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# Let's Talk About What We Can Save

## Redirecting Germany's €600 Billion Fossil Fuel Import Bill into Domestic Economic Growth through Energy Efficiency

Strengthening Germany's Economy by €120 billion in Energy Cost Savings through Energy Efficiency Investments

### ABSTRACT

This white paper analyses Germany's strategic opportunity to redirect a significant portion of its approx. €600 billion fossil fuel import bill over the last five years – one of the largest outflows from the European economy – through targeted energy efficiency investments. Rather than viewing the energy transition as a cost burden, we demonstrate how it represents one of Germany's most significant economic opportunities: achieving a modest 20% reduction in fossil fuel imports would retain €120 billion within the German economy over five years while strengthening energy security, improving trade balances, and enhancing industrial competitiveness. Focusing on high-impact technologies with rapid ROI – particularly LED lighting and high-efficiency industrial pumps – the paper examines innovative financing mechanisms that require zero upfront investment, highlighting how efficiency measures deliver immediate financial returns while complementing renewable energy growth and creating a more resilient economic foundation for German businesses and households.

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## Introduction

Shifting from energy costs to energy savings potential.

For decades, the narrative around Germany's energy transition has been mistakenly framed as primarily a cost issue—what must be spent to transform the energy system. This perspective overlooks the economic reality: Germany has built its economic powerhouse on imported fossil fuels, including oil, natural gas, and coal, creating a dependency that costs the country approximately €600 billion over the past five years (2020-2024) or approximately €120 billion annually. This massive capital outflow doesn't just represent an environmental challenge but a fundamental economic opportunity.

By shifting our perspective from the burden of energy costs to the substantial economic benefits of energy efficiency, we reveal a transformative macroeconomic opportunity. With strategic investments, Germany could save €120 billion over the next five years—money that would strengthen domestic industries, create jobs, improve trade balances, and build economic resilience rather than flowing to energy exporters.

This article examines how Germany can achieve these economic gains through targeted energy efficiency investments, highlighting practical technologies—particularly LED lighting and high-efficiency pumps—that offer immediate, substantial returns while strengthening Germany's position in an increasingly competitive global economy.

## Our Fossil Fuel Import Dependency

Historical Context: From economic engine to economic vulnerability.

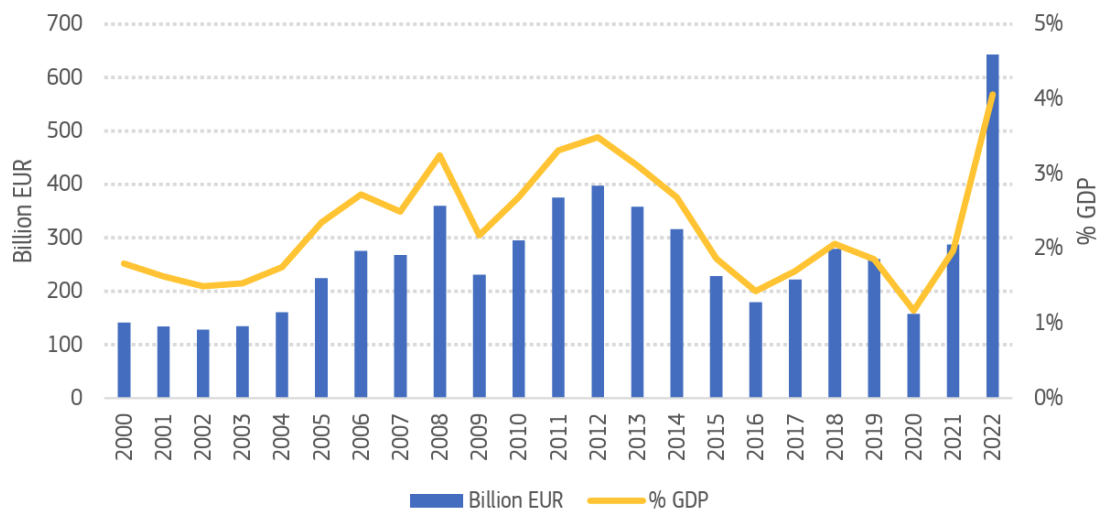
Germany's reliance on imported energy resources was once a cornerstone of its postwar economic miracle. Throughout the latter half of the 20th century, stable and relatively affordable fossil fuel imports powered Germany's industrial expansion, manufacturing excellence, and export success. This model served the country well during an era of predictable energy markets, limited global competition, and before the full understanding of climate change impacts. However, what once represented economic strength has transformed into a structural vulnerability.

