

System Efficiency Europe

Energy efficiency: Europe's strategic anchor for competitiveness and security

By Dan Jørgensen, Commissioner for energy and housing, European Commission

Europe stands at a defining juncture in its clean energy transition. As we gather for the fifth edition of European Energy Efficiency Day, co-organised by the European Commission and the European Alliance to Save Energy at the European Parliament, our shared vision has never been more pressing. In the face of persistent geopolitical shifts and volatile markets, energy efficiency is no longer viewed solely through the lens of emissions reduction: it has become a strategic imperative of European competitiveness, energy sovereignty, and economic resilience.

Our focus must look across the entire energy system, from production and distribution networks to industry, transport, and buildings. While Europe continues to make strides in expanding clean power generation, generation alone cannot deliver our transition. As we step firmly into an electrified era, energy efficiency ensures our system remains affordable and stable. Demand-side optimization, waste heat recovery, and grid flexibility are essential to avoid overstretching infrastructure, contain network costs, and safeguard industrial competitiveness.

Energy efficiency is equally integral to Europe's housing and social priorities. By unlocking public and private investment, accelerating building renovations, implementing the Energy Performance of Buildings Directive (EPBD), and modernising heating and cooling solutions, we provide tangible relief to citizens: lowering structural energy bills, alleviating energy poverty, and creating quality local jobs. Delivering on these priorities requires both immediate action and a continuous global commitment. The international momentum built at the 11th IEA Annual Global Conference on Energy Efficiency in Montreal this past June must now carry forward. As we look ahead to COP31 in Antalya, Türkiye, this November, Europe must demonstrate how domestic implementation of our current *acquis* underpins our international standing and shapes a modernised post-2030 energy framework.

This edition of System Efficiency Europe provides a vital forum for public and private stakeholders to exchange ideas and spotlight the financing and technical solutions needed to build an energy-smart Union. On this European Energy Efficiency Day, I invite all leaders across policy, finance, industry, and civil society to join our shared effort to anchor system efficiency at the heart of a secure, affordable, and competitive Europe.



Contents

- | | | | |
|-----------|--|-----------|--|
| 4 | European Energy Efficiency Day: time for Europe's efficiency industry to act as one
By Monica Frassoni | 34 | Europe is running the energy transition with an unnecessary backpack
By Andreas Gürtler |
| 6 | System efficiency in action
By Sergio Andreis | 36 | Energy efficiency has a maintenance problem
By Gusts Kossovics |
| 8 | Europe's AI future: solving the energy equation is crucial
By Laurent Bataille | 38 | Feeling the Heat: Why Energy Efficiency is Energy Security
By Jean-Christophe Krieger |
| 10 | Energy efficiency: the foundation of European energy security
By Flaminia Bonanni | 40 | From cooling to heat recovery: a broader approach to data centre energy efficiency
By Andrea Martin |
| 12 | How system energy efficiency unlocks resilience
By Björn Burbach | 42 | Cost-effective electrification plan starts with energy efficiency
By David McMahon |
| 14 | Financing energy efficiency in Europe: what's at stake as the EU redraws its budget
By Francesca Canali | 44 | Buildings can become Europe's hidden grid asset
By Robert Nuij & Anette Persson |
| 16 | Investing in efficiency, investing in Europe
By Annalisa Corrado | 46 | Energy efficiency, the EU's invisible ally to break the fossil fuel cycle
By Seda Orhan |
| 18 | The power paradox: why mass electrification fails without energy efficiency
By Justine Bernard & Margareta Djordjevic | 48 | Urban nature delivering energy efficiency
By Steven Peck |
| 20 | Energy security starts with efficient buildings
By Shiraz Dromi | 50 | The Energy Efficiency tree
By Luigi Petito |
| 22 | From energy challenges to young innovators: building the skills for Europe's green transition
By Diana Flilip | 52 | Lighting's untapped potential for Europe's energy transition
By Elena Scaroni |
| 24 | Energy efficiency is a competitive advantage for Europe
By Niels Flemming Hansen | 54 | Europe does not have an energy-efficiency technology problem. It has a deployment problem
By Peter Trillingsgaard |
| 26 | Europe has an implementation gap, not a technology gap
By Stefan Floek | 56 | A 2040 EU energy efficiency target: not a question, an imperative
By Arianna Vitali Roscini |
| 28 | AI's next constraint is physical: Why Europe must manage water and energy as one system
By Thais Gervasio | 58 | The Smart Store: Building Europe's most energy-efficient supermarket
By Andrea Voigt |
| 30 | The energy-security switch Europe has not yet flipped
By Mario Giordano | 60 | Energy Efficiency after 2030: Think systemically
By Andrea Wechsler |
| 32 | We have a system problem. Efficiency is a capacity solution
By Paula Glover | | |

System Efficiency Europe

System Efficiency Europe is the official magazine of European Energy Efficiency Day. European Energy Efficiency Day 2026 is co-organised by the European Alliance to Save Energy (EU-ASE) and the European Commission's DG ENER. The magazine brings together ideas, insights and projects showcasing the people, innovations and solutions driving Europe's energy-efficiency transition. The silver, mirror-finish title of this magazine helps to reflect on what system efficiency means. As you look at the title, you see yourself reflected in it, whether you are a policymaker, an industry leader, a civil society representative or another stakeholder. Because system efficiency is you: we are not separate actors and we all have a role to play to make our energy system more efficient, competitive and secure.

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European Energy Efficiency Day: Time for Europe's Efficiency Industry to Act as One

By Monica Frassoni, President, European Alliance to Save Energy

On 15 October, European Energy Efficiency Day returns to Brussels for its fifth edition — this year co-organised with the European Commission's DG ENER for the first time.

This partnership is itself a signal: energy efficiency is a central pillar of Europe's competitiveness and security agenda.

The evidence has been in front of us for years. Without the efficiency legislation Europe has adopted over the past two decades, the EU would need around 31% more energy today than it currently consumes. Every crisis since 2022 has reinforced the same point: the fastest, cheapest and most secure energy is the energy never used.

The technologies are mature, the economic case is proven, we need the policy signal from Brussels to be more explicit. The real question, then, is not whether efficiency matters, but whether the industrial ecosystem that delivers it is organised enough to convert that recognition into investment, jobs and results.

Three things need to happen, and for all three of them we believe that European Energy Efficiency Day can represent a powerful push.

First, the sector needs to speak as one ecosystem, not a collection of separate markets. Insulation, heat pumps, building automation, industrial motors, lighting, process optimisation, energy management systems and many other technologies and solutions together form one of Europe's largest and most innovative industrial value chains, employing hundreds of thousands of people on European soil. Different sectors have different demands, but we can work to make sure that this variety of technologies and solutions are part of a system and not a conflicting set of asks that would confuse policy makers.

The efficiency industry deserves a permanent seat wherever Europe's energy and industrial strategy is decided, starting with the Energy Union Task Force, and it will only earn that seat by presenting one voice and few common messages.

“ Second, the sector needs to invest in its own visibility. A good story does not sell itself: it needs good communication accompanied by data that policymakers can refer to, and a constant presence in the debate. The efficiency industry's story - lower bills, lower import dependency, cleaner air, increase competitiveness and security, European jobs - is a strong one. It only needs to be told consistently.

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Third, stability of the financial and legislative framework is the precondition for investment. Companies commit capital, hire and scale up when the regulatory and financial framework is predictable.

The Energy Efficiency Directive, the Energy Performance of Buildings Directive, the ecodesign rules are strong instruments on paper; what is missing is consistent transposition and enforcement across Member States, the security that they will not be reopened, and a financial architecture that treats efficiency as a priority and foresees reliable public funding, ETS revenues redirected to the transition, and a State Aid framework that puts savings on equal footing with generation.



Every delay in transposition, every reopening of agreed rules, is a cost that lands directly on the industry's balance sheet and on citizens' energy bills. Achieving this goal depends mostly on our capacity to deliver on points one and two.

This summer was another reminder of why this matters. Record heat put real strain on Europe's grids and on people's daily lives. For this efficiency is the fastest and most immediate answer we have, and the solutions are ready to deploy today.

European Energy Efficiency Day marks a further step in the consolidation of a strong and effective energy efficiency industrial ecosystem. It is time to organise accordingly.

System efficiency in action

By Sergio Andreis, Executive Director, Kyoto Club

As the International Energy Agency put it: system efficiency offers new benefits as electrification and renewable energy transform leading energy markets. The electrification of heating and cooling, road transport and industrial processes is driving higher peaks in electricity demand, increasing its hourly, daily and seasonal variability. At the same time renewable energy is taking on an increasing share of electricity production, thereby increasing variability on the supply side.

System efficiency - provided through new digital technologies that enable improved management and control as well as energy savings – is helping the consumer manage this increase in variability on both the supply and demand side.

System efficiency helps bring down consumer bills and other costs as more straightforward energy efficiency opportunities become exhausted.



Flexibility – the ability to rapidly adjust supply or demand in response to a signal such as price – is today sourced primarily from the ability to turn thermal generation supply up and down, as well as from large-scale hydropower and, increasingly, battery storage.

The publication 105 Buone pratiche di efficienza energetica made in Italy (105 made in Italy energy efficiency good practices) published in 2026 in our Kyoto Books series, the members of our energy efficiency and digital transformation Working Group have started collecting, analyzing and assessing Italian system efficiency success stories.

The first 35 of them have been published and are being used to inform decision makers in the Italian Parliament, as well as to establish a working relation with Dr. Lara Ponti, the Vice-president for Environmental Transition and ESG Goals, of Confindustria – the main association representing manufacturing and service companies in Italy.

“The energy transition exemplified by these cases acts as a genuine driver of competitiveness and showcases our country's excellence, rebuilding confidence in Italian know-how and expertise that stands out in Europe and globally while fostering sustainable development.

These cases demonstrate that it is possible to give a voice to innovators. They highlight Italian supply chains investing in electrification and energy efficiency because they excel at it and find it truly advantageous.

The experiences gathered show that scaling up these efforts is within reach, thanks to technologies and processes ready to make it happen. This is a facet of Made in Italy that deserves to be known, understood, and supported by policymakers, the market, and institutions”.

With these words, Laura Bruni, Strategic Alliances and Institutional Affairs Director of Schneider Electric Italy and Working Group Coordinator has introduced the document produced through the collaboration of all Kyoto Club member companies participating in the Group.

As part of our Digital & Sustainable Conversations online seminar series, last June 22nd, the Working Group hosted the webinar Energy Sovereignty, Competitiveness, and Sustainability.

During the event, industry experts discussed the value of these case studies, demonstrating that choosing sustainable development is both feasible and beneficial.

Europe's AI future: solving the energy equation is crucial

By Laurent Bataille, EVP Europe Operations, Schneider Electric

AI is reshaping every sector, as well as economic powers. Despite accounting for roughly one fifth of the world economy, Europe currently holds only around 4–5% of global compute capacity. Closing that gap will require building more data centers, the physical backbone of AI and cloud services. But the key question increasingly facing developers is not where they can find land, capital, or favorable regulations, but how they power their sites – and how to ensure their infrastructure's sustainable growth.

Data centers are often discussed solely as large consumers of energy and other resources. This means that they must be planned to work with the energy system from day one: located where clean power and grid capacity already exist, designed to use that power effectively and efficiently, and operated to support local energy resilience rather than strain it. Technology is also evolving to support this, such as with simulation software, new cooling technologies like liquid cooling, next generation power architecture, and predictive operation and maintenance.



And this is already happening.

For example, Start Campus in Sines, Portugal is developing a major AI-ready data center campus on repurposed industrial land near a former power station.

Its first facility, SIN01, is powered with 100% renewable electricity and uses connected power infrastructure, real-time operational insight, and sustainability services to support its growth. It demonstrates the advantage of matching digital infrastructure with the right location: access to renewable power, high-voltage grid connections, and land already suited to industrial use.

EcoDataCenter in Falun, Sweden, illustrates the next step looking at system efficiency: treating energy efficiency as a whole-system opportunity. The site combines renewable power, digital energy management, and heat reuse, reducing losses within the facility while creating value beyond it.

While data centers can consume a lot of energy, they can be powered for good too, and heat reuse is a prime example.

