BRIEFING

Powering sovereignty

How electrification can lead our transport transition away from polluting fuel imports in the EU post-2030 Renewable Energy Framework

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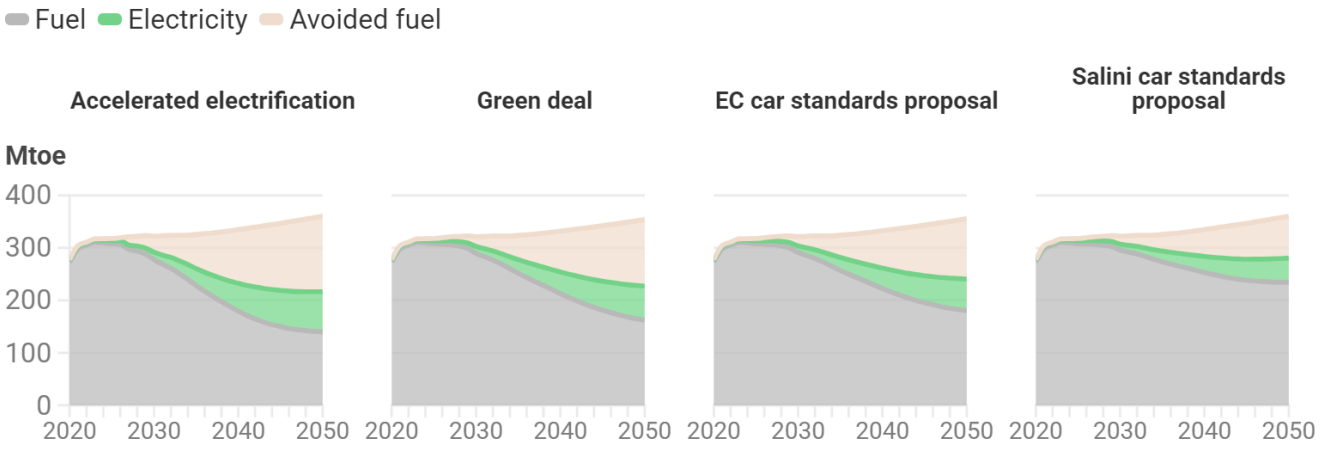
Summary

With the recurrent energy crisis affecting Europe's energy supply, **Europe's post-2030 Renewable Energy Framework must do more than just increase the share of renewables in transport**. It must also rethink its dependency pathways on imported fuels. One way to do so is to cut the amount of energy the sector needs, which will inevitably reduce fuel imports and will make the transport system less exposed to oil and bio-feedstocks supply shocks.

As reflected in AccelerateEU and the Electrification Action Plan, this year we have seen a paradigm shift resulting from the energy crisis in which direct electrification is increasingly recognised as the clearest and more ambitious way to cut energy demand, while allowing higher competitiveness, security of supply, and lower energy prices. In transport, every electric car, van and truck reduces demand for imported fuels, making electrification primarily an economic and energy security policy with emissions reduction a co-benefit. By combining much greater energy efficiency with increasingly domestically produced renewable electricity, **electrification offers the most direct route to European transport energy sovereignty**.

How electrification could shrink transport energy demand

Lowering EU electrification ambitions will delay the transition to a more efficient energy system



Source: T&E modelling (2026) and T&E's car decarbonisation roadmap (2024)

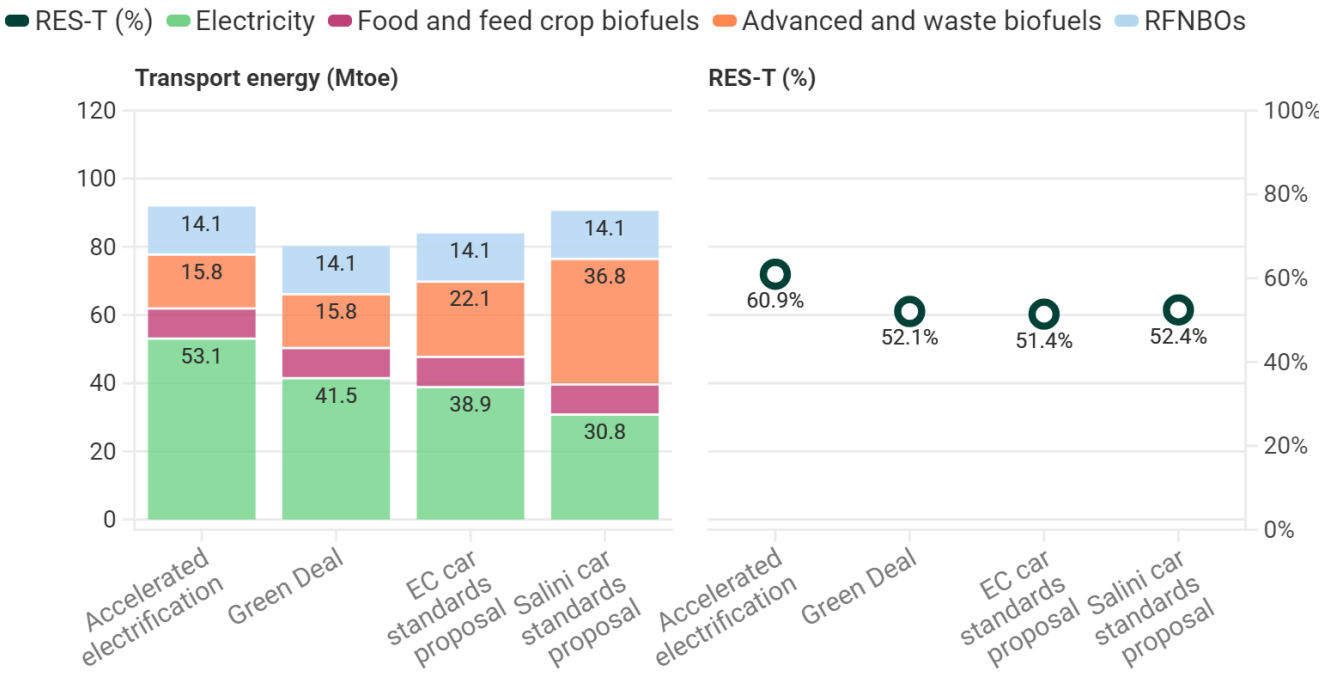
T&E's modelling shows that weak electrification would neither end Europe's oil dependence nor prevent it from shifting towards scarce and imported alternative fuels after 2030. Weakening the current car CO_2 standards would slow electrification and increase fuel demand, requiring greater use of fossil fuels, Annex IX advanced and waste biofuels, and e-fuels. Conversely, faster EV uptake, for instance driven by corporate fleet standards and scrappage schemes, would cut overall fuel demand and reduce reliance on alternatives that may be scarce, costly or imported.