Rising global energy prices, supply disruptions, geopolitical tensions, increasing competition from economies with lower energy costs, and the escalating economic risks of climate change have eroded the advantages of this import-dependent model. The 2022-2023 energy crisis wasn't merely a temporary shock but the clearest signal yet that Germany stands at a historic economic inflection point. The country now faces both an environmental and economic imperative: to fundamentally restructure its relationship with energy.

This moment represents a strategic economic opportunity to transform a centuries-old pattern of energy dependency into a new model of resource efficiency, productivity, and resilience that addresses climate risks while strengthening Germany's economic foundation.

On an EU level imports of fossil fuels have historically weighed heavily on the block's trade balance. On average in 2000-2021, gross imports of fossil fuels represented about 20% of total merchandise imports, equivalent to 2.8% of GDP. With the surge in energy prices in 2022, gross fossil fuel imports rose to more than EUR 800 billion, equivalent to 5.1% of GDP and 26.9% of merchandise imports, the

highest level in the past two decades relative to GDP. On a net basis (imports minus exports), fossil fuel imports represented EUR 640 billion in 2022 or 4.1% of GDP, compared to an average of 2.2% of GDP in 2000-2021.



*Based on Eurostat's trade data for CN code 27, with the exclusion of codes 2712, 2714, 2715 and 2716.*

*Source: Eurostat.*

### Natural Gas Imports

In 2023, Germany imported 968 TWh of natural gas (down from 1,441 TWh in 2022)<sup>1</sup> while rapidly diversifying supply sources. Norway, the Netherlands, and Belgium now provide 91%<sup>2</sup> of imports, completely replacing Russian pipeline gas, which fell from 21% to zero.<sup>3</sup> This shift, while necessary, has been challenging. Sanctions effectively reduced Germany's traditional energy supply channels, requiring rapid adaptation of the energy infrastructure.<sup>4</sup>

### The Economic Impact of Fossil Fuel Imports

The EU's fossil fuel import bill reached €427 billion in 2023 (2.5% of EU GDP)<sup>5</sup>, with Germany bearing a substantial portion as the bloc's largest economy.<sup>6</sup> Germany's fossil fuel imports in 2024 alone cost €109 billion<sup>7</sup>, creating a €76.5 billion trade deficit in this category - a substantial outflow of capital that could be significantly reduced through efficiency measures.

<sup>1</sup> Bundesnetzagentur, "Monitoring Report 2024 - Summary," 13 February 2025, p. 31

