# 4 Accelerate the decarbonisation of the economy

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A significant acceleration of emission reductions is needed to achieve net zero emissions by 2050. This entails greater harmonisation of carbon prices, before raising them gradually, and the phase out of environmentally harmful subsidies in agriculture, energy and transportation. Such efforts should be complemented by additional measures to shift to clean energy, notably a faster deployment of renewables. Also, stronger adaptation to climate risks is needed.

Slovenia has reduced greenhouse gas (GHG) emissions since 1990 through improvements in energy efficiency. Another noteworthy development has been the switch from oil to gas boilers, allowing the buildings sector to nearly halve its GHG emissions since 2005 (Al-Mansour and Cesen, 2021[1]). Over the past decade, however, emission reductions have stalled. There are several challenges to overcome to reach the ambitious net zero emission target by 2050. The transport sector accounts for a larger share of emissions than the OECD average and the sector's emissions are still growing. Agricultural emissions, mainly from livestock and fertiliser use, have remained flat over the past decade and the government foresees the sector to reduce emissions only by 3% in 2030. In addition, power generation accounts for a relatively large share of emissions, reflecting the expansion of coal power since 2015. Looking ahead, achieving more ambitious emission reduction targets will require all sectors to contribute, and can only be reached with a significant acceleration of emission reductions in agriculture, energy and transport. This entails using mitigation policy more effectively, including stronger carbon pricing and regulatory measures.

This chapter provides recommendations for mitigation policy to achieve emission reductions more effectively. It also examines climate change adaptation, including the policies put in place in the wake of the devastating floods of August 2023. The decarbonisation of the housing sector is discussed in the special chapter on housing.

## Towards more efficient climate change policy

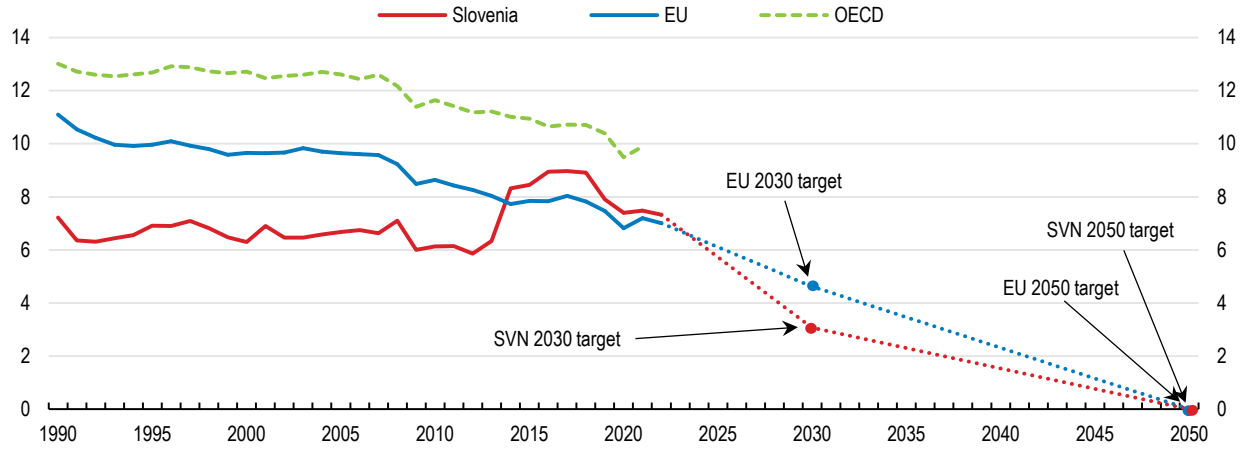
### *Improve the effectiveness of mitigation policy*

Slovenia aims to achieve net zero GHG emissions by 2050 (National Assembly of the Republic of Slovenia, 2021[2]). There is also an intermediate target of reducing GHG emissions by 36% by 2030 (compared to 1990). Other targets include increasing the share of renewables to 27% of final energy consumption and reducing final energy consumption by at least 35% by 2030 (National Assembley of the Republic of Slovenia, 2020[3]). The government will publish a revised National Energy and Climate Plan in June 2024 with more ambitious intermediate emission reduction and renewable energy targets for 2030 (Ministry of the Environment, 2024[4]).

The country has not reduced GHG emissions per capita over the past decade, although it reached its previous emission target for 2020. Net GHG emissions were reduced by 11% between 1990 and 2020, and by 16% (compared to 2005) in sectors outside the EU's emission trading system (ETS), well above the +4% emission target for these sectors (EEA, 2021[5]). However, the country fell just short of its objective of 25% of renewables in final consumption in 2020, achieving 24%, and had to purchase the remaining share from Czechia. Looking ahead, the more ambitious target of a 36% reduction in GHG emissions by 2030 (relative to 1990) will require a significant acceleration of emission reduction efforts (Figure 4.1). To illustrate the challenge, reaching the 2030 target requires a twelve-fold increase in the annual rate of emission reductions relative to 1990 and 2020.

## Figure 4.1. Emission reductions need to accelerate

Greenhouse gases emissions, tonnes of $CO_2$ equivalent per capita




Note: Greenhouse gas (GHG) emissions include those from the land use/land use change and forestry sector (LULUCF).
Source: Eurostat; European Environment Agency; OECD Environment database; OECD Population database; and OECD calculations.