But this contrast is obscured by the current accounting rules in the revised Renewable Energy Directive (REDIII) which enable similar 2040 renewable energy in transport (RES-T) targets to conceal very different transport underlying energy systems. **All T&E modelling pathways reach**

between 50-60% RES-T target in 2040, but zooming-in, the energy mix differs sharply. While the high European electrification pathway decreases the Annex IX biofuels reliance to 16 Mtoe, the draft report by the European Parliament's rapporteur (M. Salini) on the revision of the car CO_2 standard regulation would more than double their use. Higher reliance on biofuels only leads to an increasing pressure on limited sustainable feedstocks and imported biomass.

Without ambitious electrification measures, the same 2040 RES-T objective leads to lower efficiency and higher import dependency

Lower electrification will require significantly more biofuels to reach equivalent targets



Source: T&E modelling, based on projected alternative energy demand from road CO2 standards as well as ReFuelEU and FuelEU targets, applying REDIII accounting rules

This shows that **a higher headline transport renewable energy target cannot, on its own, deliver greater energy sovereignty.** Without ambitious electrification measures, the target could be met through greater reliance on scarce and imported fuels, while leaving Europe exposed to volatile global energy markets.

To ensure the future Renewable Energy Framework becomes an energy security and sovereignty tool, **policymakers must look beyond the headline renewable energy transport target**. What matters is not only how high the target is, but how it is met. A higher RES-T target must therefore be accompanied by ambitious electrification measures and a correspondingly higher contribution from renewable electricity. **All in all, the 2040 RES-T must power sovereignty by accelerating the shift towards cleaner and more efficient transport, anchored in domestically produced energy**.

The following recommendations offer first glance on what the EU must prioritise in the upcoming Energy Union Framework for the decade ahead:

01 Put direct electrification at the core of the EU's post-2030 Renewable Energy Framework and energy sovereignty strategy by **requiring renewable electricity to account for at least half of the total RES-T target in 2040.**

02 **Preserve the 4x multiplier for renewable electricity but apply it across all transport modes** and ensure that any increase in the RES-T target is matched by a higher electricity contribution, rather than greater reliance on scarce biofuels.

03 Set a transport fossil oil demand phase out target and KPI in the post-2030 energy union framework for **cutting import dependencies from 93% in 2025 to less than 75% in 2040**, thereby reducing Europe's exposure to oil shocks and strengthening energy security.

04 **Defend credible and robust car CO_2 standards as proposed under the European Green Deal**, rejecting loopholes that allow a high share of biofuels and e-fuels to substitute for direct electrification in road transport.

05 **Make the crediting mechanism in RED Article 25 mandatory across transport segments**, covering public and private EV charging, depot charging for heavy-duty vehicles, rail, shore-side electricity and electric ships, as well as electric and hybrid aircraft to reward the use of renewable electricity.

06 **Allow operators of charging infrastructure connected directly to renewable power generation** via Power Purchase Agreements (PPAs), **to claim full renewable-electricity use** above the national grid average for renewable electricity (RES-E).

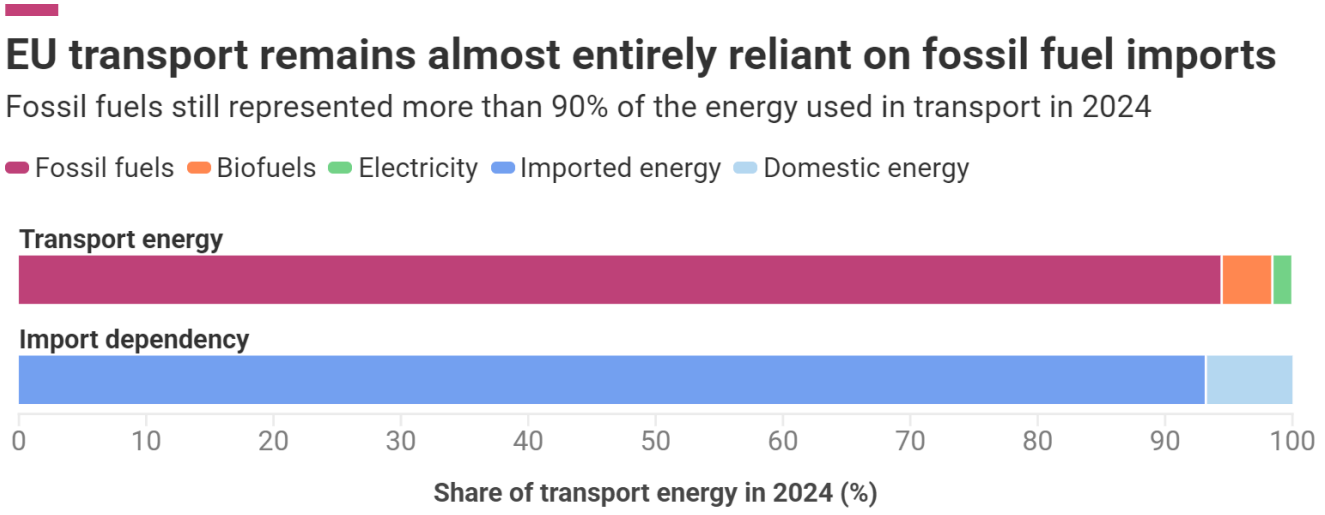
07 **Reflect the limited role of Annex IX biofuels in the post-2030 Energy Framework**, by factoring constrained availability and the cascading-use principle, maintaining strict sustainability safeguards, such as Annex IX list and caps, and avoiding a surge in imports that heighten traceability and fraud risks.

