



Policy paper on circulator pump replacement

the European case

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Introduction

Domestic circulator pumps are very common in hydronic heating and cooling systems, operating for thousands of hours each year. Globally, close to more than 150 million low-efficiency units remain in service, including around 22 million in the EU and the UK, many installed before modern efficiency standards and lacking adaptive control.¹

These legacy circulator pumps overconsume electricity and worsen system performance in buildings where they are installed.

From a policy perspective, targeting circulator pump replacement is rational and beneficial. It costs less than many building-envelope renovations and offers quick payback on investments. It can be deployed rapidly in retrofit programmes and offers near-term electricity demand reductions.

These improvements also support EU and the UK strategic objectives, lowering energy import dependence, boosting resilience, and stimulating domestic green industrial growth, while delivering sustainability benefits.

This paper focuses on how EU policy and four markets – Denmark, Germany, France and the UK – can unlock this opportunity now, and how Grundfos can support delivery at scale.

¹ Installed base of low and high-efficiency circulator pumps globally, 2025, Bidstrup, N., Madsen, P. S. and Schwarz, A., DBS LT.

Executive summary

Despite the Ecodesign Regulation, tens of millions of inefficient circulator pumps remain installed across Europe's existing housing stock, consuming around 7TWh annually, per the end of 2025.^{1,2}

While the Ecodesign Regulation (EC 641/2009) sets minimum efficiency standards for new circulator pumps placed in the market in the EU – including circulator pumps used as replacement in existing systems as well as circulator pumps in new-builds and refurbished systems – it does not address circulator pumps in the existing stock, which are still functioning.

Replacing these circulator pumps with high-efficiency, variable-speed circulator pumps can cut electricity use per unit by up to 80 per cent, with further savings and comfort unlocked through hydronic balancing.³

Targeted retrofit incentives, and renovation programmes, are required to accelerate replacement in the existing stock. These measures are among the lowest-cost and fastest-to-deploy demand-side interventions available, helping reduce grid stress, energy imports and system costs while strengthening European clean technology leadership.⁴

The UK's Warm Homes Plan introduces a large-scale retrofit delivery framework targeting up to five million homes by 2030, with a focus on lowering energy bills, tackling fuel poverty, and accelerating decarbonisation of buildings.^{5,6}

Embedding circulator replacement, hydronic balancing and smart pumping solutions within these retrofit pathways would unlock fast, low-cost electricity savings while strengthening heating system performance and supporting national energy security goals.

It is strategically urgent to embed circulator replacement in policy frameworks now. Demand-side efficiency can reduce peak electricity growth, lowering system costs, enhancing resilience, and supporting the integration of low-carbon supply.^{4,7}

Key national priorities:

- **Denmark:** leverage public procurement and social housing renovation to scale pump replacement and hydronic balancing, and embed best practice circulator standards in new public buildings.
- **Germany:** integrate circulator upgrades into federal efficiency funding under NAPE and tighten technical building requirements for circulator pumps and hydronic system commissioning.
- **France:** embed circulator replacement and hydronic balancing into EPBD implementation, Energy Performance Diagnostics (DPE) ratings, renovation subsidies and requirements. In addition high-efficiency circulator pumps in new residential construction.
- **United Kingdom:** include pump replacement vouchers within the Warm Homes Plan and strengthen Part L compliance and commissioning rules for circulator pumps in new builds.

Grundfos is uniquely positioned to support these policies through proven technology, system expertise and large-scale deployment capabilities across markets and regions.

¹ Installed base of low and high-efficiency circulator pumps globally, 2025, Bidstrup, N., Madsen, P. S. and Schwarz, A., DBS LT.

² Renovation Wave Strategy, 2020, European Commission

³ Catalogue of Energy Efficiency Measures, Hydronic Balancing, 2024, EU ASE

⁴ Electricity Mid-Year Update 2025, 2025, International Energy Agency

⁵ UK Government, 2025, Warm Homes Plan official guidance and delivery details, Department for Energy Security and Net Zero

⁶ House of Commons Library, 2025, Warm Homes Plan: Cold and damp homes briefing, UK Parliament

⁷ Electricity 2025 Demand, 2025, International Energy Agency

Circulator pumps in a global context



- Around more than 150 million low-efficiency domestic circulator pumps remain installed globally, including approximately 22 million in the EU and the UK.¹
- High-efficiency, permanent-magnet circulator pumps reduce electricity consumption by up to 80 per cent compared with legacy induction motor circulator pumps.¹
- Average pump lifetime is 10 years according to EC research standards, but technical lifetime is much longer.