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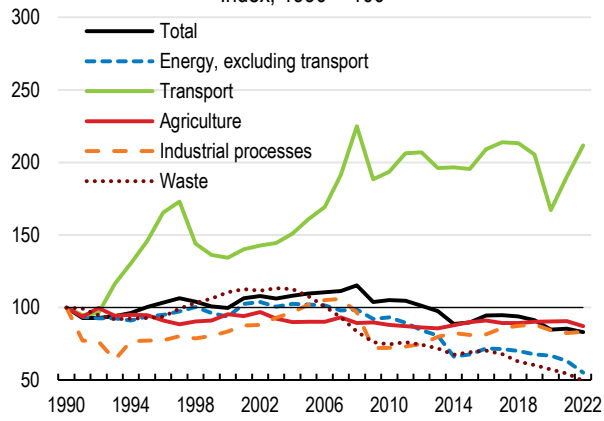
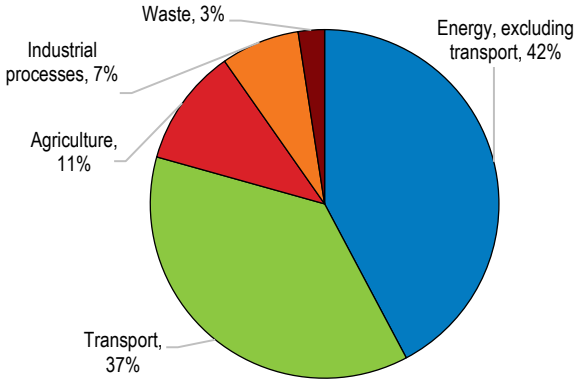
Energy (power and heat generation, including in industry and buildings), transport and agriculture produce the most emissions, accounting for 90% of total GHG emissions (Figure 4.2). Over the past two decades, the most notable emission reductions happened in energy and buildings. Between 2005 and 2020, GHG emissions declined by 30% in energy and 45% in buildings, driven mainly by improvements to energy efficiency and a switch from coal to gas as coal subsidies were phased out. In contrast, emissions in transport increased and they remained flat in agriculture. Achieving emission targets will require that all sectors contribute to emission reductions, including agriculture and transportation.

## Figure 4.2. Agriculture, energy, and transport account for a large share of emissions

**A. GHG emissions by source sector**
Index, 1990 = 100




**B. GHG emissions by source sector**
Sector shares, %, 2022




Note: Excluding land-use, land-use change and forestry (LULUCF).
Source: Eurostat; European Environment Agency; and OECD calculations.

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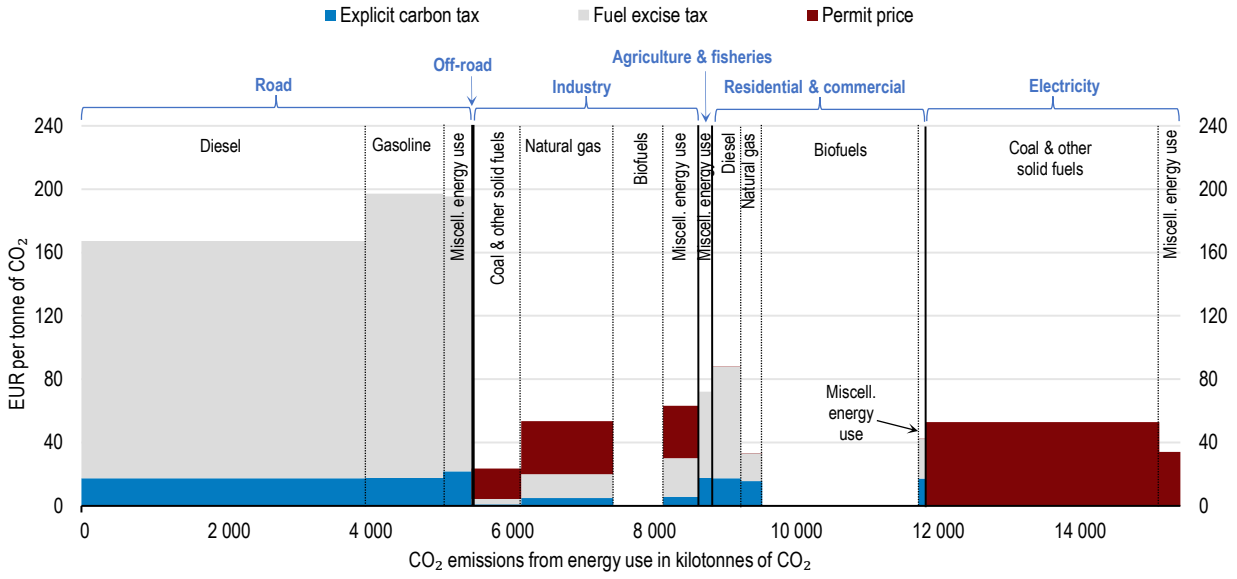
As an EU Member State, Slovenia is part of the EU's emission trading system, which puts an EU-wide carbon price on GHG emissions from power generation, energy intensive industry, and intra-European aviation. From 2027, EU-wide emission trading will be extended to fuel use in buildings, road transport and

industry (ETS 2), albeit at a lower carbon price than in the ETS. Alternatively, Slovenia may choose to tax transport and heating fuels using the current national carbon tax system until 2033, although at the higher ETS 2 rate (OECD, 2023[6]). EU funding includes EUR 2.7 billion (or 5.8% of GDP) in grants and loans under the Recovery and Resilience Plan for the period 2021-2026. EU funds support mostly investment in adaptation, public transportation, and the deployment of renewables. Apart from EU policies, climate objectives are pursued through national environmental taxation, subsidies, and regulatory measures. The government taxes energy use, including transport and heating fuels, as well as vehicles, among other things. Current regulations include stricter energy efficiency standards for heating, and a ban on oil boilers in the housing sector since 2023 (see below).

Uneven emission reduction incentives are in place. In a number of cases, fossil fuels benefit from reduced tax rates, such as on diesel and heating gas. Moreover, more than half of all GHG emissions are subject to an effective carbon price that is less than the ETS price of about EUR 60 in March 2024 (OECD, 2023[7]). This results in large differences in effective carbon prices across sectors, leading to a substantial variation in abatement incentives (Figure 4.3). The National Energy and Climate Plan foresees gradual cuts to fossil fuel subsidies (National Assembley of the Republic of Slovenia, 2020[3]). In this regard, the government announced a plan to phase out reduced rates on commercial diesel. However, these efforts were halted in 2022 as energy prices rose in response to Russia's war of aggression against Ukraine. The government capped gas prices for households and small businesses and reduced excise duties and VAT rates on gas, among other measures. It extended the cap on gas prices for households until April 2024, albeit at a lower level. As a result, fossil fuel subsidies amounted to 0.6 per cent of GDP in 2022, up by 61 per cent compared to 2017 (OECD, 2023[8]).