Direct electrification can slash transport energy demand

To achieve full decarbonisation and transport energy independence, the EU must drastically increase the sector's energy efficiency. Direct electrification offers the most mature and efficient pathway to deliver both emissions and energy demand savings. It should therefore serve as the starting point for all post-2030 Energy Union modeling and policy design.

1.1. European transport still relies heavily on fuel imports

The bloc's transport system remains heavily reliant on oil and imported fossil fuels. Although biofuels have historically driven the vast majority of transport's alternative fuel uptake, such carriers also depend significantly on imported biomass feedstocks, which accounted for up to 40% of EU supply in 2024.



Source: T&E analysis, based on Eurostat, the share of fossil-based electricity, and own estimates of biofuel import dependency

The recent energy crisis in the Middle East is a stark reminder that Europe's transport system remains highly exposed to increasingly volatile and geopolitically manipulative global fuel markets. Indeed, combustion cars alone cost the EU €67 billion in oil imports in 2025, and with the US-Israel war on Iran, the EU's fossil fuel import bill has increased by 22 billion just the first 44 days of the conflict.

Yet replacing oil with more biofuels would merely shift the dependency problem. T&E's recent analysis shows that proposed mandates could increase global biofuel demand by 70% as of

2030, adding pressure to already tight food and fertiliser supply chains while amplifying geopolitical shocks.

1.2 European transport energy mix is still lagging behind the climate transition

Despite the first Renewable Energy Directive (RED) adopted in 2008, the EU transport sector has not broken its fuel dependency with 90% of energy used still relying on imported fossil fuels. The RED should have helped replace imported oil with European produced renewable fuels and cut energy use through more efficient fuel and transport modes. Yet these have not fully materialised at scale required with **renewable energy accounting for just over 10% of transport energy consumption in 2024**. Transport continues to lag behind in renewables uptake, while also remaining the **second largest source of greenhouse gases emissions in the EU** failing to secure a climate resilient future.

The post-2030 Energy Union Framework provides an opportunity to address transport emissions and fuel dependency simultaneously, particularly in the context of the files currently or soon to be under revision, including the Renewable Energy Directive and the Governance Regulation, as well as the vehicle CO_2 standard, RefuelEU Aviation and FuelEU Maritime. Together, these files should work to reduce transport energy demand and prioritise efficient, scalable, and domestically produced energy.

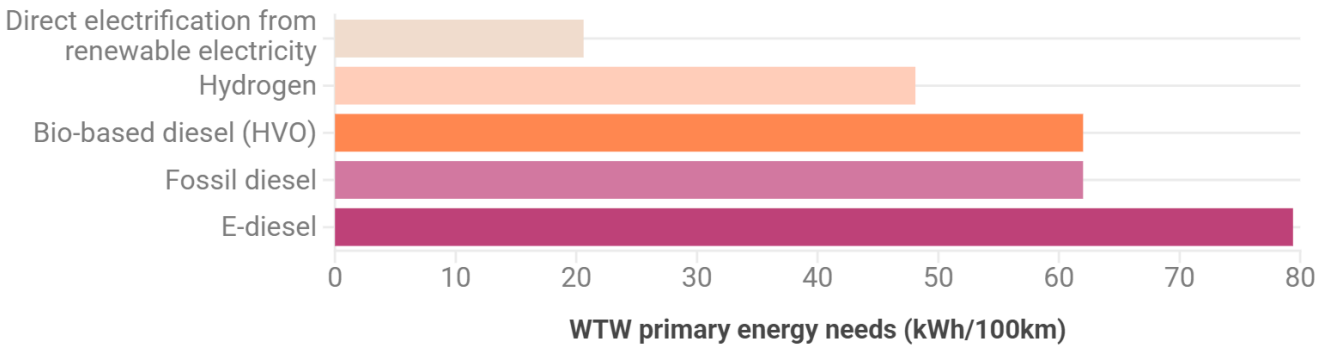
1.3 Direct electrification reduces transport energy demand via efficiency gains

On top of being cleaner than most other alternatives, direct electrification with grids powered by sufficient renewable shares brings the unique advantage of reducing the amount of fuels needed in the first place. Indeed, e-fuels and biofuels must be produced, processed and transported before being burned, with high energy lost at every step. Using electricity directly, in batteries or electric rails in all transport segments, avoids many of these losses and is therefore far more efficient. For instance in cars, **T&E estimates that direct electrification is almost four times more efficient than using e-fuels**.

However, delivering these efficiency gains requires **supply and demand side policies to work together**: car CO_2 standards must ensure that manufacturers supply sufficient electric vehicles, while purchase incentives, taxation and charging infrastructure support their uptake in other policy files, such as Alternative Fuels Infrastructure Regulation (AFIR), the proposed Clean Corporate Vehicles Regulation, RED. EU regulations also have a key role to play in accelerating the uptake of battery-electric ships and zero-emission aviation (ZEA).