While getting the site running securely matters, so does speed. Prefabricated, modular data-center solutions shift much of the engineering, assembly, and testing into a controlled factory environment. Standardized building blocks such as integrating power, cooling, racks, UPS, and control systems can make deployment faster, more flexible, and more reliable than traditional site construction, while enabling system-level efficiency from the outset.

The forthcoming EU Data Centre Energy Efficiency Rating Scheme presents an important opportunity. Its success should be judged by whether it helps create a balanced, sustainable framework that enables growth while taking a long-term view of Europe's energy system.

Its success should be judged by whether it helps create a balanced, sustainable framework that enables growth while taking a long-term view of Europe's energy system. That means pairing efficiency expectations with investment in grids, clean generation, flexibility, and faster connections which contributes to the whole energy system.



To win the next phase of AI investment, the EU must act on three fronts. Removing access bottlenecks, fast-tracking approval for projects with the highest potential, and enabling grid flexibility and reliability through digitalization. Doing so will help meet AI's growing energy demands sustainably, and provide greater investment certainty.

The rules of the game have changed. The AI race is no longer just a race for chips, capital or talent. It is a race for power, efficiency and long-term sustainable growth, and Europe has yet to play its strongest hand.

Energy efficiency: the foundation of European energy security

By Flaminia Bonanni, Senior Researcher, E3G

In recent years, international geopolitical upheaval has had significant impact on the security of Europe's energy system. As EU decision-makers continue to navigate the impacts of the ongoing Hormuz crisis, they risk overlooking a key tool at their disposal: energy efficiency. Fossil import instability, hybrid warfare, cyberattacks, and market shocks are only some of the risks to which energy efficiency can provide a long-term policy response.

Upgrading infrastructure security standards, shifting to home grown renewable sources and improving network planning and cooperation are all fundamental measures to boost Europe's energy security. However, they all involve acting on assets exposed to external cyber and hybrid military threats.

Energy efficiency measures are different, a structural reduction of total energy needs cannot become a target of external attacks, weaponisation, disruption or repricing. If the best energy is that which we do not use, then it is also the energy we no longer need to import. As such, energy efficiency reinforces energy security benefits of energy efficiency measures are tangible in citizens' daily lives and across the whole economy.

Efficiency improvements over the last 20 years have significantly reduced the EU's energy consumption, which would have otherwise been approximately 27% higher today.

Every percentage point of improvement to energy efficiency, reduces EU gas imports by 2.6%.

Energy efficiency is a risk-reduction factor, acting on both security and cost dimensions simultaneously. This is to say that lower energy demand is key for supporting faster recovery in case of disruption whether from military, physical and cyberattacks and, at the same time, every unit of energy saved is an energy unit less exposed to market shocks, price volatility and supply disruptions. Failing to embed efficiency in an energy security policy toolkit increases the vulnerability of our energy system.

This is why energy efficiency deserves significant attention in upcoming European legislative files. From the upcoming revision of the EU's energy security framework to the Governance Regulation and post-2030 policy architecture, energy efficiency should be recognised as a critical lever to guarantee the EU's energy security.

Reducing reliance on volatile imports and leveraging the homegrown and reliable tool of energy efficiency measures remains the most resilient option: precisely because it depends on us, not on external factors. In a volatile international environment, where Europe's energy security has been threatened, let energy efficiency serve as the foundation of a secure, resilient energy system for the long term.

How System Energy Efficiency Unlocks Resilience

By Björn Burbach, Business Segment Head, Siemens Smart Infrastructure

Europe's energy transition is accelerating. Renewables are scaling, electrification is increasing, and climate ambitions continue to rise. Yet a critical question remains: are we building an energy system that is both efficient and resilient?

Resilience is the ability of the energy system to withstand and adapt to disruptions, from extreme weather and geopolitical uncertainty to growing demand volatility. Energy efficiency is a key enabler. By reducing demand and optimizing available resources, it eases pressure on infrastructure while improving reliability and stability. At the same time, the rapid growth of distributed energy resources, including rooftop solar, battery storage, heat pumps, and EV charging infrastructure, is increasing system complexity.



Building resilience therefore requires more than deploying additional generation capacity. It requires a smarter and more efficient energy system capable of coordinating distributed assets and responding dynamically to changing conditions. This is where digitalization becomes essential.

Seeing the Whole System Through Digitalization

Resilience starts with visibility. You cannot manage what you cannot see, especially when energy flows are no longer one-way but increasingly multidirectional. Digital platforms such as Building X connect data across buildings, infrastructure, and decentralized energy assets, transforming fragmented information into actionable insights. By breaking down operational silos, organizations can identify inefficiencies, optimize performance, and make faster, more informed decisions. Digital twins further strengthen this capability by creating dynamic representations of physical systems, from individual buildings to district energy networks. Together, these technologies improve energy performance, increase operational reliability, and support long-term planning.

Visibility alone is not enough

Resilience also requires the ability to respond and adapt. Energy Management Systems and digital building platforms convert operational data into intelligence that enables continuous optimization. This not only improves efficiency but also strengthens resilience. The results are already visible. At Breitenburger Milchzentrale, Siemens integrated hybrid Power-to-Heat technology and intelligent load management, reduces annual energy and operating costs by approximately €300,000 while improving grid flexibility.

In Vienna's Aspern Smart City, integrated building automation, digital twins, and grid intelligence achieved a 70% reduction in energy consumption and CO₂ emissions. At Estonia's Greenenergy Data Center, Siemens-enabled optimization improved operational efficiency by approximately 30%, achieving a Power Usage Effectiveness (PUE) of 1.2 compared to the industry average of 1.6. Beyond efficiency, flexibility is becoming increasingly important. Buildings, industrial processes, EV charging infrastructure, and battery storage can all respond to grid needs. Through digital orchestration, these assets can support grid balancing, respond to market signals, and absorb fluctuations from renewable generation. The result is reduced strain on the grid, improved reliability, and lower infrastructure costs.

The Road Ahead

Europe's objectives are clear: accelerate the energy transition, strengthen reliability, and improve competitiveness. Achieving these goals requires resilience to become a core design principle across buildings, industry, infrastructure, and the grid.

The next phase of the energy transition will depend not only on deploying more clean energy technologies, but also on connecting and optimizing them as an integrated system. Physical assets remain essential, providing the foundation for a decarbonized energy future. Yet it is digitalization that unlocks their full value, delivering the visibility, intelligence, and flexibility needed to make energy systems more efficient, reliable, and resilient. By combining energy efficiency, flexibility, and digitalization, Europe can build an energy system that is not only cleaner and more competitive, but also resilient enough to thrive in an increasingly complex future.



Financing energy efficiency in Europe: what's at stake as the EU redraws its budget

By Francesca Canali, Policy & Project Manager, Mira Network

Over the past five years, EU legislation on energy efficiency has developed considerably, with the recast Energy Performance of Buildings Directive setting higher performance standards for new buildings and stricter renovation targets for the existing stock, and the revised Energy Efficiency Directive reinforcing binding energy-saving targets across the EU.

Alongside this, European funding for energy efficiency has reached an unprecedented scale, with new instruments adding to traditional financial resources for energy efficiency such as Cohesion Policy funds. The launch of the Recovery and Resilience Facility in 2020, together with other funds such as the Just Transition Fund, has contributed extensively to accelerating renovation rates across Member States, though not always evenly.

Let's take Italy as an example. Italy was the largest beneficiary of the RRF, with € 194.4 billion allocated to its national plan. Of this, roughly €30 billion was earmarked for "Energy efficiency and building renovation," covering projects of renovation and the Superbonus tax incentives.

The RRF gave many Italian regions the means to finance much-needed energy efficiency projects, particularly in residential buildings. In Rome, the €13.2 million Porto Fluviale RecHouse project is converting a former military building (occupied by residents since 2003) into an A4 energy-rated building with a rooftop photovoltaic garden feeding a local energy community. The City of Rome co-designed the project with Roma Tre University and the resident community, negotiating every phase with the people who actually live there.

Similarly, in Naples, the Taverna del Ferro regeneration project follows the same logic at larger scale: €106 million in RRF and cohesion-policy funds replacing ageing public housing blocks with 28 low-rise, energy self-sufficient buildings, through a formal co-design process with third-sector organisations and residents.

With the RRF entering its final phase, and the current EU budget cycle coming to an end in 2027, EU institutions are discussing the proposal for the Multiannual Financial Framework (MFF) for 2028-2034, and EU financing for energy efficiency will change as a consequence of this shift in architecture.

The proposal for the new EU budget now on the table would merge cohesion funds into a single national plan per Member State.

In practice, this shifts programming control from the regional to the national level, as cohesion funds are historically co-managed with regions.

For energy efficiency, this shift carries particular weight, as retrofitting a building stock is never a uniform national exercise: climate zones, housing typologies, and social conditions vary enormously between regions, and it is precisely at the regional and local level that funding has historically been adapted to those differences.



These cases point to the fact that energy efficiency funding can't be delivered without the territory. Co-design with citizens, civil society organisations, universities and local and regional administrations isn't a formality, it's the mechanism that makes retrofits durable, just, and actually used. As the EU negotiates who sets the terms of the next budget, this is the practice that deserves to shape the outcome and not just in Italy, but across all EU regions to improve energy efficiency.

Investing in Efficiency, Investing in Europe

By Annalisa Corrado, Member of the European Parliament



For the third year, I am pleased to contribute to bringing the European Energy Efficiency Day to the European Parliament, together with colleagues and in close cooperation with the European Alliance to Save Energy. I value this initiative because it creates a space for policymakers, industry and civil society to discuss energy efficiency as part of the broader choices Europe must make about its economic and energy future.

Those choices are becoming more complex. Europe needs to decarbonise while maintaining a competitive industrial base, reducing energy costs, protecting vulnerable households and strengthening its security in an unstable geopolitical environment

At the same time, electrification, renewable deployment, grids and industrial transformation will require substantial investment. Energy efficiency cannot solve these challenges alone, but it can significantly reduce their scale: lower energy demand means lower costs, reduced infrastructure needs and less exposure to imported fossil fuels.

Energy efficiency should therefore be understood as part of a broader technological ecosystem, in which different solutions interact and adapt to specific industrial, territorial and energy needs. It can also enable forms of industrial symbiosis, where energy, heat, materials or by-products from one process become resources for another, reducing consumption and waste.

This is the rationale behind the European “energy efficiency first” principle: considering whether demand-side solutions can deliver the same economic and social value more efficiently before committing resources to additional energy supply and infrastructure.

Europe has already established an important framework.

The Energy Efficiency Directive sets a binding EU objective of reducing final energy consumption by at least 11.7% by 2030 compared with the 2020 projections. We are not yet on track to achieve it. The priority must therefore be effective implementation, while beginning a serious discussion about the framework beyond 2030.