## Figure 4.3. Fossil fuels benefit from a favourable tax treatment

Effective energy tax rates across sectors, 2021




Note: Off-road refers to emissions from miscellaneous energy use. The free allocation of EU ETS emission permits is not taken into account.
Source: OECD (2022), Pricing Greenhouse Gas Emissions: Turning Climate Targets into Climate Action, OECD Series on Carbon Pricing and Energy Taxation, OECD Publishing, Paris, https://doi.org/10.1787/e9778969-en.

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Generous fossil fuel subsidies increase the cost of emission reductions as abatement activities are not targeted to where they are most cost-effective. First, the government should swiftly implement the phase-out of regulated gas prices. Furthermore, reduced tax rates on diesel and heating gas should be phased

out. Thereafter, the alignment of abatement incentives across sectors requires a gradual increase in the carbon tax in the non-ETS sectors to the ETS price level where this is not the case yet. In practice, this entails that the $CO_2$ tax for sectors not covered by the EU-ETS should gradually rise from its current level of about EUR 17 per tonne of $CO_2$, where it has been since over half a decade. The introduction of the ETS 2 for transport and heating fuels in 2027 will already lead to an increase in the carbon price for these sectors, albeit at a lower carbon price than in the ETS. The additional revenues from carbon pricing could be used to provide targeted support to population groups that are most vulnerable to higher carbon pricing.

Apart from carbon pricing, the government also uses regulations to reduce emissions. An important area is buildings regulations, where the government implemented a ban on oil boilers in 2023. This was predated by the phase-out of coal subsidies in 2012, which made gas boilers more attractive. The resulting switch from oil to gas boilers contributed to a 45% reduction of buildings emissions in 2020 (relative to 2005) (Al-Mansour and Cesen, 2021[1]). Looking forward, further emission reductions will be more difficult to achieve. A switch from gas to electricity boilers would mean that the additional electricity demand may be covered by higher emission power generation as the deployment of renewables is slow and the country is still reliant on lignite power generation to meet additional demand. Moreover, heating gas benefits from regulated prices and a reduced tax rate, rendering electricity-based solutions less attractive. Phasing out reduced tax rates for heating gas could support regulations in further reducing emissions in the building sector. But this will require the additional electricity demand to be met by lower emission power generation (see below).

### *Strengthen adaptation to climate risks*

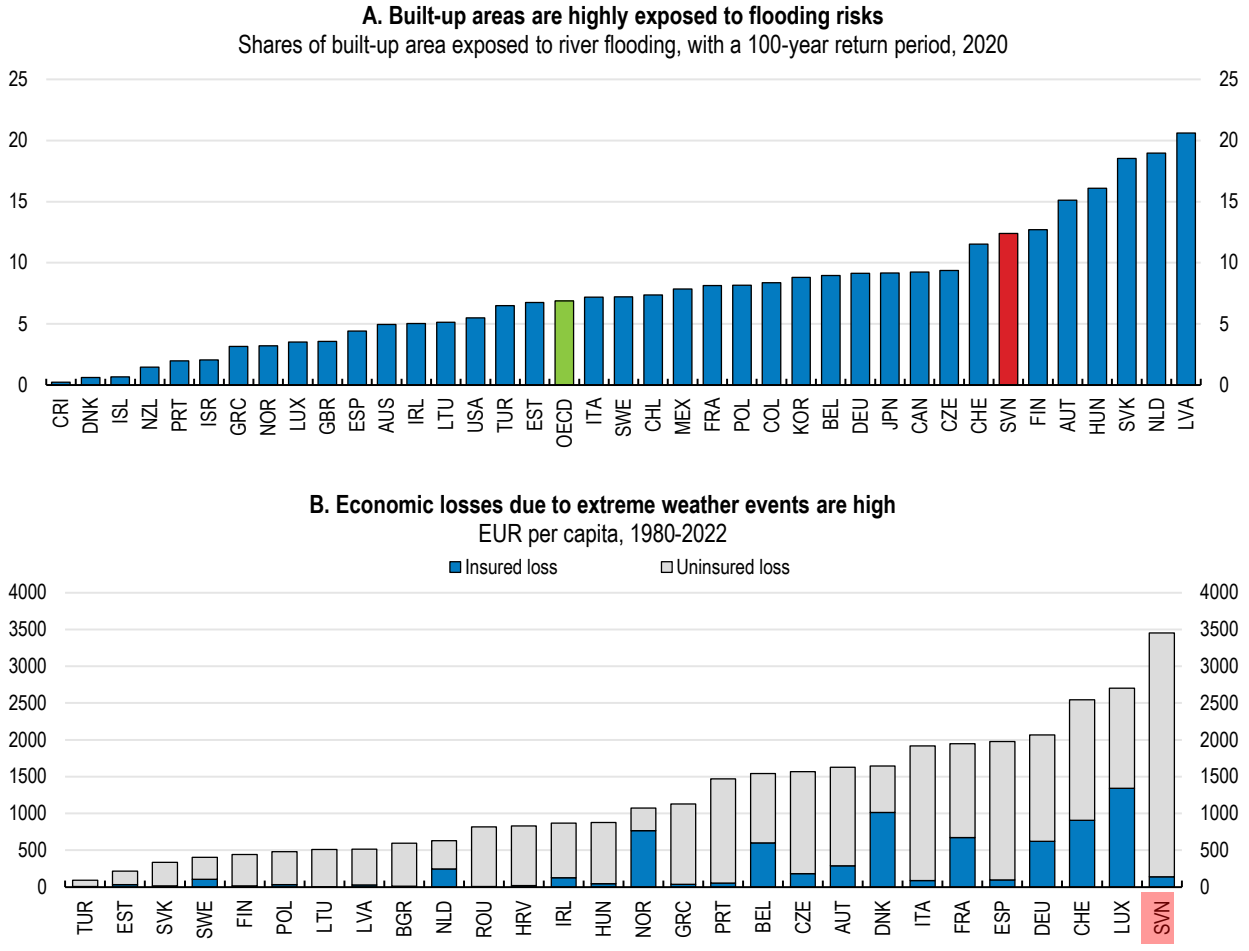
In addition to mitigation policies, adaptation policies are needed to reduce the impacts of climate change (OECD, 2024[9]). In particular, the country is highly exposed to river flooding (Maes et al., 2022[10]). The 2016 Strategic Framework for Climate Change Adaptation aims to integrate adaptation into environmental impact assessments for government planning and programming, although the strategy was not followed up with an implementation plan. Moreover, assessments of the preparedness of municipalities to climate events have been carried out since 2022. Nonetheless, the devastating floods of summer 2023 have exposed major shortcomings in flood preparedness (Sodnik, Mikoš and Bezak, 2023[11]). A concern has been underinvestment in the maintenance of water infrastructure, which is under the responsibility of municipalities. Over the past decade, the country invested much less in water infrastructure per river kilometre than neighbouring countries such as Austria (Sodnik, Kogovšek and Mikoš, 2015[12]). Since the floods in 2023, spending on water infrastructure has been substantially increased using national and EU funds, although implementation remains a challenge. The government also proposes to earmark revenues from the $CO_2$ tax to finance spending on adaptation. In addition, it is currently preparing a new adaptation strategy and regional implementation action plans that, apart from flood preparedness, also cover adaptation to climate risks in forestry, tourism, and agriculture sectors.