Direct electrification wins the energy efficiency race

Driving 100 km with a battery-electric car is at least 3 times more efficient than any combustion engine alternative



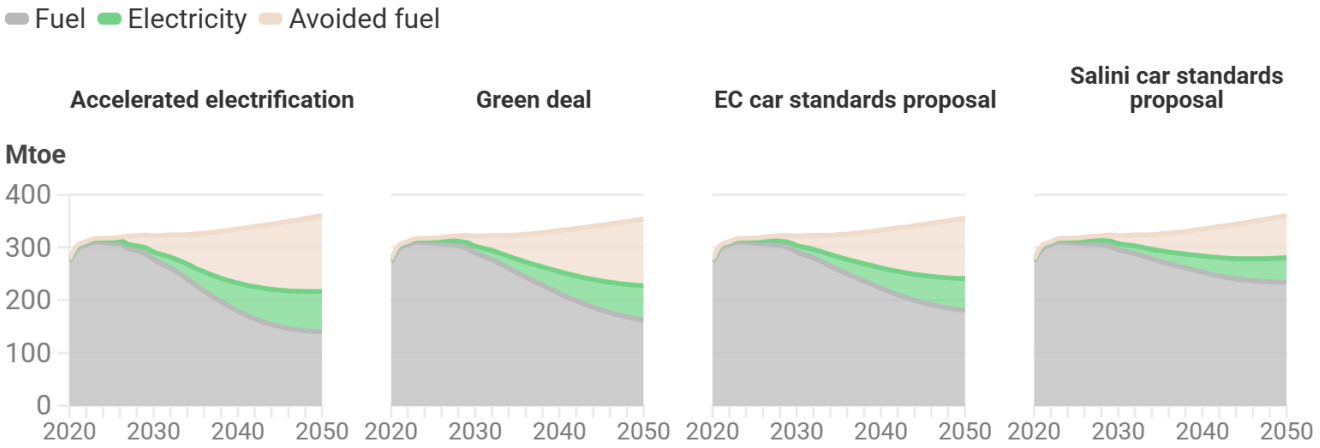
Source: T&E's LCA tool, based on an average medium size car

This is where the post-2030 renewable energy debate intersects with the car CO_2 standards' revision currently discussed by European legislators. While in the Green Deal framework the European Commission proposed a 100% zero-emission car sales by 2035, in December 2025, the Automotive Package proposed reducing the target to 90%, while requiring the remaining 10% to be compensated through low-carbon steel and alternative fuel credits. Parliament's ENVI rapporteur, M. Salini's proposal went even further: the 90% target for cars would no longer be conditional on compensating the remaining emissions, manufacturers could additionally use credits worth up to 17% - 10% from alternative fuels and 7% from low-carbon steel - and vehicles running exclusively on eligible fuels would be counted as zero-emission for compliance purposes. Yet treating these alternative options as equivalent to direct electrification mathematically ignores their vastly inferior efficiency profiles.

Our transport energy modelling through 2050 demonstrates how varying rates of battery-electric cars uptake will impact total transport energy demand. If car CO_2 standards are weakened compared to the original Green Deal, as proposed by the European Commission or MEP Salini, we anticipate that **EU transport would consume up to 40% more fuel by 2050**. On the other hand, if electric vehicle (EV) sales continue at the accelerated pace observed in the first half of 2026 during the Hormuz crisis and are driven by ambitious policies, **up to twice as much final transport energy demand could be avoided compared to MEP Salini's worst-case scenario**.

How electrification could shrink transport energy demand

Lowering EU electrification ambitions will delay the transition to a more efficient energy system



Source: T&E modelling (2026) and T&E's car decarbonisation roadmap (2024)

Europe sees record-breaking EV sales in 2026

Electric car sales in Europe started 2026 with huge growth. Driven by high fuel prices, cheaper models and the EU's car CO_2 regulation, battery-electric vehicles (BEVs) captured a 21% share of the new car market in the first half of the year. According to ACEA data, sales rose over 40% in the first six months, with massive registration spikes in major markets like France (+63%) and Germany (+48%). In addition, T&E's analysis shows that more than 80% of EVs sold in the EU were produced by Western and non-Chinese carmakers.

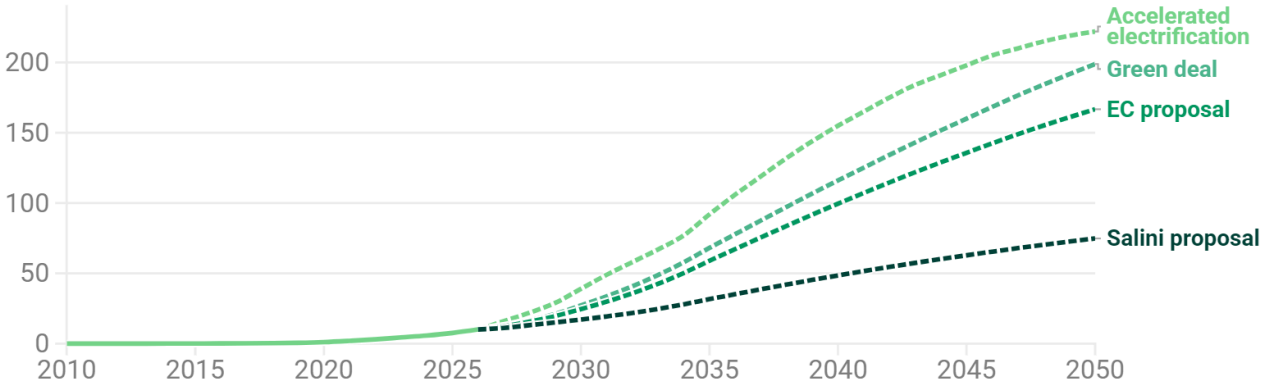
While current momentum is strong, weak car CO_2 standards threaten to block this trend. T&E expects current targets to naturally push the market to a 23% share this year. However, proposals to revise down targets would artificially flatten clean car sales, slowing down the transition just as buyers are moving away from fossil fuels.

In contrast, continuing the accelerated sales of EVs observed in the first half of 2026 could actually go beyond Green deal objectives if additional ambitious measures are implemented. Corporate fleet standards with up to 100% BEV sales in 2030 complemented with ICE car scrappage schemes could further accelerate the uptake of clean battery-electric cars in the EU fleet, as modelled in T&E's 2024 car decarbonisation roadmap. In this briefing, this scenario is presented as the *Accelerated electrification* scenario to illustrate how the EU transport energy system could benefit from such an ambitious pathway.