<sup>2</sup> Ibid, p.31

<sup>3</sup> Ibid, p.31

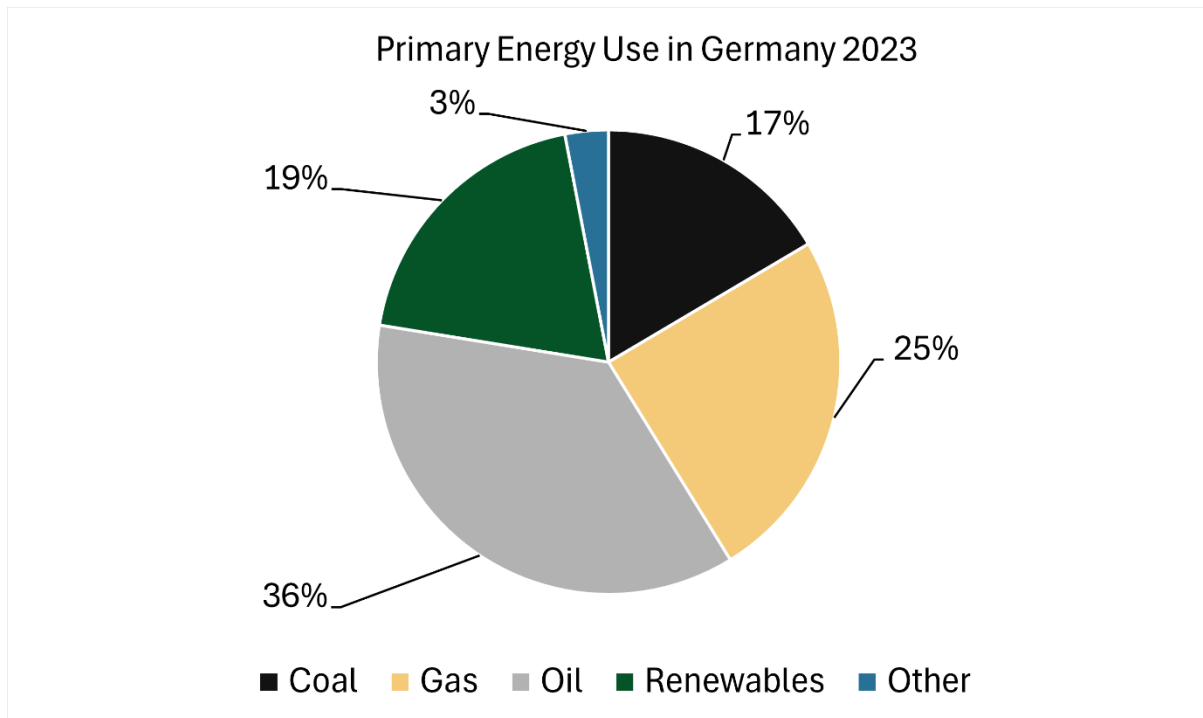
<sup>4</sup> Harvard International Review, Lontay Oliver, "Germany's Energy Crisis: Europe's Leading Economy is Falling Behind"

<sup>5</sup> European Commission, "2025 report on energy prices and costs in Europe," 26 February 2025, p. 2

<sup>6</sup> Eurelectric, "Energy Security in the Age of Electricity," 13 February 2025, p. 20-22

<sup>7</sup> Statistisches Bundesamt (Destatis), Exports and imports (foreign trade): Germany, years, classifications of trading goods, Category WA27, 2024

The below chart demonstrates that the majority of primary energy use in Germany is provided by fossil fuel imports:



Source: Umweltbundesamt

## The Energy Efficiency Opportunity

Efficiency offers cost-effective import reduction.

Energy efficiency represents the most cost-effective approach to reducing import dependence.

By focusing on energy efficiency, Germany can achieve multiple benefits:

- **Economic Impact:** A 20% reduction in Germany's fossil fuel imports would save approximately €120 billion over five years from the country's €600 billion five-year fossil fuel import bill. This represents a significant improvement to Germany's trade balance, where fossil fuel imports currently create a significant deficit.
- **Energy Security:** The 2022-2023 energy crisis highlighted Germany's vulnerability to supply disruptions. Germany still imported 968 TWh of natural gas in 2023<sup>8</sup> despite diversifying supply sources. Each 1% reduction in consumption represents approximately 9.7 TWh less imported gas.
- **Infrastructure Benefits:** Germany's annual peak load reached 73.7 GW in December 2023.<sup>9</sup> Efficiency measures targeting this peak demand can deliver disproportionate benefits, reducing both imported energy needs and infrastructure investments.

<sup>8</sup> Ibid, p.31

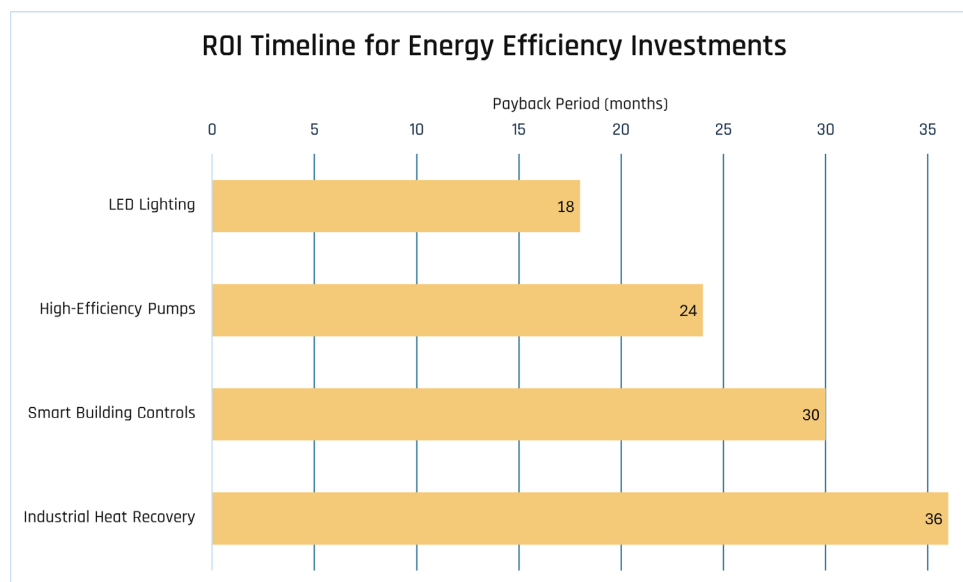
<sup>9</sup> Bundesnetzagentur, "Monitoring Report 2024 - Summary," 13 February 2025, p.14