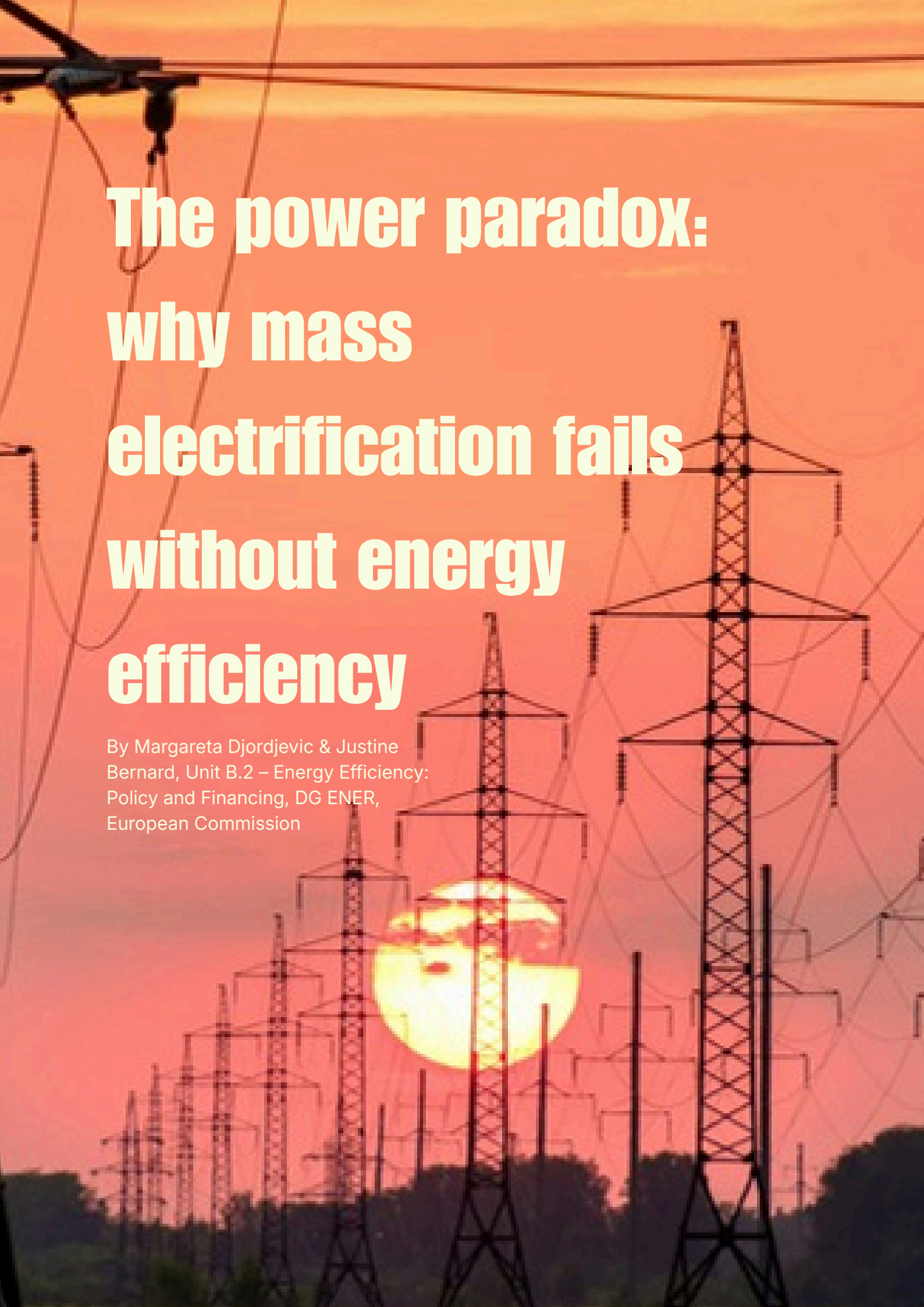
This debate comes at a delicate moment. Simplification is a legitimate objective: legislation should be workable, procedures efficient and unnecessary administrative burdens removed. But simplification should not translate into regulatory uncertainty. For businesses investing in efficient industrial processes, technologies, skills, research or production capacity, predictability matters.

These investments have long time horizons.

Rules can and should be improved when implementation experience, technological development or scientific evidence justify it. Constantly reopening recently agreed objectives for short-term political reasons is different: it risks delaying investment precisely when Europe needs to mobilise private capital for its transformation.

The European dimension is essential here. Common objectives provide a clear direction for investment while allowing Member States flexibility in choosing the instruments best suited to their circumstances. Energy efficiency is also a social policy. For households, particularly those exposed to energy poverty, structural reductions in consumption can mean permanently lower bills and better homes. Efficiency can therefore connect decarbonisation, competitiveness and social fairness. The coming discussion on Europe’s post-2030 energy efficiency framework must assess what has worked, where implementation is lagging, how investment can be mobilised and how efficiency interacts with electrification, renewables and infrastructure planning.

The European Parliament must be fully involved in these choices. The objective should not be to preserve every existing rule unchanged, but something more fundamental: a credible and predictable European direction towards an energy system that is more efficient, affordable, resilient and independent.



The power paradox: why mass electrification fails without energy efficiency

By Margareta Djordjevic & Justine
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The times when implementing energy efficiency measures was solely about achieving climate targets are past; it has become an urgent economic and strategic imperative. This strategic priority was affirmed internationally at COP28 through the Global Pledge to double the rate of energy efficiency improvements by 2030.

From the 2022 Russian invasion of Ukraine to the 2026 conflict in the Middle East, back-to-back crises have demonstrated the high cost of Europe's dependency on imported fossil fuels and volatile markets. In response, energy efficiency serves as Europe's strongest structural shield.

Beyond reducing exposure to foreign imports and safeguarding industrial competitiveness, it optimizes the entire energy system: enabling rapid electrification, integrating variable renewables through demand flexibility, recovering waste heat, and curbing costly grid overexpansion.

That foundational role is critical as the power sector transforms. Last year, Europe reached a landmark milestone: renewable sources generated half (49.9%) of all gross electricity consumed across the EU, up from 15.9% two decades ago.

Yet electricity still accounts for barely 23% of EU final energy consumption, a share that has largely flatlined over the past decade. In other words, clean electricity still fuels barely an eighth of Europe's total energy demand.

This highlights the central power paradox of Europe's transition: accelerating the shift to electricity requires consuming smarter, not merely producing more, directing capital toward high-efficiency technologies and flexing demand to match clean supply.

Globally, electricity demand is growing twice as fast as overall energy demand. Yet with European electrification stalled, the EU trails about 10 percentage points behind its 2030 targets.

That trajectory must pivot quickly: between now and 2035, European electricity demand growth is set to accelerate up to six times faster than over the past decade, propelled by electric vehicles, heat pumps, expanding cooling needs, and AI data centres.

To translate clean power into real-economy decarbonisation, electrification must scale rapidly and, as the IEA notes in announcing the "Age of Electricity", strictly in tandem with efficiency improvements across transport, heating, and industry.

The Electrification Action Plan presented by the European Commission in mid-July 2026 is a necessary step forward, and its synergy with energy efficiency must be reinforced through upcoming initiatives, including the Heating and Cooling Strategy and the post-2030 energy efficiency framework.

Delivering this future requires full implementation of the current Energy Efficiency Directive, but the policy architecture cannot stop there.

A modernised framework must evolve beyond 2030 and align efficiency with electrification, fossil fuel phase-out, system flexibility, targeted investment, and optimized grid planning.

This will ensure energy efficiency resolves this paradox and enhances Europe's competitiveness for decades to come.

Energy Security starts with efficient buildings

By Shiraz Dromi, Group Public Affairs Director at Knauf Insulation

The ongoing energy crisis in Europe are a wake-up call. After an extremely warm summer, with high demand for cooling that will only increase in the coming years, Europe is heading into another winter with very low gas reserves and increasing energy prices. Europe needs to ensure that it is ready to face these challenges.



Europe has taken many necessary short-term measures in recent years in a response to the energy crisis. While these have played an important role, they need to be complemented by long-term structural solutions, such as improving the energy performance of buildings. The answer to energy security is not only to focus on renewables, diversifying imports, investing in grids and accelerating electrification, but also to make sure that Europe needs less energy in the first place.

Energy efficiency of buildings is an important pillar of Europe's energy policy. **Buildings account for around 40% of EU energy consumption and roughly a third of energy-related greenhouse gas emissions.**

Around 75% of the building stock performs poorly in terms of energy efficiency. This is not just a climate issue. It is a structural weakness in Europe's energy system.

Every poorly insulated home increases the need for imported energy. Every winter, inefficient buildings drive up peak demand when the energy system is already under great stress. By improving the energy performance of Europe's building stock, **Europe can reduce peak demand by almost 50%.**

This could save up to €44 billion per year in distribution grid investment and also reduce total energy costs in Europe by €312 billion annually. In that sense, Europe's building stock should be seen as critical infrastructure. An energy-efficient and well-insulated building stock is more secure, more affordable and more resilient.

This is why renovation must be treated as an energy security investment. Renovating Europe's buildings could lower gas demand and imports by up to 60 billion cubic metres per year by 2040. It could also lower pressure on electricity grids, free up capacity for transport and industry, and reduce overall system costs.

Energy security is ultimately a topic also felt at home. In 2024, 9.2% of Europeans were unable to keep their homes adequately warm, and many also face difficulties keeping their homes cool in summer, a growing challenge highlighted by the 2026 heatwaves. For households, the benefits of renovation are equally tangible: lower bills, greater comfort and healthier indoor environments. A truly affordable home is one that remains affordable even when energy prices rise.

The policy implication is clear. Energy efficiency is as a core pillar of Europe's energy security strategy. That means fully implementing existing legislation, especially the Energy Performance of Buildings Directive and the Energy Efficiency Directive.

Europe cannot control every geopolitical shock or global price change. But it can control how much energy it wastes. The next phase of energy security will depend not only on producing more energy in Europe, but also on reducing demand by making buildings more energy efficient.



From Energy Challenges to Young Innovators: Building the Skills for Europe's Green Transition

By Diana Filip, Deputy & Chief Development Officer, JA Europe

Europe's energy transition is moving faster than ever, but its capacity to innovate needs to keep pace. Renewable sources made up 26.2% of the EU's gross final energy consumption in 2025, up from just 9.6% in 2004. Hitting the EU's binding target of at least 42.5% by 2030 will take a much faster rate of change than that. So the real question isn't just which technologies Europe rolls out. It's who ends up building them.



One answer turned up this summer, from a group of teenagers in Romania.

VIVO won the 2026 Schneider Electric Foundation Innovation in Energy Award for Flutter Wall, a building façade that turns wind-driven vibrations into electricity through electromagnetic induction. No turbines, no propellers, no extra land needed — just the building itself, reimaged as a source of decentralised power.

VIVO picked up the award at GEN-E, JA Europe's annual entrepreneurship festival, where young people from across Europe pitch the companies and ideas they've spent the year building.

The Innovation in Energy Award has grown alongside the Schneider Electric Foundation's involvement in it: 101 applications from 29 countries in 2025 became 348 from 39 countries this year. More Schneider Electric mentors and judges got involved, and more student teams showed up ready to take a real shot at energy and sustainability problems.

This idea is at the core of JA Europe's programmes: students learn entrepreneurship by doing it, not simply studying it.

They pick a problem worth solving, form a team, test an idea, and build a real solution with a business plan and a pitch. Industry partners bring that closer to the ground, connecting students with the problems businesses and communities are actually facing.

That model already works at scale. Between 2023 and 2026, the JA Europe–Schneider Electric Foundation partnership reached 70,220 young people, who between them set up 8,150 teams, with Schneider Electric employees mentoring, judging and speaking throughout.

The next challenge is reaching more of them. Most European teenagers still don't have access to entrepreneurship education that connects to real industry problems, let alone the green and digital skills the transition increasingly demands. Closing that gap means more programmes like this one, more industry partners willing to show up, and more students given a real problem to work on instead of a case study.

Europe won't get through its energy transition on technology alone. It needs a generation that's already practised at building the answers.

Energy Efficiency is a competitive advantage for Europe

By Niels Flemming Hansen, Member of the European Parliament, European People's Party

Energy efficiency is often presented as part of Europe's green transition. That is true, but it is far from the whole story.

For me, energy efficiency is first and foremost about Europe's economic strength. When European companies can produce more with less energy, we strengthen their competitiveness. When households and businesses use less energy, we reduce their bills. And when we reduce our overall energy consumption, we make Europe less vulnerable to volatile energy prices and dependence on energy from third countries.

This is why energy efficiency fits so naturally with the values traditionally associated with my opinions as a conservative. It ticks all the boxes: competitiveness, innovation, economic strength, security and responsible use of resources.

In my discussions with companies working on energy efficiency across Europe, it is also clear that energy efficiency is not simply a political objective. It represents a strong and innovative industrial ecosystem in its own right. It includes major companies, but also thousands of SMEs and micro-enterprises developing technologies, services and solutions that can help Europe use energy more intelligently. This European industrial base is an asset we should protect and strengthen.

That also means recognising the opportunities that come with the next phase of Europe's energy transition. Electrification and digitalisation are increasingly changing the way we produce, distribute and consume energy. Smart technologies, better data and more flexible energy systems can help businesses and households reduce consumption while making better use of the energy available.

I as European policymaker have an important role to play in making this happen. We need a clear, stable and predictable regulatory framework that gives companies the confidence to invest and allows both public and private capital to flow towards solutions that work.

Good policy should create the conditions for innovation and investment, not unnecessary administrative burdens. The energy shocks of recent years have demonstrated just how exposed Europe can be to volatile energy prices and external dependencies. Energy efficiency is one of the most concrete tools we have to reduce this vulnerability. Every unit of energy we do not need is energy we do not have to import, pay for or secure from an uncertain external source.