Weak car CO2 standards threaten Europe's early 2026 electrification momentum

Driven by EU standards and record fuel prices, EV sales surged 40% in H1 2026, proving that rapid fleet transition is possible

Million battery-electric cars in the EU fleet



Source: T&E, based on historical data from the European Alternative Fuels Observatory, and internal modelling

Designing post-2030 energy policies will require more than headline targets

A 2040 RES-T target should not be judged solely by its headline percentage. Under current RED accounting rules, different policy pathways can deliver similar outcomes. However, they can result in very different mixes of energy carriers and resource reliance.

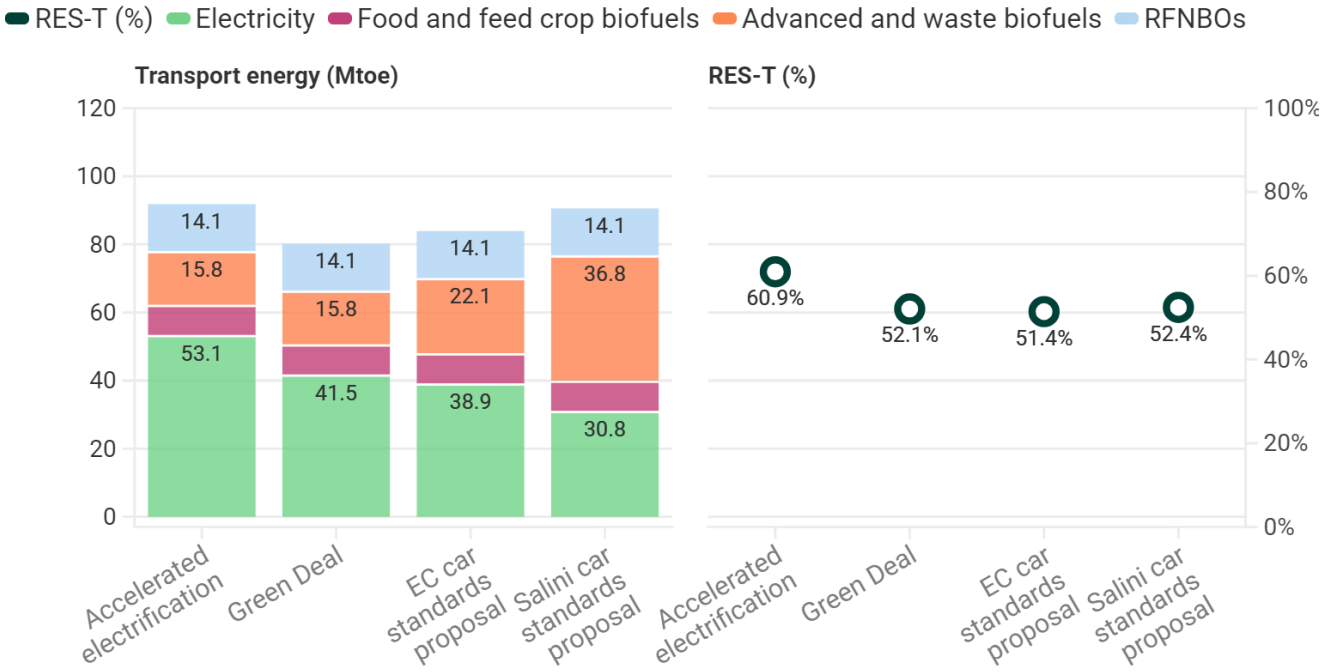
2.1. The same 2040 RES-T objective can hide divergent transport energy mixes

The headline 2040 RES-T percentage does not tell the full story; what matters equally is the route chosen to reach it. A similar headline target can either reflect a structural shift towards a highly efficient, electricity-based transport system, or mask a continued reliance on scarce, imported, sometimes unsustainable fuels to compensate for weaker road electrification. In other words, **the integrity of the target depends less on the exact percentage ambition and more on what is counted towards it**. For instance, T&E's analysis of the first decade of EU renewable energy policy grasped clearly that weak safeguards allowed targets to flood the market with imported, deforestation-driving and high-emitting biofuels. Therefore, the critical policy question here is not how high the target is set, but which fulfillment options are leveraged to meet it.

T&E modelling, shown on the page below, clearly illustrates this underlying risk. Under the Green Deal pathway, renewable electricity remains the primary fulfillment option at 42 Mtoe, yielding a RES-T outcome of 52%. Yet, despite a much weaker electrification trajectory, the Salini scenario reaches a broadly similar RES-T headline outcome. While both targets appear nearly identical on paper, the underlying energy mix changes substantially. In the Salini scenario, renewable electricity drops to 31 Mtoe, forcing advanced and waste biofuels to surge to nearly 37 Mtoe. Ultimately, the composition of the transport energy mix shifts dramatically depending on the pace of EV fleet growth, even as the headline target remains similar across scenarios.

Without ambitious electrification measures, the same 2040 RES-T objective leads to lower efficiency and higher import dependency

Lower electrification will require significantly more biofuels to reach equivalent targets



Source: T&E modelling, based on projected alternative energy demand from road CO2 standards as well as ReFuelEU and FuelEU targets, applying REDIII accounting rules

The gap left by slower EV uptake - as seen in the EC proposal and EP Salini proposal scenarios - creates a key pitfall for the 2040 RES-T target. The demand for RFNBO in the aviation and shipping sectors is deeply anchored in regulations, but stronger policy support and cost reductions will be needed for them to play a bigger role in transport decarbonisation after 2030. Instead, with first-generation food and feed crops capped to limit competition with food and deforestation risks, Annex IX advanced and waste biofuels will have to fill the deficit left by weaker electrification.

Yet this is not a neutral compliance option. Sustainable, domestic biomass residues are structurally scarce, sometimes already utilised by other sectors or most efficiently allocated to other sectors, and will also require costly processing. Relying on them to compensate for weak road electrification inevitably risks opening a Pandora's box of imported, high-fraud-risk feedstocks like suspicious used cooking oil (UCO) or palm derivatives. Ultimately, **substituting electromobility with constrained biomass compromises the very integrity of the post-2030 Energy Framework,** which should prioritise the most efficient decarbonisation pathways.