Going forward, municipalities will need new sources of revenue to fund the infrastructure that adaptation requires, in addition to the above-mentioned transfers from the central government as municipalities should not necessarily shoulder all the cost of adaptation. Since municipalities obtain their funding from recurrent immovable property taxes, one way is to raise revenues from recurrent immovable property taxation (Chapter 5). Another source of additional revenues are higher environmental fees for water and wastewater services, which are relatively low and do not reflect the associate costs of water infrastructure management as discussed in the last *Survey* (OECD, 2022[13]). Other options to finance flood protection and water infrastructure include, among others, taxes on urban development in floodplains as discussed in more detail in the latest *OECD Studies on Water* (OECD, 2022[14]; OECD, 2020[15]).

Adaptation policies include regulations that require the insurance and banking sectors to reveal their exposure to climate risks. However, many households remain highly exposed to floods. More than 3% of all buildings are in flood areas, and 12% of the country's build-up area is exposed to river flooding (Komac, Natek and Zorn, 2008[16]). As a result, economic losses from extreme weather events are among the

highest in the OECD (Figure 4.4, Panel A). The floods in summer 2023 have exposed the lack of adaptation to floods as the government had to step in to pay households for flood damages. The government disbursed 0.7% of GDP for flood reconstruction in 2023 and announced flood-related spending of 2% of GDP in 2024, financed by EU funds, a three-percentage points increase in the corporate tax rate to 22% (until 2028) and a new 0.2% tax on banks' assets (Government of Slovenia, 2024[17]). However, government compensation increases households' incentives to settle in flood areas. Exposure to floods can be reduced by more stringent land-use planning that prohibits new construction in high-risk flood areas (OECD, 2016[18]). In this regard, the government's proposal to strengthen restrictions for new construction in flood-risk areas is a step in the right direction and should be implemented.

## Figure 4.4. Economic losses due to extreme weather events are high




Source: OECD (2022), Climate-related hazards: River flooding, Environment Statistics (database), https://oe.cd/dx/58w (accessed on 24 July 2023); and European Environment Agency (EEA).

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Insurance covers less than a tenth of economic losses from extreme weather events, as less than a quarter of Slovenian households are estimated to have flood insurance (European Insurance and Occupational Pensions Authority, 2023[19]) (Figure 4.4, Panel B). The floods in 2023 have exposed this insurance gap as the government had to step in to pay households for flood damages not covered by insurance. However, government compensation reduces households' incentives to buy flood insurance. A stronger uptake of flood insurance could reduce risks for the budget. For instance, flood insurance could be made mandatory for all properties irrespective of location as done in France. Such an insurance scheme helps to keep

premiums in high-risk areas affordable, with the insured in non-flood areas effectively subsidising settlements in flood areas. Another approach is to require flood insurance for mortgages in flood areas as done in Belgium and Denmark, two countries with high coverage of flood insurance. Governments remain exposed to budgetary risks as such insurance schemes require state-backed insurers or reinsurers to keep premiums affordable. In Slovenia, the government already co-finances 60% of insurance premiums for agricultural producers since 2023 with the aim to increase insurance uptake against natural hazards. More frequent climate hazards might lead to higher government involvement in the insurance sector as more areas will become highly exposed to climate events. Developing insurance schemes will help to lower risks for the budget while aligning incentives for adaptation. Importantly, insurance will have to be complemented by regulations that prohibit new construction in high-risk flood areas (see above) (OECD, 2024[9]).

