) to reflect the cost of a boiler replacement midway through the 15-year analysis (+£2k) and its residual value (-£1k) at the end of the analysis. • **Total upfront cost example:** £9,600 for a semi-detached house	Bio-hybrids are more cost-effective than heat pumps in **45%** of GB homes
Scenario #2 Existing boiler without replacement	Assumes the household uses their existing boiler when installing a bio-hybrid, and that this boiler remains in use during the full 15-year analysis timeframe, reducing the upfront capital cost by £2,000 . • **Total upfront cost example:** £8,600 for a semi-detached house	Bio-hybrids are more cost-effective than heat pumps in **65%** of GB homes