We should therefore focus on properly implementing and transposing the existing European energy-efficiency framework. It is the result of many years of work and difficult negotiations. Rather than constantly reopening the rules, we should make sure that they work effectively in practice and provide the certainty that businesses and investors need. Our focus should increasingly be on the period after 2030. This is where we have an opportunity to build on the progress already made and ensure that energy efficiency remains a pragmatic cornerstone of a European economy.

Energy efficiency should not be seen as yet another burden placed on European businesses. It should be recognised for what it increasingly is: an investment in a stronger European economy, a more resilient industry.



Europe has an implementation gap, not a technology gap

By Stefan Floeck, Division President, IEC Low Voltage Motors, ABB

Europe's industrial ambition has rarely been more clearly stated, or more urgently needed. Across the continent, rising energy costs and decarbonization commitments are reshaping the economics of industry and driving industrial electrification.

The recently published EU Electrification Action Plan sets out a compelling vision: doubling Europe's electrification rate from 23% to 46% and saving up to €260 billion per year on fossil fuel imports by 2040. But electrification can only deliver its full economic and environmental benefits when paired with greater energy efficiency. The Action Plan recognizes this, positioning energy efficiency as a key enabler of electrification and reinforcing the Energy Efficiency First principle.

Industrial electric motors are the untapped opportunity

Industrial electric motors account for 60% of global industrial electricity demand. Yet around half are over 10 years old, meaning much of industry is missing out on a decade of innovation in efficiency and performance.

This represents far more than an energy challenge. It is a competitiveness challenge. Every unnecessary kilowatt-hour consumed increases operating costs, weakens productivity and places additional demand on already constrained electricity infrastructure.

The IEA states that upgrading the global installed base of motor-driven systems could cut global electricity consumption by up to 10%, freeing up grid capacity for other needs. Technology is here today, and the business logic is equally compelling.

At a time when energy affordability has become a strategic concern for European industry, the economic case for action has never been stronger. Payback periods that once spanned several years can increasingly be measured in months.



Closing the execution gap

The challenge facing Europe is no longer technological. It is operational. Across European industry, efficiency investments are routinely undermined by siloed decision-making, capex-focused procurement, and a lack of total cost of ownership discipline. The IEA's Montreal Collaboration Framework, 2026, identified this gap directly: deployment is falling far short of what is needed, held back by fragmentation and financing barriers. The Framework's call was clear – move efficiency from the plant floor to the boardroom and become a strategic business priority.

Advances in motor technology mean organizations can achieve significant gains in efficiency without compromising reliability, productivity or operational performance. For example, choosing an ABB IE6 SynRM motor over IE4 induction technology in a typical application can deliver €51,200 in energy cost savings and 92,200 kg of CO₂ reduction over a 20-year service life – with a return on investment of just 8 months. That's just one motor. The results at fleet level are even more significant.

At Aurubis' Pirdop plant in Bulgaria – home to Europe's largest copper producer – replacing 460 motors with ABB IE5 SynRM and IE4 Process Performance technology is delivering a 28% reduction in energy consumption. Aurubis is now on track to save 25 GWh of electricity every year, equivalent to the annual energy use of 823 EU homes.

The results speak to what becomes possible when efficiency is treated not as a compliance exercise but as a strategic lever for competitiveness and growth.

“

The challenge facing Europe is no longer technological. It is operational. Across European industry, efficiency investments are routinely undermined by siloed decision-making, capex-focused procurement, and a lack of total cost of ownership discipline.”

The time to act is now

By modernizing industrial motor systems, Europe can cut energy consumption, lower costs, strengthen industrial resilience, and boost competitiveness. Upcoming legislation on public procurement, Energy Efficiency Directive, and ecodesign will be key to bridge Europe's implementation gap.

The technology exists. The opportunity is clear.

The question is no longer whether Europe should act, but whether it can act with sufficient speed and scale.

AI's next constraint is physical: Why Europe must manage water and energy as one system

By Thais Gervasio, Senior Vice President and General Manager, Water Solutions Europe, Ecolab

AI may be digital, but its next constraint is physical. Behind every model sit chips that generate unprecedented heat, electricity that powers them, water used in power generation and cooling, and communities that must trust new infrastructure. By 2030, AI could require electricity comparable to India's annual demand and water equivalent to the annual drinking needs of the United States. The question is therefore not whether Europe can build more computing capacity, but whether it can deliver more compute with fewer resources; and without compromising reliability.



Cooling is the operational pivot. It connects heat, power and water, yet data centres too often optimise Power Usage Effectiveness (PUE) and Water Usage Effectiveness (WUE) separately. Dry cooling can reduce on-site water withdrawals but increase electricity demand; and electricity generation itself can carry a significant water footprint. Evaporative systems can be energy-efficient but depend more heavily on local water. Direct-to-chip liquid cooling handles much higher loads through closed loops and can reduce the burden on facility cooling.

There is no universal cooling solution. Cooling strategy must start with the system, not with a preferred technology. A solution that works in one data centre may perform very differently in another, depending on climate, water availability and quality, the local power mix and the intensity of the computing workload.

The objective is therefore not to minimise water or electricity use separately, but to optimise them together while protecting uptime and accommodating higher heat loads.

This is what system efficiency must mean in the AI era: more computing output with fewer resources.

The old model is linear and reactive: take water, cool equipment, discharge it, and respond when performance drifts.

AI infrastructure needs a circular, adaptive model.

That means using treated or non-potable water where appropriate; recycling water for evaporative cooling; deploying closed-loop liquid systems; and combining chemistry, sensors and predictive analytics to detect changes in pH, conductivity or coolant health before they threaten efficiency or uptime.

This is where Ecolab's experience from site to chip matters. We help more than 1,400 data centres globally optimise cooling with advanced chemistry, digital monitoring and on-site expertise. Our 3D TRASARTM technology provides real-time visibility across cooling towers, adiabatic systems and direct-to-chip loops.

Across 35 facilities managed for a single customer, an AI-driven Ecolab pilot is expected to reduce water use by up to 15% and avoid up to 126 million gallons of potable water withdrawals annually. Following Ecolab's acquisition of CoolIT Systems, we can combine those capabilities with coolant distribution units, cold plates and direct liquid cooling hardware to deliver an integrated cooling platform.

The infrastructure leaders of the AI era will not be those that simply consume less power and water. They will deliver more computing with less of both, consistently and at scale. **Europe can meet rising AI demand while strengthening energy security, water resilience and community confidence; but if only if it treats cooling, water and power as one system.**

The energy-security switch Europe has not yet flipped

By Mario Giordano, Global Head of Public & Government Affairs, Signify

Europe's search for energy security usually begins with pipelines, LNG terminals, and power plants. It should also begin with demand. Research by Jan Rosenow shows that efficiency improvements since 2000 have saved the EU energy equivalent to 29% of its entire 2024 consumption. This is energy that did not need to be generated, imported, or paid for. Now the next opportunity is hiding in plain sight: upgrading Europe's lighting.

The first LED revolution was a major success, but it left unfinished business. Early-generation LEDs are now reaching the end of their lives, just as the average efficacy of new LEDs has roughly doubled since 2015. The next step requires more than a better lamp. It requires a different way of thinking about lighting. Europe should not simply replace yesterday's LEDs with today's; it should now upgrade the system around them.

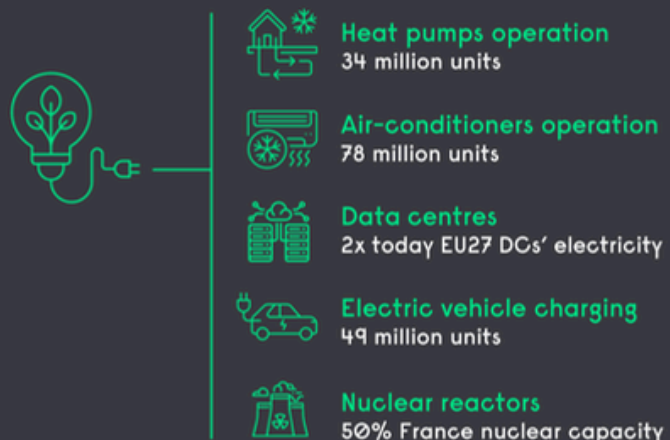
Occupancy and daylight controls can match lighting to how a space is used, dimming or switching off when rooms are empty, or daylight is sufficient. Circular design can make luminaires easier to maintain, upgrade, and reuse. That means you can have lighting that uses less energy, adapts to use, and lasts longer.

The scale of that opportunity is significant. Signify estimates that lighting uses about 288 TWh across the EU27, or around 11% of electricity demand.

Free-up electricity

Switching all the light points in EU27 countries to efficient connected LED, could make electricity available to power other devices and support the electrification process.

By switching to LED, electricity could power:



Data presented here is a simulation within the framework of the Green Switch light point conversion model, which is a program run by Signify to help its customers accelerate the switch to energy-efficient lighting products, systems and services. All figures and data presented here are illustrative and based on forecasts and assumptions. The diagram represents a selection of electric device consumption. Data refers to EU27 countries. Thousands separator is . - Decimal separator is ,.

Additionally, 22% of light points are still conventional, and 23% of installed LEDs are early-generation products. Replacing this legacy stock with efficient, connected lighting could save up to 185 TWh annually, cut energy costs by €42.6 billion and avoid 50 million tonnes of CO₂e. As heat pumps, electric vehicles, data centres and industry continue to demand more electricity; efficiency can create headroom now while Europe continues to expand generation and strengthen its grids.

Real-world projects show what this looks like in practice. In Roztoky, Czechia, street-lighting power consumption fell by 74% after the city installed LEDs with connected dimming. At Tuborg Harbour in Copenhagen, more than 80 historic luminaires are being upgraded and reinstalled rather than replaced, reducing rated power from 115 W to 32.7W per luminaire. The retrofit makes each light approximately 3.5 times more efficient while preserving the harbour's architectural character.

And because efficiency must not create a new materials problem, a typical Signify 3D-printed luminaire has a 47% lower carbon footprint than a comparable conventionally manufactured metal luminaire and can be shredded and reused.

The lesson is straightforward; proven projects can become a broader energy-security strategy if policy and procurement make them easier to replicate.

Europe has the tools to do that. The Energy Efficiency Directive gives “energy efficiency first” legal standing and lifts the annual end-use savings obligation to 1.9% from 2028.

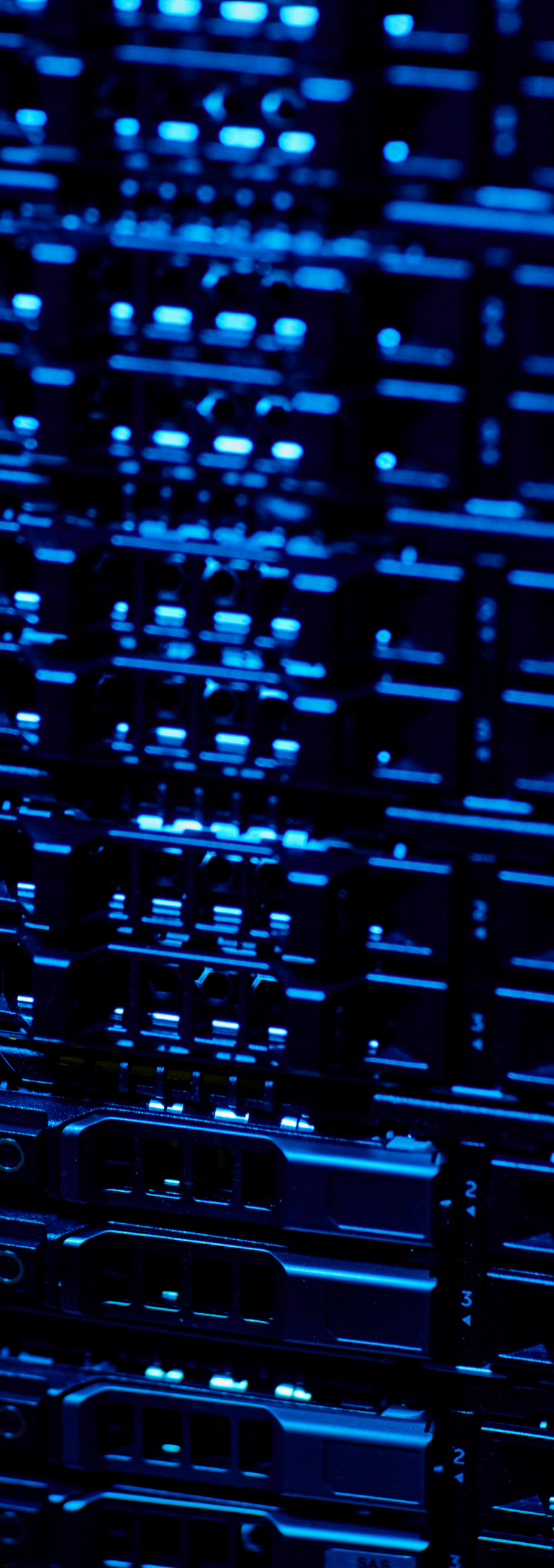
The Energy Performance of Buildings Directive's national renovation plans provide a route to include lighting upgrades, while AccelerateEU offers Member States measures to reduce oil and gas use quickly. The proposed Industrial Accelerator Act can use public spending to create markets for low-carbon European products. The post-2030 energy-efficiency framework should now turn lighting from an afterthought into an implementation priority.