Globally, circulator inefficiency represents one of the largest untapped electricity-efficiency opportunities in buildings. Even though the standard lifetime assumption for circulator pumps in this paper is ten years, in line with industry and EC standards, we know that many circulator pumps last significantly longer and remain in use for twice that time and even longer.

National stock analyses, such as in France, show that even in advanced markets, a significant number of installed circulator pumps remain inefficient, suggesting that global estimates may understate the real potential.

With electricity demand forecast to grow strongly through electrification of heating, cooling, mobility and data infrastructure, inefficient end-use devices become a strategic system risk.⁴ Circulator replacement delivers immediate, verifiable demand reductions at low cost, while robust standards for new buildings ensure that future demand growth is not locked into avoidable inefficiency.

Grundfos contributes through high-efficiency circulator pump technologies, digital control solutions and system optimisation expertise, supporting policymakers and building owners in achieving both rapid retrofit savings and long-term efficiency.



¹ Installed base of low and high-efficiency circulator pumps globally, 2025, Bidstrup, N., Madsen, P. S. and Schwarz, A., DBS LT.

⁴ Electricity Mid-Year Update 2025, 2025, International Energy Agency



Circulator pumps in a European context



- Even after major gains under the Ecodesign Regulation, domestic circulator pumps still draw around 1 per cent of EU electricity demand, which roughly equals the entire annual electricity consumption of a European country like Ireland.⁸
- Millions of inefficient legacy circulator pumps remain in operation, making replacement one of the fastest to implement, lowest-cost and quickest-payback, energy-saving measures in buildings.⁹
- Modern circulator pumps can cut pump electricity use by up to 80 per cent while enabling smarter and more flexible heating systems.⁸

Circulator pumps in the EU consume roughly 7 TWh of electricity per year following implementation of ecodesign requirements, as indicated by European Commission review studies and ecodesign impact assessments. Close to 1 per cent of total electricity demand, driven by their widespread use in residential heating and cooling systems.

The Ecodesign framework has reduced circulator electricity use by a confirmed 24.5 TWh in 2020 compared to pre-regulation market projections, according to the European Commission's

2026 review update. The result is significant cost savings for consumers and measurable CO₂ reductions.⁸

Long product lifetimes mean that the installed base still contains large volumes of inefficient legacy circulator pumps, particularly older fixed-speed and three-speed models. France alone is estimated to have more than five million such circulator pumps still in operation in houses, with similar patterns likely to be found across major EU markets.⁹

As electrification of heating and industry accelerates, circulator pump replacement represents one of the fastest and lowest cost levers to curb structural electricity demand growth.¹⁰

While stronger renovations may be costly and intruding, pump replacement requires minimal disruption, short installation times and modest capital investment while delivering immediate and measurable energy savings.

Grundfos supports EU climate and energy priorities through best-in-class circulator pump efficiency and connected pump solutions that enable deeper system optimisation when combined with hydronic balancing and smart controls.¹¹

⁸ European Commission Ecodesign Review of Circulators, 2024

⁹ Grundfos France market analysis on installed base of circulator pumps, 2024

¹⁰ IEA Electricity 2024 and EU Electricity Market Outlook, 2024

¹¹ Grundfos Sustainability Report, 2024

EU context

EU

- The Renovation Wave aims to renovate 35 million buildings by 2030, providing a platform for embedding circulator replacement and balancing in mainstream renovation policy.²
- National Building Renovation Plans under the EPBD recast can explicitly recognise circulator upgrades as priority technical measures.¹²

EU policy already contains most of the elements needed to unlock circulator efficiency. What remains missing is systematic targeting of the installed base. The Renovation Wave and EPBD implementation offer immediate entry points to integrate pump replacement, hydronic balancing and distributed pumping into national renovation frameworks.

Dedicated EU level funding windows or guidance for circulator replacement in existing buildings would accelerate uptake and help standardise best practice across Member States.

For industry players such as Grundfos, the combination of Ecodesign, renovation funding and national programmes offers a clear route to scale deployment, and a way to support EU industry and critical EC policies as well as key strategic goals of the EU and Member States.

Accelerating the adoption of high efficiency circulator pumps and system-optimising solutions that deliver both energy savings and market growth demands that the industry engages actively with EU institutions, national governments, housing associations and system integrators.