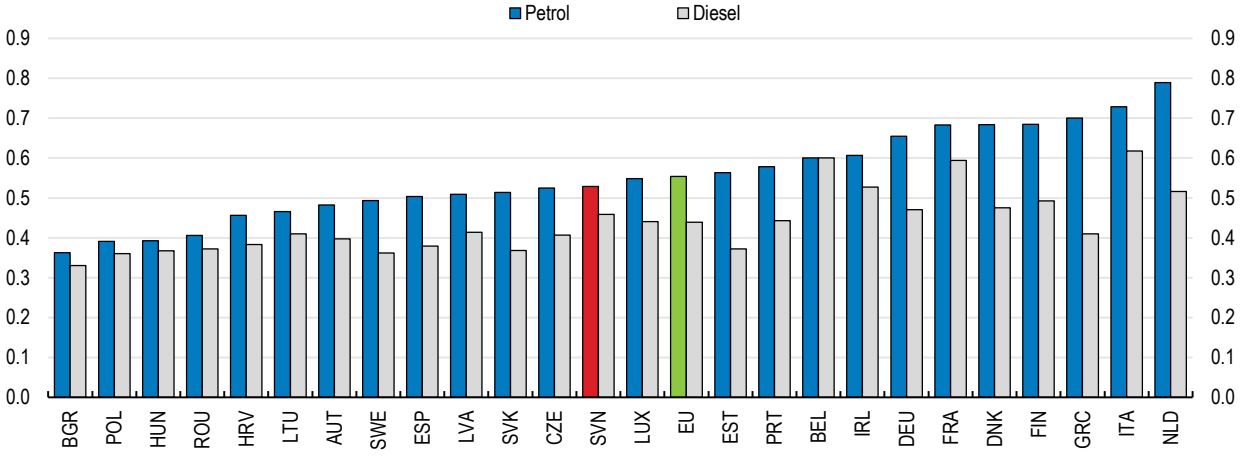
## Accelerating the green transition in high-emitting sectors

### *Reducing emissions in transportation*

The transport sector has seen an increase in emissions over the past decade. This reflects transit freight and widespread commuting due to residential dispersion, supported by generous commuting allowances. Another contributing factor has been the relatively low taxation of transport fuels, especially for diesel (Figure 4.5). A new EU-wide emission trading system for transport, industrial and residential heating fuels will gradually increase the carbon price for transport fuels from 2027 (OECD, 2023[6]). However, tax reductions for commercial diesel and diesel used in agriculture in the order of 0.1% of GDP in 2022 reduce the effective tax rate for diesel, despite its higher environmental harm (European Commission, 2024[20]; Financial Administration of the Republic of Slovenia, 2022[21]). Such a tax advantage for commercial diesel encourages freight trucks to fuel in Slovenia on their route between Central and South-Eastern Europe, leading to emissions being accounted for in Slovenia. A similar tax advantage is in place for agricultural diesel.

### Figure 4.5. Excise duties on diesel are relatively low

Road fuel excise duties, Euros per litre of road fuel, 01-Jan-2024




Note: Unweighted average for the EU.
Source: European Commission, Taxation and Customs Taxes Database, https://ec.europa.eu/taxation_customs/tedb/advSearchResult.html.

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The government plans to phase out the reimbursement of excise duties on commercial diesel conditional on the approval of the new EU energy tax directive that foresees such a phase out of fossil fuel support in all EU countries, although agriculture will continue to benefit from diesel subsidies. Tax advantages for

diesel should be phased out, including for agricultural diesel, to align incentives to reduce emissions in the sector (OECD, 2023[22]).

Generous commuting allowances encourage passenger road transport and contradict efforts to decarbonise the sector. Employees benefit from a tax-free commuting allowance amounting to 10% of the gasoline price times the kilometre distance between home and the workplace. Such a per kilometre commuting allowance increases incentives to use private cars considerably, while discouraging the use of public transportation (see below). Moreover, the allowance per kilometre driven can be up to a third of the carbon price on gasoline, including excise duty and carbon tax, reducing the carbon price's effect on emission reductions. To reduce emissions in road transport, the government should reduce incentives for commuting with private cars, starting with taxing the commuting allowance. This should be complemented by congestion pricing to capture other negative effects from road transport, such as air pollution and congestion, as recommended in the last *Survey* and *OECD Environmental Tax Policy Reviews* (OECD, 2022[13]; OECD, 2023[22]). As the share of combustion engine cars is projected to gradually decline over the longer term, a sustainable tax policy will also require shifting from taxes on fuels to taxes on distances driven to compensate for revenue losses. Hence, a gradual reform of transport taxation will be important, even more so for Slovenia where excise duties and carbon taxes levied on transport fuels accounted for 15% of the central government's tax revenues in 2016 (OECD/ITF, 2019[23]).