### Case Study: High-Impact Efficiency Technologies

A wide range of proven energy efficiency technologies offer immediate savings potential for Germany. These technologies already exist and have demonstrated their effectiveness for many years – we simply need to accelerate their widespread adoption across the country.

LED lighting represents a significant opportunity in commercial and industrial sectors as well as for public street lighting. Modern LED systems offer 50-80% lower energy consumption, superior light quality, longer lifespan (up to 25,000 hours), and reduced maintenance costs compared to conventional lighting.

For industrial customers who consumed 302.3 TWh in 2023,<sup>10</sup> energy-efficient lighting systems represent a significant savings opportunity. Modern LED systems can substantially reduce energy consumption while providing superior light quality, longer lifespan (up to 25,000 hours), and reduced maintenance costs. LED retrofits typically offer 1-3-year payback periods, with substantial savings continuing for decades.



Source: Eurelectric, "Energy Security in the Age of Electricity," 13 February 2025

Similarly, pumping systems across water utilities, chemical processing, and manufacturing often operate inefficiently. High-efficiency pumps with variable frequency drives can reduce energy consumption by 30-50%, while proper sizing and maintenance yield additional 10-20% savings.

With pumping systems typically accounting for 10-20% of industrial electricity use, optimization could deliver 15-30 TWh in annual savings. These savings would directly benefit energy-intensive sectors where energy represents 5-10% of production costs, significantly enhancing competitiveness.<sup>11</sup>

<sup>10</sup> Ibid, p. 7

<sup>11</sup> Statistisches Bundesamt (Destatis), Exports and imports (foreign trade): Germany, years, classifications of trading goods, 2024

Both technologies offer rapid returns on investment:

- LED lighting: 18-month average payback<sup>12</sup>
- High-efficiency pumps: 24-month average payback<sup>13</sup>
- Combined potential: 30-45 TWh annual savings<sup>14</sup>

The implementation of these technologies has already demonstrated success. Municipal LED lighting conversions across Germany show considerable savings, while industries that have upgraded pumping systems report both energy savings and improved operational reliability.

### **The Renewable Energy Connection**

Germany's energy efficiency efforts are complemented by its growing renewable energy sector. In 2023, renewable generation increased by 12.2% to 265.9 TWh,<sup>15</sup> accounting for 53% of gross electricity consumption.<sup>16</sup> Solar output rose 17.5%<sup>17</sup> while onshore wind added 16.3 TWh<sup>18</sup>.

However, despite its impressive 53% renewable share,<sup>19</sup> Germany's renewable infrastructure remains insufficient to provide the stable supplies required by its massive industrial base. This gap between renewable capacity and the demands of energy-intensive industries underscores the need for complementary strategies.

This gap emphasizes why pursuing efficiency alongside renewables is crucial, efficiency makes the existing renewable capacity more effective while reducing overall system costs.

## **Macroeconomic Benefits of Energy Efficiency**

Economy-wide benefits beyond individual cost savings.