German context

DE

- According to the EU ASE catalogue, as much as 85 per cent of residential heating circuits in Germany may operate without optimal hydronic balancing, leading to large-scale heat energy losses.³
- Germany's National Action Plan on Energy Efficiency (NAPE) explicitly calls for upgrading technical systems in buildings, including pump replacement and system optimisation.¹⁶
- Germany's engineering and manufacturing capacity makes it a strategic partner for scaling high-efficiency circulator and distributed pumping solutions, aligning with industrial policy objectives.¹⁷

Germany's heating sector presents both significant challenges and opportunities. Many older systems suffer from hydraulic imbalance and suboptimal pump performance. By replacing inefficient circulator pumps and applying balancing, German

policy can unlock energy savings and reduce emissions at scale.^{3, 17}

Policy instruments under NAPE provide an enabling environment. With funding and incentives directed at mechanical system upgrades, circulator replacement can be included in national and regional retrofit programmes. These measures help reduce the demand on the electricity grid and support Germany's long-term energy transition goals.¹⁶

Industrial engagement is crucial. As a global pump manufacturer, Grundfos can collaborate with German authorities, utilities, and HVAC stakeholders to deliver pilot projects, training programmes, and scalable solutions. This approach would support both energy efficiency and industrial competitiveness, aligned with European strategic autonomy objectives.¹⁷

² Renovation Wave Strategy, 2020, European Commission.

¹² Energy Performance of Buildings Directive recast 2024/1275, 2024, European Parliament

³ Catalogue of Energy Efficiency Measures, Hydronic Balancing, 2024, EU ASE.

¹⁶ German NAPE, 2024?

¹⁷ Grundfos, 2022?

¹⁵ Ngee Ann Polytechnic Distributed Pumping Case Study, 2023, Grundfos

Danish context

DK

- Hydronic balancing retrofits can deliver 5 to 10 per cent heating energy savings in Danish residential buildings.³
- Denmark hosts leading circulator manufacturing and system competence through Grundfos.¹³
- Public procurement and social housing renovation schemes offer leverage points for scaling pump replacement.²

Denmark's strong manufacturing base, including the historic presence of Grundfos, provides the industrial foundation to lead

the circulator-efficiency transformation. By replacing old circulator pumps with high-efficiency models and improving hydraulic balance, the Danish building stock can significantly reduce electricity demand and heat system losses.¹⁴

Government-led renovation projects offer a scalable path. For instance, municipal retrofits or social housing upgrades can mandate pump replacement and hydronic balancing, supported by procurement rules that favour high-performance and distributed-pumping systems.¹⁵ This directly contributes to Denmark's national climate and energy targets.

French context

FR

- Over five million inefficient circulators remain installed in French homes, with potential electricity savings of 1.5 TWh annually from pump replacement alone.⁹
- When combined with hydronic balancing, total savings potential reaches around 10 TWh annually.⁹
- Policy levers include EPBD implementation, renovation support schemes and the DPE.

France presents one of the most structured policy environments for accelerating circulator pump replacement. Integrating circulator replacement and hydronic balancing in the maintenance requirements, DPE ratings and renovation incentive schemes would enable significant electricity savings while improving heating system efficiency.

The scale of the opportunity is significant. France's residential heating sector contains more than five million inefficient circulator

pumps. Replacing these legacy units with technology compliant with current Ecodesign requirements would deliver electricity savings of around 1.5 TWh annually, avoiding 33 kt CO₂-eq and generating €300 million in national savings each year.

To unlock this potential, French public policies on housing renovation include a coherent set of levers. By integrating hydronic balancing and pumps performances in the DPE and renovation subsidies, regulations would become a major incentive in pump replacements.

These measures align directly with France's climate and energy security objectives by reducing consumer bills and system costs. Grundfos can support delivery through national pilots, installer training and deployment of connected circulator pumps that enable continuous system optimisation and performance monitoring. Collectively, these measures align closely with France's SNBC and PPE3 objectives and contribute to strengthening national energy sovereignty by reducing electricity demand.

³ Catalogue of Energy Efficiency Measures, Hydronic Balancing, 2024, EU ASE.

¹³ Distributed Pumping Application Guide, 2022

² Renovation Wave Strategy, 2020, European Commission.

¹⁴ Apartment block saves energy with dynamic balancing, 2024, Danfoss.