“ The lesson is straightforward: proven projects can become a broader energy-security strategy if policy and procurement make them easier to replicate. ”

That means embedding high-efficiency lighting, sensors and controls in renovation plans; judging public tenders on lifetime cost, interoperability and circularity rather than sticker price, aggregating projects so cities and SMEs can secure finance and paying for upgrades from the savings they generate.

Lighting alone will not end Europe's dependence on imported fossil fuels. But every kilowatt-hour it saves makes it easier to electrify heating, transport and industry.

The next unit of secure European energy may not need to be produced. It may simply need to be switched off.



We Have a System Problem. Efficiency is a Capacity Solution

By Paula Glover, President, Alliance to Save Energy

Energy systems on both sides of the Atlantic are under pressure. Electricity demand is rising again, driven by data centers, advanced manufacturing, cooling and other growing loads.

The International Energy Agency expects U.S. electricity demand to grow by nearly 2% annually through 2030 and European Union demand by about 2.3% annually. In the United States, data centers are expected to account for roughly half of electricity-demand growth over that period.

The immediate question is often what new generation, transmission or other infrastructure must be built. Those investments will be needed. But that is only part of the equation.

Before asking how much more energy a system needs, we should also ask whether the system is using the energy it already has as effectively as possible. That was the central idea behind the Alliance to Save Energy's Systems Efficiency Initiative a decade ago, and it is even more relevant today.

For decades, energy-efficiency programs have advanced better appliances, lighting, insulation, motors, windows, and heating and cooling equipment. Those measures remain essential. But a building is not a collection of independent products. Better controls can reduce unnecessary heating, cooling and ventilation. Efficient equipment can underperform when poorly sized, commissioned or operated.

Coordinated design and operations can deliver savings that individual components cannot achieve alone.

Today, that systems approach extends beyond the building. Efficiency reduces how much energy a building needs; flexibility can help optimize when that energy is used. Automated controls, thermal storage and smarter operating schedules can reduce demand during constrained periods while maintaining the services customers expect.

This is not simply a technical distinction. It is a capacity strategy.

For example, PSE&G's work with the Montclair Public Library in New Jersey combined HVAC upgrades, digital controls and remote monitoring

The approach is fuel-neutral and technology-neutral. It does not prescribe one heating technology, generation resource or building design.

Whether energy is delivered through electricity, natural gas, thermal systems or another resource, the objective is the same: deliver the services customers need with less waste, lower cost and less system strain.

Europe and the United States use different policy and regulatory structures, but the underlying challenge is similar. The European Union's Energy Efficiency First principle requires efficiency to be considered in planning, policy and investment decisions.

In the United States, growing attention to large loads and grid constraints is creating a parallel focus on demand-side resources, building controls and system optimization.

A decade ago, ASE argued that the next gains in efficiency would come from looking beyond individual devices. In 2026, with affordability, reliability and competitiveness under pressure, that systems perspective has become operational: use what we have better, reduce waste first, and build what the system still needs.

Europe Is Running the Energy Transition with an Unnecessary Backpack

By Andreas Gürtler, Foundation Director, European Industrial Insulation Foundation

Europe has been running its energy transition marathon for many years. The destination has never changed: a climate-neutral, competitive and resilient economy powered by clean energy. Through the European Green Deal and its energy and climate policies, Europe is investing heavily in renewable energy, electrification, hydrogen, smarter grids and industrial transformation.

But the race has become much harder.

Climate change is accelerating, energy costs continue to challenge European industry, and geopolitical uncertainties are testing Europe's resilience and security of supply. At the same time, global competition is intensifying.

If Europe wants to complete the energy transition marathon successfully, it must now run smarter. The success of every marathon depends not only on determination but also on using every available resource as efficiently as possible.

Imagine a runner approaching kilometre 30 carrying an unnecessary backpack. The runner may be well trained, highly motivated and equipped with the latest technology.

From the very first kilometre, the unnecessary backpack has demanded additional energy without providing any benefit or bringing the runner any closer to the finish line.

If someone offered, now at kilometre 30, to remove that backpack, no experienced runner would refuse. It would eliminate an avoidable burden and make every remaining kilometre easier.

Europe has now reached a similar point in its energy transition.

Yet much of the debate still focuses primarily on how Europe can produce and supply more clean energy. This is essential.



But system efficiency requires us to ask an equally important question: how much energy do we still consume without creating any additional value?

Across Europe, vast amounts of energy are still imported, generated and paid for, only to be lost before they create any productive value.

One of the clearest examples can be found in industrial insulation.

In many industrial facilities, pipes, valves, flanges, tanks and other high or low temperature equipment remain uninsulated, poorly insulated or fitted with damaged systems.

The resulting thermal losses create no additional production or economic value. They simply increase the amount of energy consumed by the plant.

According to research by the European Industrial Insulation Foundation, improving industrial insulation across Europe could save around 160 TWh of energy every year and avoid approximately 40 million tonnes of CO₂ emissions. Large parts of this potential can be realised through proven measures with short payback periods.

These are not future technologies waiting to be developed. The technology exists. The standards exist. The expertise and installation capacity exist. What remains is implementation.

Industrial insulation is just one of the clearest examples. Similar opportunities exist in compressed-air systems, steam systems, electric drives, pumps and many other industrial processes. System efficiency begins wherever unnecessary energy demand can be eliminated.

Or, to stay with the marathon metaphor: it is time for Europe to take off its unnecessary backpack by capturing the efficiency opportunities that already exist.

Europe will win the energy transition by continuing to expand clean energy while needing less of it to deliver the same prosperity.

Energy efficiency has a maintenance problem

By Gusts Kossovics, Managing Director, European Building Automation and Controls Association (eu.bac)

A building can waste energy without anything appearing to be broken. The rooms are comfortable and nobody complains, but the heating may still follow the timetable of a tenant who left last year. A temporary override can stay in place long enough for everyone to forget why it was needed.

These are ordinary operational problems. They deserve more attention in a policy discussion that tends to concentrate on what gets installed and the savings expected from it. Occupancy changes, sensors drift and equipment deteriorates. Keeping a building efficient means checking whether its settings still suit the way it is used and adjusting them when they do not.

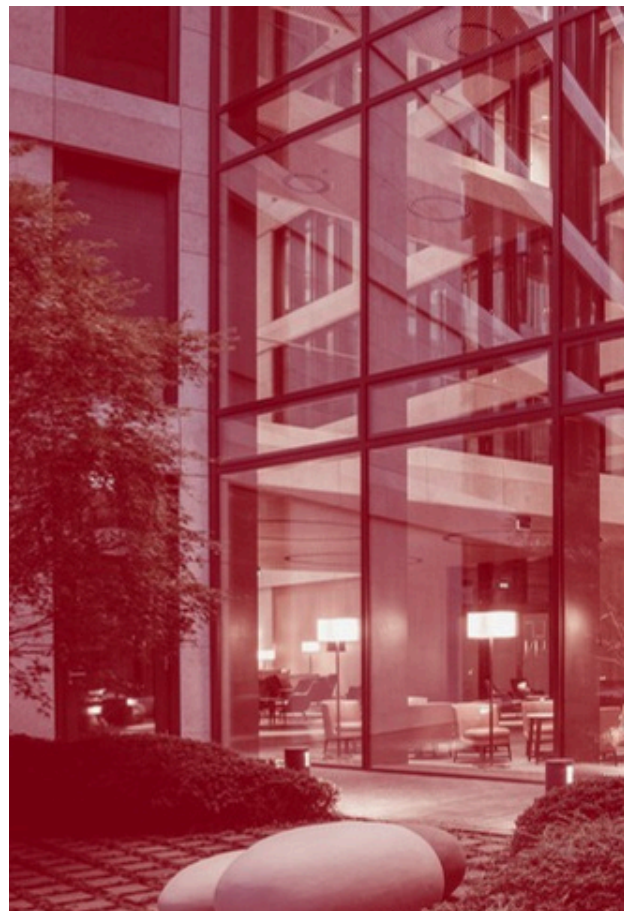
Building automation and controls make this possible by connecting information about energy consumption and conditions inside the building with the operation of heating, cooling and ventilation.

They can flag unexpected consumption, adjust operation to demand and help operators check whether changes have improved performance and whether its savings persist, accounting for changes in weather and occupancy. This is work that continues after commissioning.

There can be considerable scope for improvement even in buildings with strong environmental credentials.

At NOVE office building in München, our member reported roughly 30% lower energy demand following predictive control and operational optimisation, while maintaining room comfort.

A review of the existing automation also identified poorly positioned sensors and programming that needed improvement.



] NOVE München, Photo credit: Rainer Taepper Architectural Photography

Such cases are a useful reminder how much remains to be gained by examining actual operation, despite a strong starting point.

The recast Energy Performance of Buildings Directive gives national authorities a basis for addressing this. Under Article 13, the BACS covered by its non-residential requirements must be capable of monitoring and analysing energy use, detecting efficiency losses and informing those responsible for building management. Its requirements concern functionality, not simply the presence of equipment.

With the general transposition deadline of 29 May 2026 now behind us, national implementation must make those functions verifiable. eu.bac's transposition guidelines recommend approaches to commissioning and verification.

Our BACS compliance verification checklist sets out the supporting records owners can provide and checks inspectors can undertake.

These tools can help authorities make requirements understandable and enforceable without leaving every owner to work out an evidence trail from scratch.

We also need to see responsibility for acting on the findings made explicit in operating and maintenance arrangements.

Someone needs access to usable data, time to investigate and authority to make changes. An alert sitting in an inbox does little for the energy bill.



Contracts should specify who reviews performance and follows up corrective work, with proportionate checks that the required functions remain operational.

This is a reasonable expectation when owners and public authorities are investing in efficiency and counting on the savings for years afterwards.

Europe has spent years deciding what efficient buildings should contain.

The next task is to ensure that they continue to perform efficiently on an ordinary working day, long after the ribbon-cutting and the energy audit.

Feeling the Heat: Why Energy Efficiency is Energy Security

By Jean-Christophe Krieger, President, KNX Association



This summer exposed new challenges for Europe's energy transition. As temperatures pushed 40°C, millions of people needed more energy to keep homes, schools, hospitals and workplaces comfortable and safe, at precisely the moment when Europe needs to reduce pressure on its energy system.

This is where energy efficiency, too often overlooked in the wider energy transition, comes into its own. It is not simply about using less energy. It is about using energy intelligently: ensuring buildings can respond to the people inside them, to changing temperatures and to the needs of the wider energy system.

That matters as Europe races to electrify. Electrification will bring millions more heat pumps, EVs and other technologies into our buildings. But simply adding more of these does not make buildings efficient. Without safeguards and intelligent, interoperable coordination, electrification can also increase peak demand and put greater pressure on the grid. The real opportunity comes when those technologies can communicate, coordinate and respond.

In other words, Europe does not just need more electrified buildings. It needs smarter ones.

Building automation is what can make this happen. It can reduce or shift consumption, coordinate generation and storage and respond to price or grid signals, allowing buildings to do more with less. In practice that means cooling where needed, coordinating HVAC, managing EV charging and making better use of rooftop solar PV. At scale, these adjustments add up to significant flexibility for the grid. EU policy is moving in the right direction. AccelerateEU calls for faster deployment of heat pumps, batteries and smart meters that enable efficient, flexible energy use.