The national-level benefits of energy efficiency extend far beyond individual cost savings for businesses and consumers. A comprehensive energy efficiency strategy delivers multiple economic advantages:

### **Enhanced Energy Security**

By diversifying energy sources and reducing reliance on imports, Germany can shield its economy from price shocks and geopolitical risks.<sup>20</sup> The economic challenges Germany currently faces stem from three key energy factors: disruptions to Russian natural gas imports following the invasion of Ukraine, the

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<sup>12</sup> Eurelectric, "Energy Security in the Age of Electricity," p. 17-18

<sup>13</sup> Ibid, p.17-18

<sup>14</sup> Ibid, p.17-18

<sup>15</sup> Bundesnetzagentur, "Monitoring Report 2024 - Summary", p. 7

<sup>16</sup> Ibid, p. 7

<sup>17</sup> Ibid, p. 8

<sup>18</sup> Ibid, p. 8

<sup>19</sup> Harvard International Review, Lontay Oliver, "Germany's Energy Crisis: Europe's Leading Economy is Falling Behind"

<sup>20</sup> Ibid, p. 25

phase-out of nuclear power plants, and the still-developing transition to renewable energy infrastructure.<sup>21</sup>

### **Reduced Trade Deficits**

Germany's substantial expenditure on fossil fuel imports significantly impacts its trade balance. The country imported 968 TWh of natural gas in 2023, along with considerable volumes of oil and coal.<sup>22</sup> Reducing these imports would directly improve Germany's trade balance.<sup>23</sup> The targeted €120 billion in savings over five years would reduce Germany's energy trade deficit significantly, representing a material structural improvement in the country's economic position. This reduction would not only strengthen the euro but also increase fiscal flexibility for other critical investments.<sup>24</sup>

### **Price Stability**

Energy efficiency measures help stabilize energy prices by reducing peak demand. In 2023, the average day-ahead wholesale electricity price was €78.51/MWh, 17.5% lower than the previous year's average of €95.18/MWh.<sup>25</sup> Further efficiency improvements could help maintain this downward pressure on prices.

### **Job Creation**

The energy efficiency sector has significant potential to generate new jobs in Germany, particularly in retrofitting buildings and implementing industrial efficiency projects. This contributes to economic growth beyond direct energy savings.<sup>26</sup>

## How Businesses and Consumers Can Benefit

Tangible benefits beyond lower energy bills.

For German businesses and households, energy efficiency investments offer multiple benefits:

### **Lower Costs & Enhanced Competitiveness**

Energy-saving measures reduce electricity bills—household prices fell from 45.19 to 41.59 ct/kWh in 2023-2024,<sup>27</sup> while industrial prices dropped by 13%.<sup>28</sup> Further efficiency improvements can drive additional savings, making German businesses more competitive internationally.

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<sup>21</sup> Harvard International Review, Lontay Oliver, "Germany's Energy Crisis: Europe's Leading Economy is Falling Behind"

<sup>22</sup> Bundesnetzagentur, "Monitoring Report 2024 - Summary," 13 February 2025, p. 31.

<sup>23</sup> Eurelectric, "Energy Security in the Age of Electricity", p. 21-22

<sup>24</sup> Statistisches Bundesamt (Destatis), Exports and imports (foreign trade): Germany, years, classifications of trading goods, 2024

<sup>25</sup> Bundesnetzagentur, "Monitoring Report 2024 – Summary", p. 19

<sup>26</sup> Ibid, p. 15

<sup>27</sup> Ibid, p. 23

<sup>28</sup> Ibid, p. 22



### Protection from Price Volatility

The 2022 crisis saw wholesale electricity prices spike to €699.44/MWh, compared to €202.73/MWh in 2023.<sup>29</sup> Efficiency measures provide a buffer against such volatility.