¹⁵ Ngee Ann Polytechnic Distributed Pumping Case Study, 2023, Grundfos

⁹ Grundfos France market analysis on installed base of circulator pumps, 2024

- The UK's Warm Homes Plan now prioritises building energy performance upgrades, including funding mechanisms and incentives that create opportunities to embed circulator replacement, hydronic balancing and smart controls into retrofit pathways.⁶
- Independent technical research indicates that replacing old circulator pumps with variable-speed models can reduce pump electricity consumption by up to 75 per cent in real-world hydronic systems.¹⁸
- Targeted grants, loans and vouchers under the Warm Homes Plan and linked schemes are likely needed to accelerate the replacement of inefficient circulator pumps and support system optimisation.^{19, 5}

The UK's building stock contains many older hydronic systems with low-efficiency circulator pumps still in operation. Many homes, particularly those below Energy Performance Certificate (EPC) Band C, are eligible for funded energy performance and low-carbon heating upgrades under the government's Warm Homes Plan, which aims to improve up to 5 million homes and cut energy bills by 2030.^{5, 6}

Incorporating circulator replacement and hydronic balancing into retrofit packages, alongside insulation, heat circulator pumps, and smart heating controls, would create complementary electricity-saving impacts and improve overall system performance.

The Warm Homes Plan's financial levers provide new retrofit delivery vehicles that can help overcome upfront cost barriers. The Warm Homes: Local Grant and Warm Homes: Social Housing Fund deliver fully funded upgrades for eligible low-income and social households, with up to £15,000 per home available for energy performance measures including heating controls and system upgrades.^{5, 6}

Additional zero- and low-interest loans and extended Boiler Upgrade Scheme grants for heat pump installation further expand this landscape of support. Targeted vouchers or grant add-ons for efficient circulator pumps and hydronic balancing would align with these financial pathways and accelerate uptake of efficient solutions.

For industry players like Grundfos, this evolving policy landscape presents an opportunity to engage with UK retrofit delivery programmes and shape the integration of circulator efficiency into mainstream energy performance measures.

⁶ House of Commons Library, 2025, Warm Homes Plan: Cold and damp homes briefing, UK Parliament

¹⁸ Energy Efficient Renovation Guidebook for HVAC Systems, 2024, REHVA

¹⁹ Regulation on Ecodesign Requirements for Circulator pumps, 2009, European Union

⁵ UK Government, 2025, Warm Homes Plan official guidance and delivery details, Department for Energy Security and Net Zero

⁶ House of Commons Library, 2025, Warm Homes Plan: Cold and damp homes briefing, UK Parliament



Policy asks

At EU level

- Continue to push for circulator pump replacement to be embedded in policy frameworks and Member State programmes when feasible. Demand-side efficiency can reduce peak electricity growth, lowering system costs, enhancing resilience, and supporting the integration of low-carbon supply.^{7, 4}
- Launch a dedicated circulator replacement programme under the Renovation Wave, providing funds for pump replacement, hydronic balancing, and distributed pumping.²
- Recognise circulator pumps and hydronic balancing as priority retrofit measures eligible for funding in National Building Renovation Plans under the EPBD.¹²

⁷ Electricity 2025 Demand, 2025, International Energy Agency

⁴ Electricity Mid-Year Update 2025, 2025, International Energy Agency

² Renovation Wave Strategy, 2020, European Commission

¹² Energy Performance of Buildings Directive recast 2024/1275, 2024, European Parliament



At country level

Denmark

Government-led renovation projects offer a scalable path. Municipal retrofits or social housing upgrades can mandate circulator pump replacement, supported by procurement rules that favour high-performance systems.

Germany

Expand renovation subsidy programmes, such as e.g. NAPE. Through funding and incentives directed at mechanical system upgrades, circulator replacement can be included in national and regional retrofit programmes.

France

Integrate circulator pumps energy consumption and promote hydronic balancing through the proper equipment of a hydronic heating system in renovation's public policies, prescriptions and support schemes.

UK

Recognise circulator replacement and hydronic balancing as eligible measures under the Warm Homes Plan. Integrate circulator replacement vouchers into the Warm Homes Plan or similar retrofit programmes to target inefficient legacy circulator pumps (REHVA, 2024).



Concluding remarks

Circulator pump replacement is a rare policy measure that simultaneously advances competitiveness, self-sufficiency and affordability. It reduces electricity demand at scale, lowers consumer bills, strengthens domestic manufacturing and improves energy system resilience. Unlike many infrastructure investments, it delivers measurable impact within months rather than decades.

With the right mix of regulation, incentives and system design requirements, Europe can unlock this opportunity now. Grundfos stands ready to support policymakers, utilities and building owners with proven technologies, application expertise and scalable delivery models that turn circulator efficiency into a cornerstone of Europe's clean energy transition.

References

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- 6 House of Commons Library, 2025, Warm Homes Plan: Cold and damp homes briefing, UK Parliament
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