2.2. Electrification will become the leading fulfilment option from 2030 onwards

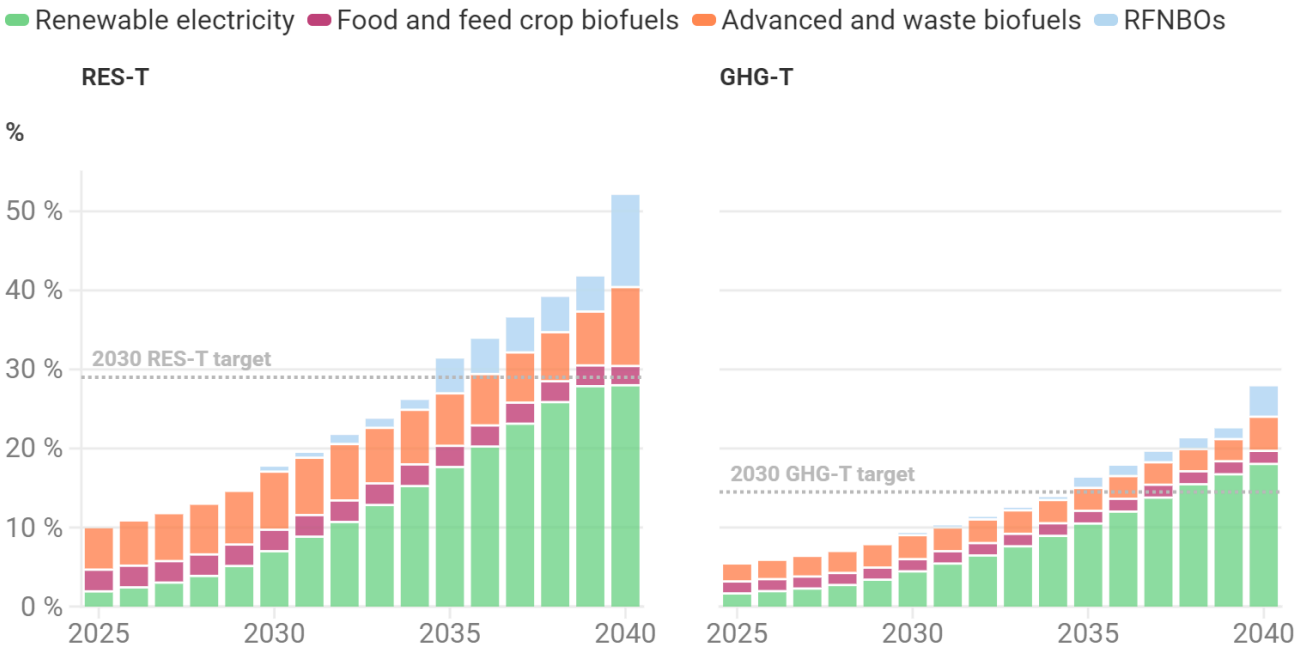
Road transport dominates Europe's transport energy demand, accounting for around three-quarters of final transport energy consumption. At the same time, T&E has repeatedly

shown that the road sector has the clearest near-term potential to cut both CO_2 emissions and energy use through direct electrification. The credibility of the 2040 RES-T target will therefore depend first and foremost on how much road transport is electrified, and how fast it gets electrified.

Under the Green Deal objectives scenario, assuming current standards and mandates remain in place, renewable electricity is expected to become the primary means of meeting any potential RES-T target from 2030 onwards. By 2040, we estimate that **renewable electricity, driven by the road sector, will overtake biofuels to become the main contributor, accounting for over half of the renewable energy share in European transport**.

Electrification emerging as the leading fullfillment option

Projected EU27 renewable energy and greenhouse gas contribution to transport targets under Green Deal objectives



Source: T&E modelling, based on projected alternative energy demand from road CO2 standards as well as ReFuelEU and FuelEU targets, applying REDIII accounting rules

While direct electrification will do most of the heavy lifting under current policies, demand for advanced and waste biofuels, as well as renewable e-fuels will also increase significantly. This growth will be primarily driven by dedicated aviation under the RefuelEU Aviation and, to a lesser extent, shipping targets FuelEU Maritime. Backed by the target for a 100% reduction in car emissions by 2035, accelerating truck electrification, and the strong multipliers embedded in RED accounting rules to incentivise alternative liquid fuels (more on RED accounting rules in the *Methodology*), our modelling shows that RES-T could reach approximately **52% by 2040**. As it can be seen below, such projected share of renewables in transport would translate into around **28% GHG emission savings (GHG-T) compared to fossil fuels and electricity emissions**, close to double the 2030 14.5% GHG emission saving target adopted under REDIII.

Finally, all our modelling scenarios point to the severe challenge the EU faces in reaching its 29% RES-T target by 2030. With only an 11.2% share recorded in EU transport in 2024, a near-tripling of the renewables used in the sector will be required to meet the 2030 milestone. In the near term, **Member States should finalise transposing REDIII without further delay and narrow the remaining gap by maximising the contribution of renewable electricity**, rather than relying on a surge in scarce biofuels to meet the headline 2030 target. As set out in our recommendations, this requires faster vehicle electrification, charging deployment and improved recognition of electricity backed by additional renewable generation. Looking beyond 2030, this finding underlines the need for greater consistency in the post-2030 Energy Framework between different EU legislative targets and what can realistically be delivered through climate and energy policy. **Any 2040 RES-T target must combine high ambition with credible sectoral delivery pathways and clear safeguards on how the target is met**.

Electrification cuts the fuels Europe needs to import

The post-2030 Energy Framework must serve as an energy security tool. By cutting transport energy demand, direct electrification reduces Europe's need for imported fuels, which lowers exposure to oil price shocks and eases pressure on third country biofuel feedstocks.