### Sustainability Advantages

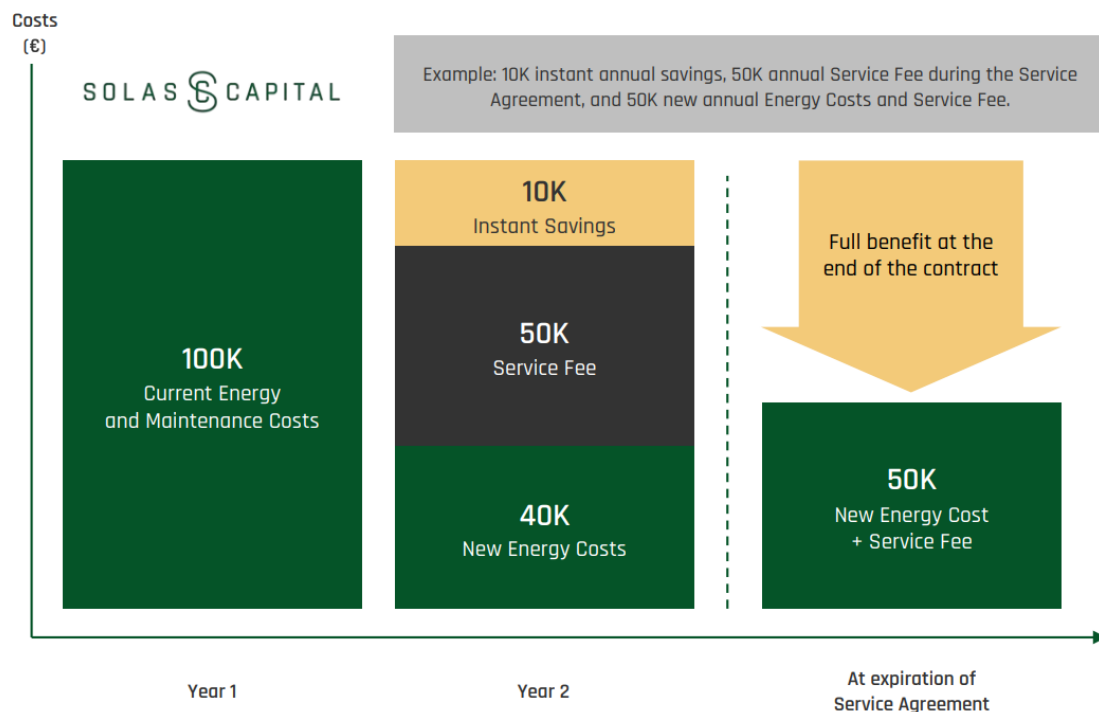
Energy efficiency aligns with decarbonization targets while capitalizing on the growing share of green electricity (54% in 2023, up from 43% in 2022).<sup>30</sup>

### Financing Energy Efficiency Investments

The initial investment costs for energy efficiency improvements often present a significant barrier. However, the Energy-as-a-Service model is transforming this landscape by removing this obstacle entirely.

This innovative approach allows businesses and consumers to implement energy efficiency measures with zero upfront costs. Through long-term service contracts (typically 8-15 years), energy consumers simply pay a regular service fee that is consistently lower than their previous energy costs. This creates immediate positive cash flow from the first year of implementation. When the contract period concludes, the consumer receives the full benefit of the energy savings with dramatically reduced ongoing energy costs.

The below chart provides an example of the economics for an energy user entering into an energy as a service agreement:



<sup>29</sup> Ibid, p. 19

<sup>30</sup> Ibid, p. 21

For Energy Service Companies (ESCOs), this model creates significant growth opportunities by allowing them to focus on their core technological expertise and implementation capabilities without carrying the full financial burden of projects. The financing structure can be arranged off-balance sheet for both consumers and ESCOs, substantially increasing the number and scale of projects that can be undertaken simultaneously.

Institutional investors gain access to an attractive asset class that combines compelling returns with meaningful climate impact. Energy efficiency project debt investments generate stable, long-term cash flows without electricity price risk due to fixed long term offtake agreements. The portfolio approach spreads risk across different countries, technologies, and energy consumers, while the essential nature of the underlying energy assets significantly reduces default concerns—even during economic downturns, buildings still require lighting, heating, and cooling systems to operate.

The energy efficiency financing market represents a true win-win-win scenario: consumers immediately reduce costs, project developers expand their business potential and create local jobs, and investors receive attractive returns while making a substantial contribution to climate goals with measurable CO<sub>2</sub> reductions.

## The Institutional Investment Opportunity

Energy efficiency project debt – A green fixed-income alternative.

For institutional investors seeking stable, long-term returns with meaningful climate impact, energy efficiency project debt represents a compelling opportunity. These investments offer several distinct advantages compared to traditional green investments:

- fixed and long-term cash flows through contractual off-take agreements that eliminate electricity price risk;
- extremely diversified counterparty exposure across public sector, large corporates, SMEs, and residential customers;
- limited correlation to traditional asset classes; and
- energy efficiency assets are typically essential for building operations, meaning payments continue even during economic downturns.