The Electrification Action Plan recognises their potential to shift heating and cooling demand and unlock flexibility.

The challenge is ensuring these technologies do not simply sit alongside one another, but work together as part of an efficient, responsive building.

Flexibility is valuable only if it is dependable. Buildings combine technologies from different manufacturers, often spanning generations, so the systems coordinating them must be interoperable, maintainable and secure. Standardised approaches such as KNX provide a common 'language' that allows building technologies from different manufacturers to work together reliably as one efficient system over the long term.

This is where the next phase of energy-efficiency policy matters: moving from ambition to implementation and ensuring these technologies work at scale.

As Europe implements the EPBD and looks towards its review, the focus must be on accelerating progress on the ground. That means tackling barriers to investment, developing the skills needed to deploy smart building technologies and crucially, making interoperability a prerequisite, not an afterthought. Without it, the technologies going into Europe's buildings risk remaining siloed rather than becoming part of a genuinely efficient, flexible and, ultimately, resilient energy system.

Europe cannot control the next heatwave or energy shock. But it can control how intelligently its buildings respond. Making them more efficient, automated and flexible is not simply a question of reducing energy consumption. It is part of building a more resilient European energy system.

From cooling to heat recovery: a broader approach to data centre energy efficiency

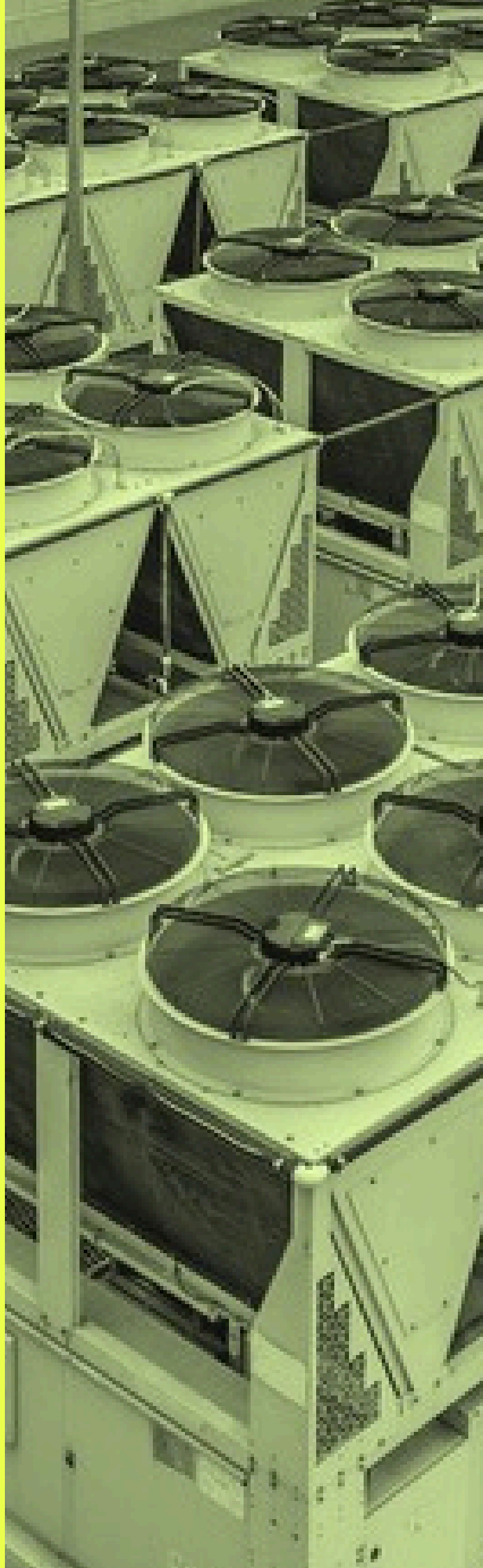
By Andrea Martin, Senior Policy Advisor EPEE

According to the International Energy Agency (IEA), data centre energy consumption has grown by around 12% annually over the past five years and is expected to double by 2030.

This growth reflects the increasingly important role data centres play in our digital infrastructure, supporting services now essential to businesses, public services and everyday life.

At the same time, data centres need electricity to operate, and much of that electricity ultimately becomes heat. This rapid growth is creating a new energy efficiency challenge where cooling becomes central to the energy efficiency of data centres.

IT equipment cannot operate without maintaining appropriate temperature conditions, meaning that the cooling systems have a direct impact on the facility's energy performance.



High-efficiency cooling technologies can reduce the energy needed to remove heat while creating opportunities to recover it. As rack densities rise with the growth of AI workloads, liquid cooling is increasingly complementing traditional air-based systems. This shift is particularly relevant for heat recovery, as liquid cooling typically captures heat at higher temperatures, making it easier to reuse directly or with limited upgrading by heat pumps.

This is why EPEE believes efficient cooling and heat pump technologies are an important part of improving the energy performance of data centres. Our industry provides the technologies needed to keep these facilities operating reliably and efficiently, while supporting wider energy efficiency goals.

Energy efficiency should not, however, stop once the heat has been removed.

The heat generated by IT equipment can itself become a useful energy resource. Depending on temperature and local conditions, recovered heat can be supplied to buildings, offices, industrial processes or district heating networks. Turning what would otherwise be waste heat into a useful energy source can deliver additional efficiency gains beyond the data centre itself.

The EU is already putting a framework in place to improve the energy performance of data centres and unlock this potential. Under the Energy Efficiency Directive, data centres with an installed IT power demand of at least 500 kW must report on their energy and environmental performance. The next step is to build on this with a framework that can assess, compare and track data centre energy performance.

As part of its upcoming Data Centre Energy Efficiency Package expected later this year, the European Commission is preparing an EU-wide rating scheme for data centres alongside minimum performance standards (MPS)

From EPEE's perspective, the upcoming framework should assess energy efficiency across the whole energy cycle. It should recognise the role of efficient cooling and heat recovery, while reflecting the different technical, climatic and local conditions in which data centres operate. Finally, while clean electricity sourcing is important, there are other performance indicators such as overall system efficiency, Power Usage Effectiveness, and Energy Reuse Factor that need to remain central.

As data centre capacity continues to grow, we need to use the energy as efficiently as possible.

Cost-Effective Electrification Plan Starts with Energy Efficiency

By David McMahon, Managing Director, Kingspan Insulation



The European Commission's Electrification Action Plan sets an ambitious direction: increasing electricity's share of final energy consumption from 23% today towards 46% by 2040. Electrification can reduce Europe's dependence on imported fossil fuels, strengthen energy security and support industrial competitiveness.

But producing more clean electricity is only part of addressing the issue. The real test is how Europe can decarbonise heating and cooling at the lowest total cost. That requires reducing energy demand before investing in the generation, grid capacity and equipment needed to meet it.

Buildings account for around 40% of EU energy consumption, while approximately 75% of the building stock performs poorly. Every unit of energy lost through an inefficient roof, wall or façade must be generated, transported and paid for. Changing the source of that energy does not eliminate the waste or its cost.

Every building electrification project should therefore incorporate reducing avoidable demand through cost-effective improvements to the building envelope, including insulation. This is what "energy efficiency first" means: a planning principle, not an inflexible requirement for complete renovation in every case. Lower demand allows heating and cooling systems to be properly sized, reducing capital costs, energy bills and peak load. Efficient buildings also retain comfortable temperatures for longer, improving resilience and enabling demand to be shifted away from peak periods.

Once demand has been reduced, the remaining energy should be supplied and distributed efficiently.

Modern, low-temperature and properly insulated district heating and cooling networks can capture waste heat, geothermal energy and other local low-carbon sources. They can also incorporate thermal storage, limit distribution losses and reduce or better manage demand on the electricity grid.

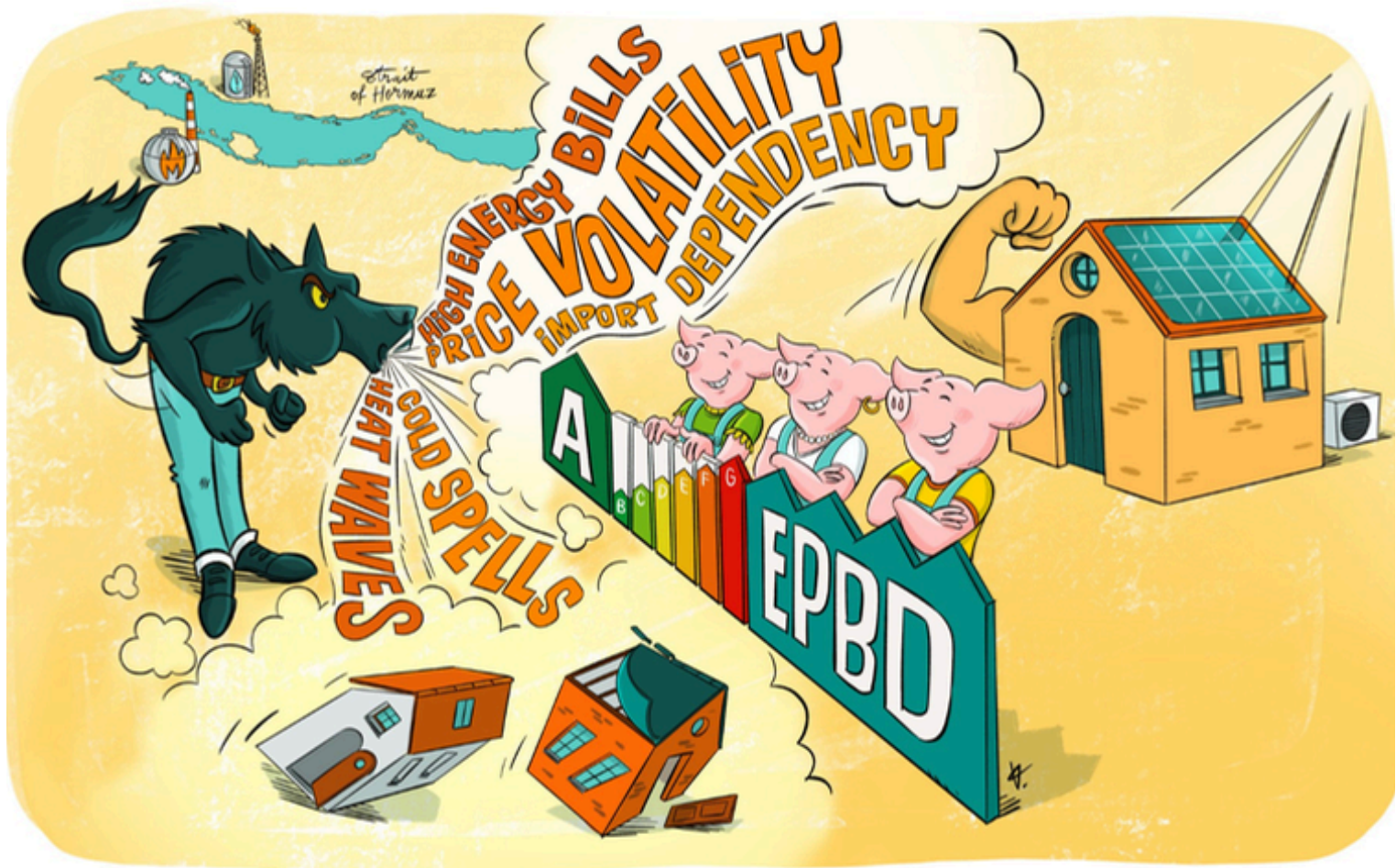
Heat pumps can also contribute significantly to efficient electrification. Their benefits are greatest when they form part of an integrated approach that includes a well-performing building envelope and properly sized heating and cooling systems. Heat pumps can also deliver efficient energy to district heating and cooling networks.

The Electrification Action Plan rightly promotes heat pumps and district heating and cooling, while recognising the importance of coordination with insulation and renovation. The next task is to ensure that reducing building demand receives the same practical attention as deploying new technologies.

The Commission should reinforce support for Member States in fully implementing the Energy Performance of Buildings Directive, including through National Building Renovation Plans. The forthcoming Cooling and Heating Action Plan, public procurement rules and European financing programmes should support integrated solutions that reduce avoidable demand and then meet the remaining need through the most cost-effective low-carbon technology.