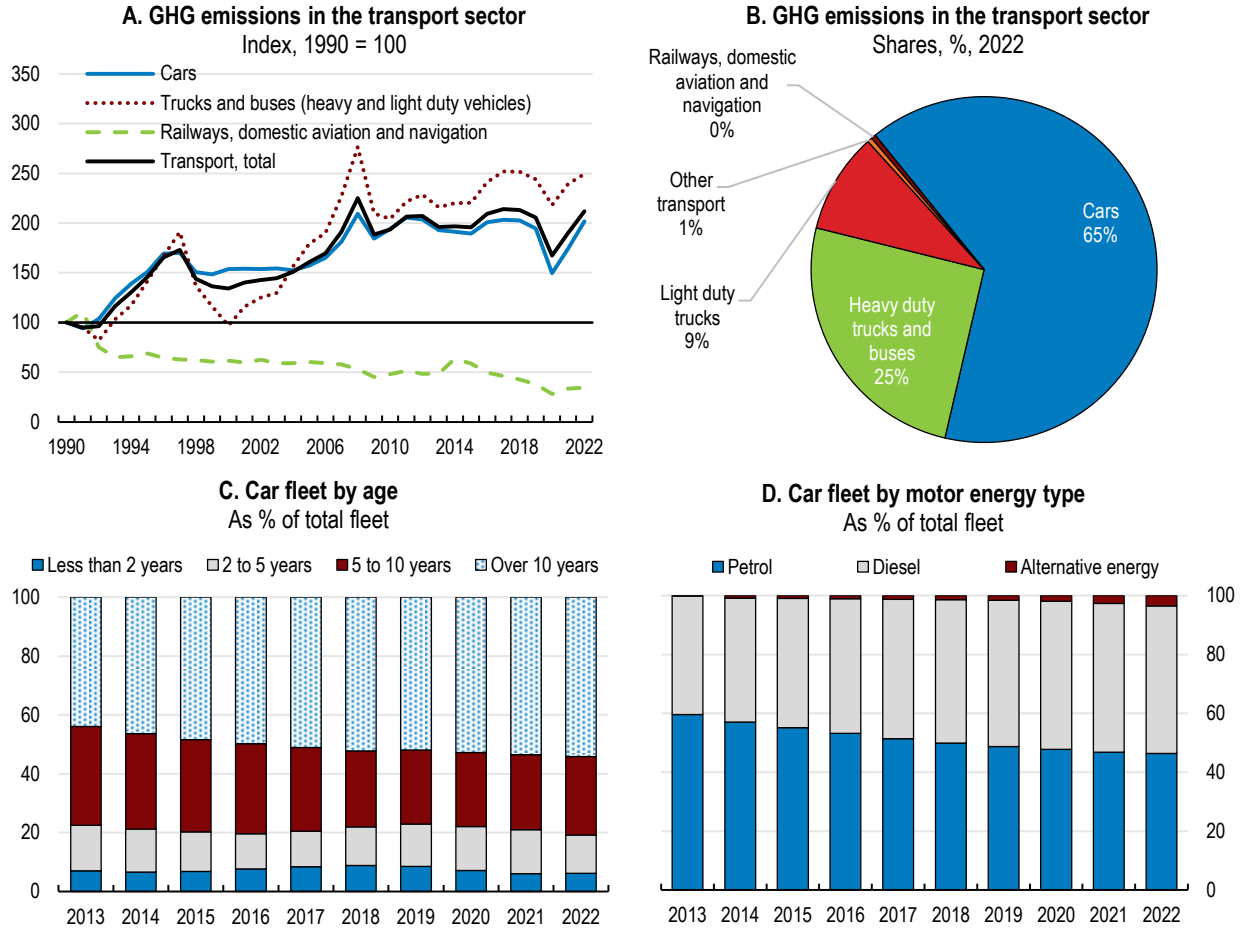
More stringent $CO_2$ emission standards for cars foresee that after 2035 new cars are only allowed to emit zero $CO_2$. However, this regulatory measure will only affect newly registered vehicles. It may not be sufficient to lower overall emissions in road transportation given the increasing average age of the car fleet with a higher share of cars with diesel engines (Figure 4.6). An additional factor is that the composition of the car fleet may only change slowly as the new emission standards are likely to lead to a fall in the resale value of used cars, increasing incentives to extend the life span of the existing car fleet.

Vehicle taxation already promotes cleaner cars by focussing on environmental factors (OECD, 2022[24]). However, one factor behind the slow renewal of the car fleet is the relatively low taxation of transport fuels, notably diesel. Other factors that may slow the renewal of the car fleet are households' budget constraints and the fact that cars are not written down as quickly as other goods. Also, the generous commuting allowance is not based on the carbon-intensity of cars. For road transport to contribute significantly to emission reductions, taxation of transport fuels should be raised, and relatively more for diesel to reflect its higher environmental harm. In addition, commuting incentives should be gradually reduced as discussed above. Such a policy mix to reduce emissions could be complemented with congestion pricing, and in the longer-term with distance-based pricing (OECD, 2023[22]). The resulting higher tax revenues could be used, for instance, to lower the relatively high labour tax burden to soften negative employment effects (Chapter 2).

Another factor behind the ageing car fleet is the slow rollout of electric cars, although this has started to pick up significantly since 2022. Fully electric cars accounted for 5% of new sales in 2022 against 10% in the EU, and their share in the stock of vehicles remains low at around 1% (Figure 4.7, Panel A) (Statistical Office of Slovenia, 2023[25]; European Environment Agency, 2023[26]). The government offers subsidies and tax incentives for the purchase of new and used electric vehicles, depending on the price of the vehicle, although cars priced above EUR 65 000 are not subsidised. However, the relatively low number of charging stations outside urban areas may slow the rollout of electric cars (Figure 4.7, Panel B). In particular, rural areas with the greatest need for private cars and motorways remain underserved (Prah, Kmetec and Knez, 2022[27]).

Countries with a higher uptake of electric cars have shifted policy focus from purchase subsidies to subsidies for charging stations. For instance, purchase subsidies were removed in Denmark and Germany in 2023 and 2024, respectively, while support for charging infrastructure was stepped up, including for home charging stations.

## Figure 4.6. The ageing car fleet is the main source of emissions in the transport sector




Note: In Panel A and B, GHG emissions from international aviation and navigation are excluded.
Source: Eurostat; European Environment Agency; and OECD calculations.