3.1. Less fuel imports, more sovereignty

The transport sector is where Europe's fuel dependency is most evident. Despite steady expansion of renewable energy used in transport in recent years, **the EU still relies heavily on imported fossil fuels**. The EU's current import rate stands at around 97%, domestic extraction of European fossil fuels is steadily declining. For road transport, this dependency is even more structural, making every oil shock a direct cost for drivers and the wider European economy.

Yet this sector is also where the EU has the clearest lever to reduce shock exposure. Direct electrification cuts the amount of energy needed in the first place, shifting transport away from globally traded oil towards renewable electricity that keeps being deployed across Europe. **Every electric car, van and truck deployed permanently reduces future oil demand and this is already visible today: EVs in the EU avoided** 46 million barrels of oil in 2025**, saving more than €2.9 billion in import costs**. To maximise these benefits, direct electrification should also be supported by additional and domestically generated renewable power to avoid any continuous reliance on imported fossil gas.

Does electrification risk replacing oil dependence with battery dependence?

It is critical to acknowledge that electrification does not eliminate all external dependencies. Critics often claim that going electric simply replaces a dependency on oil with a dependency on batteries. However, this comparison overlooks a fundamental difference. Oil is extracted, imported, and endlessly burned with every single journey. In contrast, battery materials are mined once to manufacture a battery that can then be driven for years with local, clean energy. Crucially, those raw materials remain within the supply chain, where they can be continuously reused and recycled.

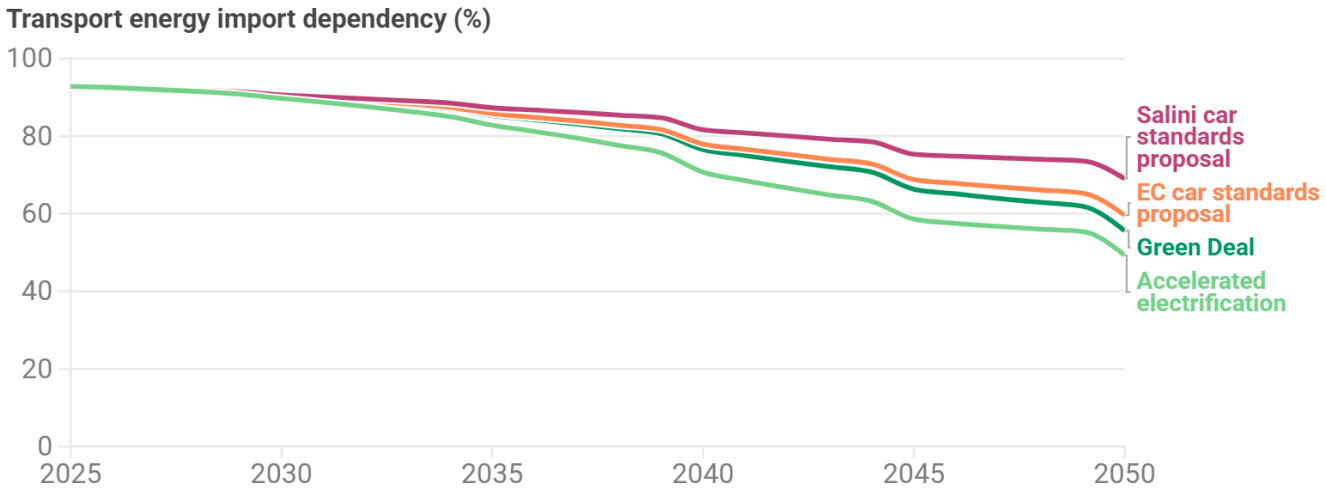
A lot less new materials are therefore needed to power electric vehicles, compared to the amount of fuel burned in combustion engines. With only 49kg of newly mined materials needed for an EV battery, compared to 12,400L of fuel consumed during the lifetime of a hybrid vehicle, the dependency on oil is on another scale.

However, Europe is currently highly reliant on imports for critical minerals, processing, battery components and cell manufacturing. Yet, with ambitious car CO_2 targets and industrial policies, Europe can decrease its dependency on battery imports to only 7%, in contrast to the EU's current 96% dependency on oil imports. When it comes to battery production, according to T&E analysis, Europe can become self-sufficient by 2030, if projected capacity is realised. There is also potential further upstream, as well as opportunities from recycling. Recycling could supply 14% of lithium, 16% of nickel, 17% of manganese and 25% of cobalt demand by 2030. Europe can therefore reduce its battery dependencies over time through domestic production, diversified sourcing and circularity.

T&E modelling pictures the same dynamic beyond 2030. Import dependency falls in all scenarios as electrification increases. However, pace differs sharply. Under a weaker road electrification pathway, based on the Salini proposal, **Europe only reaches around 2050 the level of import independence that the Green Deal pathway reaches around 2040**. The graph shows that higher EV ambition, driven by complementary measures like corporate fleet standards and ICE scrappage schemes, , would **reduce 2040 transport import dependency by nearly a quarter, around a 15% drop compared with low-electrification pathways.**

Less ambitious electrification measures would postpone European transport energy independence by 10 years

Higher EV ambition would slash EU transport's 2040 import dependency by nearly a quarter - a 15% drop in foreign fuel reliance compared to low-electrification pathways



Source: T&E modelling, assuming that fossil fuels are 100% imported, biofuels and e-fuels 50% imported, and electricity fully domestically produced

3.2. Increasing biofuels usage means higher reliance on imported bio-feedstocks

Under the European Parliament MEP Salini's proposed car CO_2 standards, the road sector would demand significant additional biofuel volumes. When combining transport sectors across the entire system, our modelling estimates that by 2050, the **Salini scenario would require nearly**

twice the volume of advanced and waste biofuels compared to the baseline Green Deal pathway.

However, Europe's domestic potential for sustainable biofuels is strictly constrained, with a maximum of 10 Mtoe advanced and waste biofuels under strict T&E's sustainability criteria. As ReFuelEU aviation and FuelEU Maritime targets scale up, demand for advanced and waste biofuels is projected to surge. These sectors alone risk exhausting Europe's domestic sustainable biomass availability for transport. Introducing any additional biofuel demand from the road sector will push this already strained resource past its breaking point.