Investments should be assessed against their life-cycle and wider system costs, not simply their initial installation cost.

Success should be measured by energy saved, distribution losses avoided, peak load removed and total cost reduced. Europe should not build ever more capacity to meet demand that can be eliminated at source. Cost-effective electrification starts with energy efficiency. In buildings, that means beginning with the envelope.



Buildings can become Europe's hidden grid asset

By Robert Nuij & Anette Persson, Unit B.3 – Buildings and Products, DG ENER, European Commission

Europe's buildings are major consumers of energy. Increasingly, they must also become one of the energy system's greatest assets. As electrification accelerates, demand-side flexibility in buildings is no longer theoretical; it is already being deployed across Europe. The challenge is making it work at scale, seamlessly, and for everyone.

Together, residential and commercial buildings accounted for roughly half of EU electricity consumption in 2023, a share set to rise as heat pumps and electric vehicles expand.

Unlocking flexibility through smart controls, heat pumps, storage, solar PV and smart charging stabilizes the grid, reduces system costs and accelerates the phase-out of fossil fuels.

Making flexibility invisible, interoperable, and fair

The primary barrier to demand-side flexibility is not technology; it is complexity. Consumers should not be expected to monitor fluctuating wholesale electricity prices or constantly reprogramme home appliances.

Flexibility must happen automatically. Energy-smart heat pumps, intelligent building controls and connected EV chargers can shift consumption away from peak hours while maintaining indoor comfort. The most successful solutions are those consumers barely notice: people care about warm homes, affordable bills, and reliability, not grid balancing.

To deliver choice rather than vendor lock-in, devices behind the meter must communicate seamlessly. Interoperability is not a technical objective in itself; it is the foundation of consumer empowerment and market competition. Combining devices from different manufacturers with services from different providers allows aggregators to manage flexible appliances across brands on behalf of customers.

Through the European Commission's ongoing work with industry on the voluntary Code of Conduct for interoperability of Energy Smart Appliances, spanning heat pumps, white goods, home batteries and EV chargers, open standards can unlock true cross-device coordination.

Furthermore, flexibility should follow three simple principles: it should be easy, voluntary and rewarded.

When households shift electricity demand away from peak periods, networks can avoid costly congestion and reduce the need for expensive peak generation, while consumers can benefit from lower bills. Smart meters are fundamental to making this possible, providing the basis for time-based billing, real-time insights and automated flexibility services.

Unlocking the existing building stock

Some of Europe's largest flexibility reserves already lie inside today's built environment. Beyond new smart technologies, existing water heaters, heat pumps, and the structural thermal inertia of buildings can provide immediate grid relief through software-enabled controls. The recast Energy Performance of Buildings Directive promotes smart technologies through the Smart Readiness Indicator and requires new charging infrastructure to support smart—and where appropriate bidirectional—charging.

Grid congestion, including situations where new homes and businesses cannot connect to the electricity network, shows why this matters. The solution is not only to build more infrastructure, but also to make better use of the flexibility already available. Initiatives like the Better Homes Partnerships demonstrate how scaling high-quality renovations and smart integration go hand in hand.

The priority now is implementation: harmonised market access, standardised data exchange, and fair consumer incentives. When buildings shift from passive consumers into active energy partners, they do more than save energy: they anchor an affordable, competitive, and resilient European energy system.



Energy efficiency, the EU's invisible ally to break the fossil fuel cycle

By Seda Orhan, Head of Energy, CAN Europe

When the EU adopted its first Energy Efficiency Directive (EED) in 2012, it recognised energy efficiency as a way to tackle Europe's dependence on energy imports and climate change. Fast forward 14 years, these challenges have manifested into crises.

The EU's dependency on fossil fuels has brought about catastrophic climate impacts and spiralling energy costs, directly impacting people's lives and wreaking havoc on the economy. Energy efficiency is no longer just a valuable tool, it is now a necessity for the health and well-being of people and the EU's prosperity.



Breaking the cycle of fossil fuel crises Europe has endured over the past four years requires a clear strategy for a fossil fuel exit. Rapidly deploying renewable energy, investing in Europe's grid infrastructure, electrification and flexibility options are proven solutions, but reducing Europe's dependence on fossil fuels needs to be tackled on both ends. This is why boosting energy savings and reducing demand needs to be a central pillar of this exit strategy.

Although the 2030 target set in the revised EED is just 11.7%, it is already yielding results. With every 1% improvement in energy efficiency translates into a 2.6 % reduction in gas imports. Accompanied with demand reduction measures, such as shifting more electricity consumption of off-peak hours, helps replace more fossil gas with renewable energy. These gains are projected to reduce Europe's fossil fuel bill by €33 billion by 2030 and €70 billion by 2040.

Moreover, ambitious energy savings measures with accelerated EU climate action could save the EU up to €1 trillion by 2030. Becoming more efficient in how we produce and consume energy is proving to be a cost-effective approach in making the EU resilient to fossil fuel shocks.

Failing to keep up the momentum would be a strategic blunder.

As the EU begins to shape its energy policy beyond 2030, it has an opportunity to build on the progress already made and put energy efficiency at the heart of Europe's future energy system with an ambitious and binding energy efficiency target for post-2030.

With a binding EU target to reduce energy consumption that can hold Member States accountable, governments will begin to take the lead on developing a strategy to reach this target. It would send a strong signal to industry to invest in more energy-efficient processes and technologies, drive the renovation of Europe's homes and buildings, and ensure that renewable energy and renewables-based electrification go further by avoiding unnecessary energy demand in the first place.

Europe already knows what works. The task now is to scale it up. By putting ambitious energy savings at the heart of its post-2030 energy framework, the EU can build an energy system that costs less to run, is harder to disrupt, delivers better lives for people across Europe, and helps reverse the perilous trajectory of our climate.

Urban nature delivering energy efficiency

By Steven Peck, President, World Green Infrastructure Network

Green infrastructure and green roofs in particular, have been shown to contribute to energy efficiency by reducing energy demand. Green roofs help reduce heat gains through the roof during summer months, and limit heat loss during winter months, with studies reporting energy savings of approximately 2–10 kWh/m²/year, depending on building characteristics, climate and system design. In Mediterranean climates, individual studies have reported reductions of around 30% in cooling energy demand from green roofs.



Urban greening measures may also improve the performance of technologies central to the energy transition. Vegetation reduces the roof temperature helping photovoltaic panels operate more efficiently. PV efficiency declines as operating temperatures rise. Studies suggest that green roofs can increase electricity generation by approximately 2–8%, with peak output gains of up to 20%, depending on climate and system design. Green roofs combined with PV can therefore contribute to energy efficiency by reducing building energy demand while improving renewable electricity generation.

Their contribution also extends to urban water systems. Green roofs are able to retain part of the rainfall that would otherwise enter drainage and wastewater networks, reducing the volume of water that needs to be pumped and, in some systems, treated and the energy needed to do so. This should inspire Member States designing measures to implement the revised EED, which requires annual savings from Energy Savings Obligations as well action from public bodies to reduce final energy consumption by 1.9%.

The city of Basel provides a useful example of the potential of urban greening at scale. Over the past two decades, the city has introduced mandatory requirements for green roofs on new and renovated flat-roofed buildings. This created greater market certainty and helped integrate green roofs into normal construction practice. Around 80,000 m² of new green roofing is installed each year, and green roofs now account for roughly 40% of the city's roof area. When green roofs and other forms of green infrastructure reach a certain level, they have the ability to reduce overall temperatures, regulating the local climate, and reducing energy consumption associated with cooling buildings across the city.

In Basel, early support for green roof came from an energy-saving fund financed through a levy on customers' electricity bills, highlighting the connection with energy-efficiency objectives.

The example illustrates how measurable energy savings, combined with clear and consistent regulation, can create the market certainty needed to expand nature-based solutions.

The policy framework is also moving in this direction. Article 8 of the Nature Restoration Regulation establishes objectives for urban green space and tree canopy, including no net loss by 2030 and a subsequent increasing trend, including through the integration of green space into buildings and infrastructure. The revised Urban Wastewater Treatment Directive likewise requires integrated approaches to stormwater management, favouring nature-based solutions and encouraging increased green and blue spaces in urban areas.



This policy momentum could be reinforced by the initiatives announced by Commission President Ursula von der Leyen in her 2026 State of the Union address, including a European Heatwave Plan and a new Water Initiative. Together with the European Climate Resilience Framework expected at the end of October, these initiatives represent an important opportunity to create the enabling conditions for wider deployment of urban green infrastructure for European cities more liveable, resilient and energy efficient.



EUROPEAN ALLIANCE TO
SAVE ENERGY
Creating an Energy-Efficient Europe

Market Projections for 2030-2035

Will be worth:

€426B yearly

Will employ:

4.8M in the EU (2030)

Will own:

39.200 patents (2035)



The EU Energy Efficiency Industrial Ecosystem today

Is worth:

€200B yearly

Employs:

2.2M in the EU

Owens:

21.361 patents (2000-2026)

The Energy Efficiency Tree

Energy Efficiency in the European Economy

This infographic is brought to you by the European Alliance to Save Energy (EU-ASE). Across the EU-27 in 2024, EU-ASE members represented €76 billion in annual turnover, 246.000 jobs, 7.007 patents and 805 facilities - including manufacturing plants, R&D, training centres and logistics hubs.

By Luigi Petito, Head of Secretariat, European Alliance to Save Energy

Energy efficiency has always had a communication problem.

Unlike a new power plant, a wind turbine or a transmission line, there is often no ribbon to cut when an energy-efficiency project is completed. The achievement is less visible: energy that does not need to be consumed, wasted, transported or produced. It is difficult to put that achievement into a single image or a simple story.

But perhaps the real reason energy efficiency is so difficult to represent is that there is no single energy-efficiency technology. It is a whole ecosystem of solutions, companies and innovation. This diversity makes the sector complex to communicate, but it is also precisely what makes it such a powerful European industrial ecosystem: innovative, economically significant and present across almost every part of our economy.

I have been working on energy efficiency since the early 2000s, and communicating its value has been one of our biggest challenges. Yet the underlying logic is remarkably simple. Before deciding how much energy we need to produce, we should first ask how much energy we actually need and how efficiently we can use it.

It is the same rational approach that any good family applies at home: first reduce unnecessary energy needs, then optimise consumption, and only afterwards determine how much additional energy supply is required. The same logic should guide public and private investment across Europe's energy system.

Some macroeconomic figures about energy efficiency makes its economic case more visible. We have now updated those figures. And the story they tell is remarkable.

In 2025/26, the EU energy-efficiency industrial ecosystem generated approximately €200 billion in turnover, supported 2.2 million jobs, and was associated with 21,361 patents filed since 2000. Looking ahead to 2030–2035, these figures could rise to approximately €426 billion in turnover, 4.8 million jobs and 39,200 patents.

These numbers tell us that energy efficiency is not simply about saving energy. It is about industrial strength, jobs, innovation, investment and Europe's competitiveness.

The estimates are also conservative. Market-size figures draw on current studies covering a range of energy-efficiency technologies, using company revenues, production and trade data, regulatory information and expert interviews. They capture direct economic activity but do not fully measure the much wider impact along complex value chains.

The longer-term projections are based on historical trends and should therefore be seen as an indication of the sector's potential rather than a prediction set in stone.

The Energy Efficiency Tree seeks to make visible these figures.

Its roots are already deep: thousands of companies, technologies, investments and innovations spread across Europe. Its trunk is a growing industrial ecosystem. Its branches reach into buildings, industry, transport and infrastructure.

And the canopy? It is the opportunity! It represents what Europe could achieve over the next decade. With the right policy, regulatory and financial conditions, this tree can grow substantially, creating more value, more jobs, more innovation and greater energy security.



Lighting's untapped potential for Europe's energy transition

By Elena Scaroni, Secretary General, LightingEurope

Flip a switch, and a room fills with light, an act so routine that most people never think twice about it. Yet this everyday convenience hides one of the most powerful tools Europe has for cutting energy use, driving innovation, and building a more sustainable future. As the EU pushes toward a greener, more competitive economy, lighting deserves far more attention than it currently gets.