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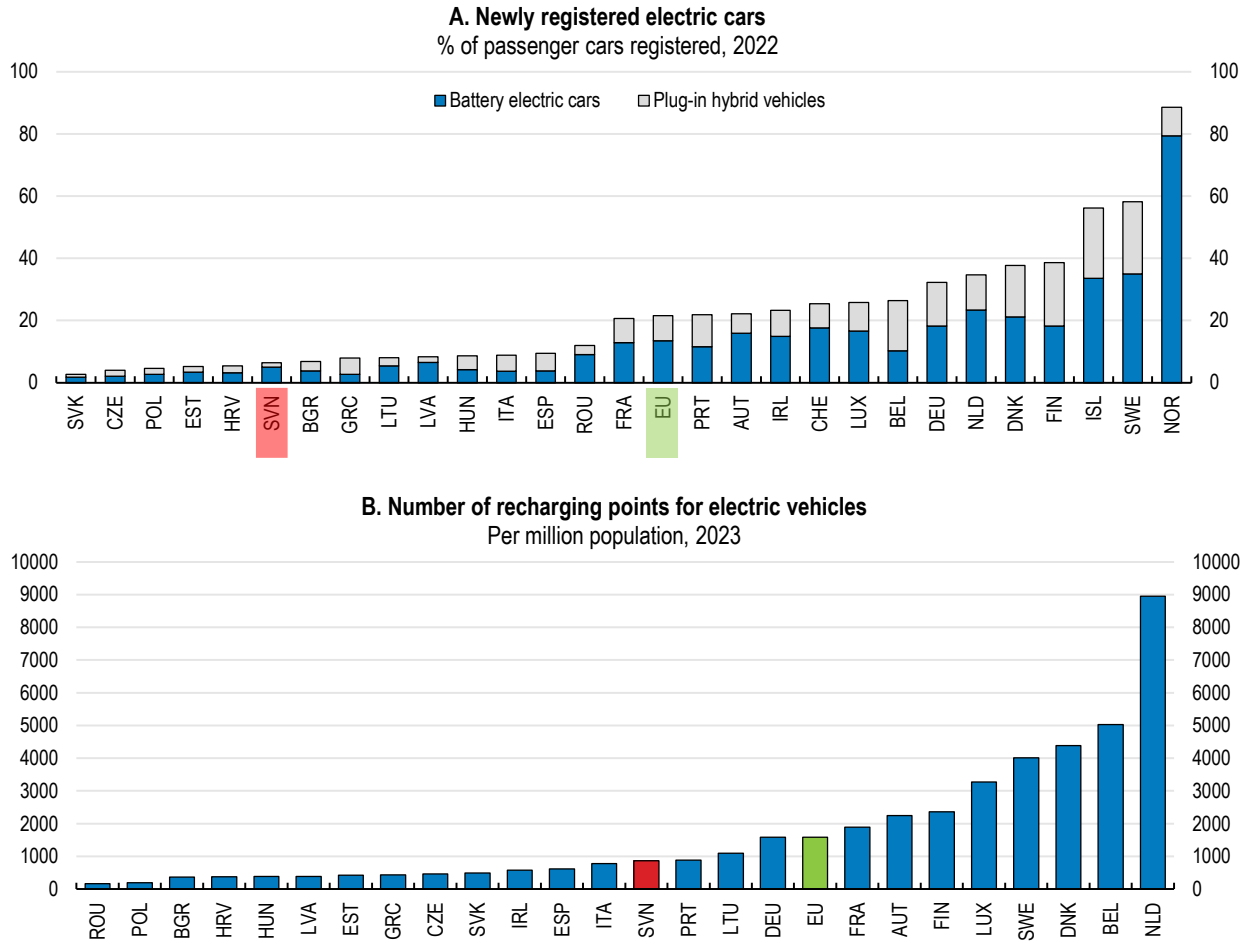
To encourage the rollout of public charging stations, the government plans to provide 0.5% of GDP in subsidies to the private sector for the deployment of public charging stations in remote areas and along motorways (National Assembly of the Republic of Slovenia, 2023[28]). This will be complemented by EU support for investment in public charging stations of 0.1% of GDP until the end of 2026. A more efficient solution would be to let the market provide public charging stations. In areas where the market does not provide sufficient public electric charging capacity, targeted subsidies could be provided for home charging stations. Cost-benefit analysis and detailed cost models could inform better targeting of subsidies to remote areas. For instance, granular data on access to public charging stations could be used to calculate co-financing rates for home charging stations in remote areas.

## Figure 4.7. The network of charging stations remains underdeveloped




Note: Panel B shows alternating current and direct current power recharging points based on the EU Alternative Fuels Infrastructure Directive.
Source: European Environment Agency; European Alternative Fuels Observatory (EAFO); Eurostat Population database; and OECD calculations.

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Other barriers to electric charging include difficulties in comparing prices and paying for charging, which often requires a subscription to a payment provider. These factors risk reducing the confidence and trust in electric cars. To increase price transparency, charging station operators are required to share price data with a new national digital platform from 2024. However, there are concerns about exclusionary behaviour, with charging station providers offering better terms of access to customers of their payment providers than to customers of rival payment providers (Elektro Ljubljana, 2024[29]). It will be important to monitor and assess competition concerns to ensure a competitive electric charging market. In this regard, the competition authority should conduct a market study, as done in the United Kingdom (Competition and Markets Authority, 2021[30]).

Incentives to use public transportation are weak. This is despite public trains and buses having on average lower carbon emissions per kilometre than private passenger transport (ITF, 2023[31]). Public transportation had a relatively low market share of 10% in 2021, almost a third lower than the EU-average of 14% (Eurostat, 2023[32]). This reflects residential dispersion, which makes public transportation less attractive for commuting due to the low frequency and speed of connections (European Commission, 2019[33]). Another factor are generous incentives for commuting with private cars, notably the tax-free commuting allowance. The government plans to expand the offer of public passenger train services and regional public

bus services. Preference is given to investment in railways, with spending of 1% of GDP in 2023. However, these measures are mostly about expanding the supply of public transportation.