If Europe were to apply T&E's sustainability safeguards, which respect the EU bioeconomy's cascading use principle, **it would be forced to import over three-quarters of its advanced and waste biofuels by 2040** to meet the remaining demand gap under a low-electrification scenario. In sharp contrast, a high-electrification scenario cuts total biofuel volume demand in half, reducing necessary imports fourfold in the same year.

Lower electrification pushes biofuel demand past EU sustainable potential

Setting slower mandates risk driving up to four times more hard-to-verify imports into the EU

Source: T&E modelling. Sustainable biofuels availability from T&E (2024)

Methodology

Projected transport energy demand

To model post-2030 EU transport energy demand, we used a bottom-up approach to aggregate data from each individual transport mode. For road transport, fuel and electricity demand was calculated by translating CO_2 standard sales targets into full fleet turnover projections via T&E's internal European Transportation Roadmap Model. We designed several scenarios based on different CO_2 standard proposals - ranging from current Green Deal objectives to the alternative frameworks put forward by the European Commission and MEP Salini (detailed in Section 1.2). Our high-electrification scenario incorporates the accelerated battery-electric car sales observed during the first half of 2026, applying a standard S-curve model to project cumulative sales across the fleet over time.

For other modes, aviation fuel requirements were sourced from T&E's *Down to Earth* report, which captures how projected industry growth interacts with ReFuelEU Sustainable Aviation Fuel (SAF) mandates. Shipping energy needs were estimated using 2024 Eurostat data for domestic navigation and international maritime bunkers, assuming flat sectoral growth combined with moderate efficiency gains. Shore-side electricity demand was calculated based on FuelEU Maritime requirements, adapted from the ICCT's 2023 analysis. Finally, rail fuel and electricity consumption were assumed to remain constant.

Alternative energy carriers allocation

Similarly, alternative energy carriers - such as renewable electricity, biofuels, and e-fuels - were allocated using a bottom-up approach to meet the previously forecasted demand. The share of renewables in the EU electricity grid was derived from EU reference scenario projections and applied as a rolling two-year average, in accordance with Article 27(3) of the Renewable Energy Directive (RED).

Fuel demand from food and feed-crop biofuels was assumed to remain constant at 2020 EU consumption levels, reflecting the cap set by Article 26. Meanwhile, Annex IX biofuels and Renewable Fuels of Non-Biological Origin (RFNBOs) sub-targets from RED III were assumed to drive volumes until surpassed by dedicated aviation and shipping targets. Bio- and e-SAF demand was again sourced from T&E's Down to Earth report, while bio- and e-shipping fuel volumes were derived from T&E's FuelEU Maritime optimisation modelling. Because FuelEU Maritime targets are based on emissions intensity, we acknowledge that precisely quantifying the specific fuel mix used to comply with annual limits is highly sensitive to feedstock availability and pricing. In addition, no distinction was made between low-carbon e-SAF and RFNBO-compliant SAFs.

Finally, the share of renewable energy in transport (RES-T) was calculated using the standard RED methodology, which applies multipliers and double-counting mechanisms to both the numerator and denominator per the EU SHARES protocol guidelines. We also estimated the RED III-equivalent greenhouse gas (GHG) emissions savings for each scenario by dividing total emissions from fossil and alternative energy carriers by their respective fossil fuel and electricity

comparators 94 gCO_{2e}/MJ and 183 gCO_{2e}/MJ. Renewable electricity was assumed to have zero emissions. Food and feed-crop biofuels were modeled with a 55% emissions reduction, mirroring current average savings using default values from RED Annex V, while Annex IX biofuels and RFNBOs were both assigned an 80% savings rate. In the absence of official guidance in the legal texts, we conservatively assumed that non-renewable electricity carries the same emissions profile as the fossil electricity comparator.

RED targets accounting 101

Historically, progress toward RED targets has been measured through the share of renewables in the EU transport sector (RES-T). While the scope has progressively been enlarged from road and rail to all transport sectors, the approach remains similar.

A set of multipliers are factored in to promote less mature pathways and steer the market:

- **Annex IX biofuels and RFNBOs** are counted twice their volumes towards the target, and additional multipliers incentivise their use toward aviation and shipping.
- **Renewable electricity used in road** is multiplied by four to account for the massive efficiency gains from switching from combustion engine vehicles to electric ones.

All in all, such multipliers are accounted for in both the numerator and the denominator estimating the total RES-T. This approach explains why the denominator keeps increasing over the years, even if total transport activity remains constant. Consequently, in our modeling shown above, the contribution of renewable electricity towards the 2040 RES-T seems to be stagnating despite a massive EV increase in the fleet. This happens because the higher step in aviation and shipping mandates translates into a jump in the denominator for all transport.

Finally, from REDIII onwards, **Member States can decide to implement greenhouse gas saving targets (GHG-T) instead of a renewable energy target**. While no official guidelines on how such a new approach should be implemented have been published, we interpret the GHG-T from the legal text as total emissions from all energy carriers compared to fossil fuel and electricity equivalent emissions.

Import dependency estimates

To estimate how the various transport energy scenarios affect Europe's energy import dependency, we assigned specific import rates to individual energy carriers. Fossil fuels are assumed to be 100% imported; while the EU's current import rate stands at around 97%, domestic extraction of European fossil fuels is steadily declining.

Conversely, both biofuels and e-fuels are modeled as 50% domestically produced and 50% imported - either as finished refined fuels or as intermediate products like biomass feedstocks and hydrogen carriers. This projection is grounded in T&E's assessment of current European biofuel consumption, which already relies on around 40% imports and risks rising alongside growing demand. This assumption is further supported by the substantial pipeline of global e-fuel projects currently under development. Finally, low carbon electricity generation is considered to

be fully domestic in our import dependency estimates, while fossil-based power is assumed to be fully dependent on non-EU imports. The EU's power generation mix is projected based on the EU reference scenario, which shows a clear acceleration of clean and renewable capacity being deployed.

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