A bigger deal than it looks

It's easy to underestimate lighting. Any single lamp or fixture draws only a small amount of power. But multiply that across the billions of light sources installed worldwide, and lighting becomes one of the largest consumers of electricity on the planet, actually responsible for somewhere between 12% and 20% of global electricity use. In European households, lighting accounts for roughly 12% of electricity consumption. That scale is exactly why upgrading how we light our homes, offices, streets, and factories can deliver some of the fastest, most cost-effective climate wins available today.

The encouraging news is that the technology to do this already exists. Many assume the shift to LED lighting is finished, but Europe has only completed about half of that transition. Pairing LEDs with smart sensors and automated controls can cut energy consumption by as much as 80% compared with older, conventional lighting.

More than energy savings

The benefits of good lighting extend well beyond the electricity bill. Lighting shapes how people see, feel, and function in the spaces around them, supporting comfort, wellbeing or safety, while transforming both indoor and outdoor environments. It's a rare technology that touches nearly every part of daily life while simultaneously advancing climate goals.

Lighting is also a genuine economic asset for Europe. The continent's lighting market is worth more than €20 billion annually, and the sector supports around 120,000 jobs across the full value chain in Europe, from manufacturing to distribution.

Innovation is thriving too: more than 600 new patents were filed in the EU lighting market between 2021 and 2022 alone. The industry maintains deep roots on the continent, with research, development, and production facilities spread across Europe, complemented by a large network of small and medium-sized manufacturers.

A case for greater recognition

Despite this potential, lighting is very often missing from major EU initiatives and legislation. That's a missed opportunity. Ambitious, well-enforced implementation of existing rules, like requirements for automatic lighting controls in non-residential buildings in the Energy Performance of Buildings Directive, could accelerate emissions reductions without waiting for new technology. Smarter public procurement that values performance and quality over the lowest price, and public support into renovation of lighting in public buildings would all help unlock lighting's full contribution to Europe's climate and economic ambitions.

Lighting may be easy to take for granted, but it sits at a rare intersection of everyday human experience, industrial strength, and climate opportunity. Giving it the policy attention it deserves could make Europe's green transition faster, smarter, and more human-centered, one well-lit room at a time.

[1] See the results of the Project Odysee-Mure available here.

[2] <https://www.signify.com/global/our-company/blog/sustainability/green-switch-the-time-to-act-on-energy-efficiency-is-now>

[3] CSIL, The European Market for Lighting Fixtures, 2023.

[4] Ibid.

[5] Ibid.

Europe does not have an energy- efficiency technology problem. It has a deployment problem

By Peter Trillingsgaard, Senior Vice President & Director
for DI production

Europe's competitiveness debate often starts with what we lack: cheaper and more reliable energy, stronger grids, more investment and breakthrough technologies.

Yet one of our most immediate opportunities is much simpler: getting more out of the energy and technologies we already have.

One example of how we can achieve this can be found at the company Kamstrup. The company invested around DKK 6 million (roughly EUR 0.8 million) in energy-efficiency measures across its production facilities. By improving ventilation and humidity control, reusing excess heat from compressors and using data to optimize operations, it cut annual energy consumption by roughly 4,000 MWh and saved around DKK 1.2 million (EUR 0.16 million) each year.



That is a simple payback of about five years achieved largely by making existing systems work better and smarter together. While Kamstrup's results are impressive, they also point to a broader European paradox. Europe is home to many world-leading energy-efficiency companies, technologies and capabilities. It has also built an ambitious framework for reducing energy demand that is still to be fully implemented. Yet our own markets are still not geared to deploy these solutions at the speed and scale that Europe's competitiveness, security and climate objectives require. Implementation relies on companies like Kamstrup to actively go the extra mile to be more energy efficient.

At a time when European industry faces higher energy costs than many global competitors, using energy more efficiently is increasingly becoming a competitiveness issue. Across the energy system, lower demand can reduce pressure on infrastructure, limit exposure to imported fossil fuels and strengthen resilience. The benefits do not stop at the company gate: greater efficiency strengthens both individual businesses and the European economy's competitiveness and resilience.

The policy challenge is therefore to change technical solutions into scaled implementation across Europe.

For this, companies need access to capital for efficiency upgrades. Where electrification is part of the solution, they also need affordable electricity and faster, more predictable grid connections. Above all, they need a stable and ambitious regulatory framework that gives them confidence to invest for the long term. That last point matters. Industrial investments are complex and planned over years, while political priorities can shift much more quickly. Weakening or repeatedly reopening Europe's efficiency framework risks delaying the very investment incentives we need. Policy continuity, by contrast, creates demand, gives suppliers confidence to scale and allows companies to plan.

The next phase of European energy-efficiency policy should therefore be judged not only by the ambition of targets on paper, but by what happens on factory floors, in buildings and across energy systems.

Kamstrup demonstrates how energy-efficiency investments can create value for both business and society. Across Europe, thousands of businesses face similar opportunities to cut costs by using energy more intelligently. We already have much of the technology, expertise and business rationale needed to capture them.

The task now is to build a European market that allows those solutions to become the rule rather than the exception.

A 2040 EU energy efficiency target: not a question, an imperative

By Arianna Vitali Roscini, Secretary General, The Coalition for Energy Savings

As the European Commission prepares its post-2030 energy efficiency framework, there is one key question that still needs to be answered: will there be a binding 2040 energy efficiency target that builds on the 2030 objective?

If we agree that the European Union must be freed of its dependence on fossil fuel imports, support its businesses to remain competitive in Europe, slash its emissions to mitigate climate change, and keep demonstrating that the actions it takes matter for its citizens, the answer should be an unequivocal yes.

The absence of an energy efficiency target for 2040 would send the signal that the European Union is backtracking on its ambition on energy savings and energy efficiency. While energy efficiency legislation will remain in place even in the absence of a 2040 target, the long-term signal will be blurred.

The risk? A damaging stop-and-go effect that could freeze investment pipelines and undermine the energy efficiency industrial ecosystem, which employs over 1.2 million Europeans.

Energy efficiency policy is a European success story.

The combination of an energy efficiency target, defining the scale and speed at which energy efficiency action must advance, alongside a set of policies and measures providing sector specific rules and enabling conditions, has helped cut bills, improve household's comfort, and increase industry's competitiveness.

Without energy efficiency measures, EU energy use in 2023 would have been 29% higher than in 2000, making the EU even more dependent on fossil fuels imports.

This speaks for itself: reducing energy use, in combination with renewable energy and faster electrification, makes our continent less vulnerable to external supply shocks, ultimately making European citizens and businesses safer, more resilient, and more independent.

What Europe needs in this moment of instability is not a U-turn on energy efficiency policy, but rather maintaining a clear course. The current policy architecture can of course be improved to accommodate certain Member States' specific realities and needs. However, in the current geopolitical context, it is not the time for reshuffling and uncertainty, but for predictability – and this can only be achieved by implementing what exists and giving the energy efficiency framework a chance to deliver its benefits.



Today, we should be discussing how to make our schools heatwave-proof, how to help an SME adopt efficient technologies to save on its costs, how to support a mayor to plan renovations in its city, and how to ease the installation of a heat pump in a multifamily building, rather than questioning the overall direction of travel that a 2040 energy efficiency target provides.



The Smart Store: A New Blueprint for the Energy Efficient Supermarket

By Andrea Voigt, Vice-President Public & Industry Affairs, Sustainability, Communications, Danfoss

Supermarkets are an essential part of daily life across Europe and the world. They provide fresh food and a comfortable shopping environment, but keeping them running around the clock requires significant amounts of energy for refrigeration, heating and cooling.

Reducing that energy use without compromising food safety, customer comfort or day-to-day operations is a central challenge for food retailers. In Nordborg, Southern Denmark, a fully operational supermarket offers one example of how this challenge can be addressed.

From energy consumer to energy contributor.

The COOP 365 discount supermarket is situated just across the road from the headquarters of Danfoss, a global leader in energy-efficient technologies.

It looks and operates like any other newly built supermarket, providing customers with fresh food in a comfortable shopping environment.

Behind the scenes, however, the store brings together refrigeration, heating, cooling and energy management technologies in a single integrated system.

The results speak for themselves. The Smart Store consumes on average 60% less net energy compared to benchmark stores. Over its lifetime, it is projected to achieve emission savings of 39% compared to a modern CO₂-based store and a remarkable 68% compared to a traditional HFC-based supermarket.

The store brings together a fully integrated set of solutions, from natural refrigerants and intelligent controls to continuous monitoring and service. One of its clearest benefits is how it turns waste heat into a valuable energy asset.

By capturing surplus heat from the advanced CO₂ refrigeration units, the system provides all the store's heating and hot water, eliminating the need for fossil-fuel-based systems.

This investment is not only environmentally sound but also economically savvy, with an average payback time of just three years. All of this is orchestrated by a sophisticated control system that optimizes energy use in real time, keeping food fresh and customers comfortable.

But the innovation doesn't stop at the store's walls. The remaining heat is fed into the local district heating network, providing affordable heating to the surrounding community and creating an integrated and efficient local energy system.

The store is also coupled with an Application Development Center, where Danfoss co-creates energy-efficient solutions together with its customers and tests them under real operating conditions.

The Danfoss Smart Store is a real-world case study of what can be achieved by integrating proven technologies. It demonstrates that net-zero-ready supermarkets are not a future concept but a scalable reality. By fostering policies that encourage the adoption of integrated, energy-efficient solutions like these, the EU can accelerate its decarbonization journey, lower its energy dependency, and build a truly sustainable food retail sector for generations to come. Additionally, these technologies can also be applied to other industries, boosting system efficiency and helping citizens and businesses achieve energy resilience, competitiveness, and affordability.



Energy Efficiency after 2030: Think Systemically

By Prof. Dr. Andrea Wechsler, Member of the European Parliament,
European People's Party

Energy has become one of the strategic resources of the 21st century. It determines not only how we heat our homes or power our factories, but increasingly Europe's security, competitiveness and geopolitical capacity to act.

Recent crises have exposed the risks of energy dependence. At the same time, energy remains too expensive in Europe. For industry in particular, this is a decisive competitive disadvantage. A resilient European energy policy must therefore deliver three things at once: security of supply, affordability and competitiveness.

Energy efficiency is a key pillar of that strategy.

But as Europe prepares its post-2030 framework, we need to think beyond the traditional equation that greater efficiency simply means lower energy consumption. Europe is electrifying transport, heating and industry. Data centres, hydrogen production and new industrial capacity will require additional electricity. Grids need major investment, generation is becoming more decentralised, and flexibility increasingly determines system costs.

In this context, an additional kilowatt-hour is not automatically a sign of inefficiency. Falling industrial production also reduces energy demand – but deindustrialisation is certainly not an efficiency strategy.

The better measure is energy productivity: how much economic and social value Europe creates from the energy it uses, and at what total system cost.

This should guide the next generation of European efficiency policy.

The “Energy Efficiency First” principle remains important, but it must increasingly be understood systemically. Efficiency gains are lost if renewable electricity is curtailed, grids are congested, waste heat remains unused or demand cannot react to periods of scarcity and abundance. Demand-side flexibility, storage, digital energy management, waste-heat recovery and efficient electrification can reduce peak loads, infrastructure needs and overall costs. This is where energy efficiency becomes industrial and competitiveness policy.

Europe should prioritise investments that deliver the greatest system-wide benefit per euro spent. Regulation should set clear objectives while avoiding increasingly prescriptive technological pathways. Companies must retain the freedom to choose the solutions that improve productivity, reduce emissions and lower costs most effectively.

The same principle should apply to the post-2030 target architecture. Europe needs ambition and investment certainty, but not ever more overlapping targets and obligations.

The implementation gap should give us pause. Following the 2025 transposition deadline, the Commission opened infringement proceedings against 26 Member States over the revised Energy Efficiency Directive. Measures in national plans currently add up to an 8.1% reduction in final energy consumption by 2030, short of the EU’s binding 11.7% target.

Europe therefore does not primarily lack targets. It lacks delivery. Energy efficiency will remain indispensable to climate neutrality. But it must also become a central pillar of a resilient Energy Union: reducing dependencies, containing system costs and strengthening Europe’s industrial base.

The goal should be simple: minimise waste while maximising the productive value of every unit of energy, every kilometre of grid and every euro invested. That is what system efficiency means.