The projects align with Art. 9 SFDR requirements and EU Taxonomy eligibility, satisfying increasingly stringent ESG mandates.

With energy efficiency representing over 40% of emissions abatement needed by 2040 according to the International Renewable Energy Agency's (IRENA) 2050 scenario, and the EU's Energy Performance of Buildings Directive driving regulatory momentum, institutional capital can play a pivotal role in addressing the €150+ billion annual funding shortfalls for building efficiency.<sup>31</sup>

By investing in highly diversified portfolios of energy efficiency projects through specialised asset managers, institutional investors can achieve attractive risk-adjusted returns while directly advancing the energy transition and European energy security.

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<sup>31</sup> <https://www.bruegel.org/external-publication/financing-european-unions-buildings-decarbonisation-strategy>

## Conclusion: From Costs to Savings

Transforming from energy cost focus to energy savings strategy.

Germany stands at a critical economic inflection point, with a unique opportunity to fundamentally reimagine its energy strategy. The conventional framing of the energy transition as a cost burden has obscured the substantial economic benefits available through energy efficiency investments. By strategically investing in proven efficiency technologies—particularly LED lighting and high-efficiency pumps—Germany can redirect a significant portion of its €600 billion five-year fossil fuel import bill back into its domestic economy while simultaneously strengthening energy security and accelerating environmental progress.

Our analysis demonstrates the concrete macroeconomic returns of this approach: a 5% reduction in fossil fuel imports retains €30 billion within the German economy, a 10% reduction retains €60 billion, and achieving the targeted 20% reduction would retain approximately €120 billion. These aren't abstract figures but real resources that can strengthen Germany's economic foundation, improve its trade balance, create jobs, and enhance the competitiveness of its industries in global markets.<sup>32</sup>

The data clearly shows that energy efficiency represents one of the fastest, most cost-effective paths to economic strengthening through reduced import dependency. As renewable energy generation continues to grow—now accounting for 53% of total electricity generation<sup>33</sup>—the synergy between clean energy production and enhanced efficiency creates a powerful economic engine driving Germany's future prosperity and stability.

Germany's economic future depends not just on transforming how energy is produced, but fundamentally revolutionizing how it is used. By embracing efficiency as a core economic strategy, Germany strengthens against external shocks and lead Europe's transition to a more secure and sustainable economic future.

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<sup>32</sup> Statistisches Bundesamt (Destatis), Exports and imports (foreign trade): Germany, years, classifications of trading goods, 2024

<sup>33</sup> Ibid, p. 7

**About Sebastian Carneiro**

Sebastian Carneiro is the Chief Executive Officer and Co-founder of Solas Capital AG, a specialised investment advisory firm that pioneers financing solutions for decentralised energy efficiency and behind-the-meter assets across Europe. Sebastian has over 15 years of experience in project finance, including his previous role as Director at Europe's largest private energy efficiency fund. As a CFA Charterholder and engineer by trade, Sebastian is driven by developing innovative investment solutions that accelerate the deployment of green assets and make the energy transition a reality.

**About Antonia Bader-Lang**

Antonia Bader-Lang is the Investment and Compliance Officer at Solas Capital. She brings more than 4 years of infrastructure portfolio management experience, specializing in illiquid assets debt. Her expertise in due diligence and fund setup supports the company's operational efficiency and strategic growth.

**About Solas Capital**

At Solas Capital we provide specialised financing solutions for demand-side energy projects, bridging the gap between institutional investors and high-impact energy efficiency projects. Unlike traditional renewable energy investments focusing on supply, we specialise in reducing energy demand at scale—an often-overlooked but equally important pillar to reach Net-Zero.

We focus on the building sector—responsible for 40% of Europe's energy consumption—and industrial efficiency, providing capital to project developers to offer zero upfront cost solutions. Our team of experts structures funding solutions for distributed energy transition projects across Europe, delivering cost savings while reducing fossil fuel dependence.

Our asset-backed private credit strategy offers investors fixed-income like returns from EU Taxonomy aligned assets while accelerating Europe's transition to a carbon-neutral economy. We firmly believe that the best energy is the energy we don't use.

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## Disclaimer

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