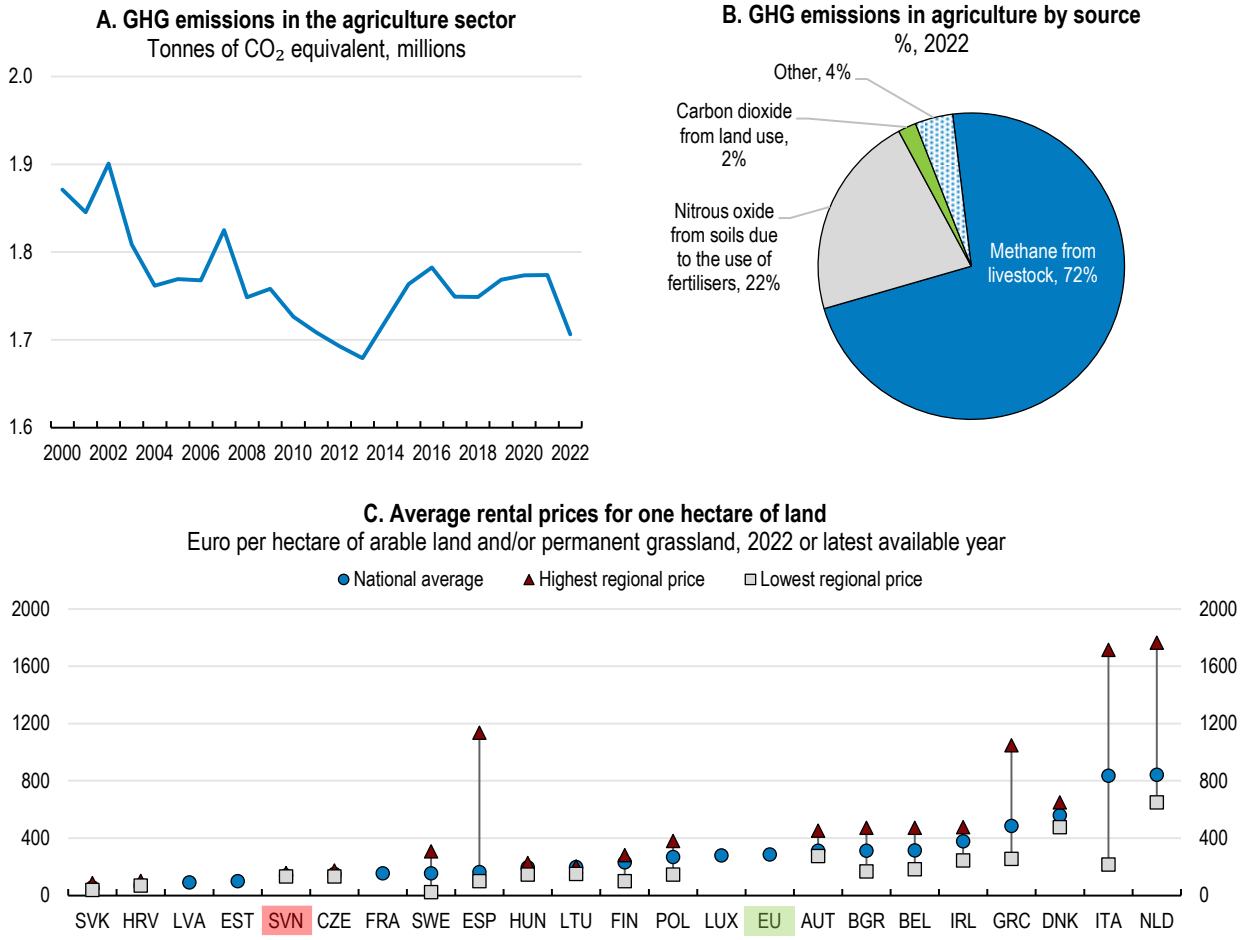
To reduce emissions from passenger road transport, stronger incentives for the actual use of public transportation are required. This would entail a strategy to stimulate demand for public transportation with view to raising the average load on a train or bus route throughout the day. To raise public transportation's market share, it will be important to integrate service and ticketing to ensure prices and services are competitive with private car transportation. A positive development in this regard has been the establishment the Passenger Transport Management Company in 2022, which aims to better integrate planning and management of regional bus and train services. At the same time, generous incentives for commuting with private cars need to be reduced (see above).

Public spending on railways includes investment in the railway line connecting the state-owned port of Koper to Austria and Germany, primarily for the purpose of freight transport. However, spending efficiency is a concern. Spending of about 3% of GDP in railway connections for the port of Koper since 2015 have not led to a higher market share, with the port's cargo volume remaining low at about 0.03% of EU ports' total cargo volume between 2017 and 2022 (Port of Koper, 2018[34]; Port of Koper, 2023[35]; Eurostat, 2023[36]). This reflects comparative advantages of already established ports which serve Central Europe, such as Rotterdam and in neighbouring countries. The rationale for state-ownership of the port is not clear. State-ownership also binds public resources which could be used more effectively in other areas. Hence, the port of Koper could be privatised to free up public resources. Moreover, to ensure cost-efficiency of public spending, investment decisions in public transportation should be based on a thorough cost-benefit analysis including a mapping of emissions from distinct types of public transportation as discussed in the last *Survey* (OECD, 2022[13]).

### *Bringing agricultural emissions on a downward track*

Agricultural emissions have been reduced by about 10% between 1990 and 2019, mainly reflecting declines in emissions from livestock and fertiliser use. However, the fall in emissions happened mostly in the 1990s and 2000s, while emissions have not been reduced over the past decade. This reflects in part agricultural subsidies (so-called coupled payments) for livestock, which accounts for 72% of overall agricultural emissions. Coupled payments also support good land management and the maintenance of biodiversity. In addition, agricultural producers benefit from diesel subsidies, in the form of reduced excise duty rates, and below-market rental prices of state-owned agricultural land (Figure 4.8). Such subsidies and favourable rental prices support farmers' incomes. However, they have also contributed to a fragmented agricultural sector which is dominated by inefficient small farms specialised in emission-intensive livestock, although smaller farms contribute to the preservation of biodiversity. Another important factor behind the fragmentation is geography, with the numerous mountainous areas offering limited space for larger farms. Reducing agricultural emissions will require, first, phasing out environmentally harmful agricultural diesel subsidies, and second, withdrawing coupled payments for livestock. The resulting revenues could be used to redirect funding to support low-income farmers most vulnerable to higher mitigation costs.

## Figure 4.8. Agricultural emission reductions have stalled




Note: GHG refers to greenhouse gases emissions. Panel C, unweighted average for the EU.
Source: Eurostat.

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The State owns 9% of all agricultural land, about 10% of which is used for purposes other than agriculture, such as private gardening (Agricultural Land and Forest Fund of the Republic of Slovenia, 2023[37]). The Agricultural Land and Forestry Fund manages state-owned land with the aim to consolidate the sector by increasing the average farm size to raise agricultural productivity, although rental protection of existing small farms on state-owned land slows the process. Another factor behind the slow consolidation is rents for state-owned land that are regulated below market prices, leading to a misallocation of state-owned land despite high and growing land demand for renewables and housing. For instance, the monthly regulated rent for state-owned permanent grassland stood at EUR 84 per hectare in 2022, compared to a monthly market rent of EUR 140 per hectare for privately-owned permanent grassland (Eurostat, 2024[38]; Farmland and Forest Fund of the Republic of Slovenia, 2022[39]). Below-market rental prices also keep more agricultural land in use than would otherwise be the case. The rationale for regulated rents is to strengthen agricultural self-sufficiency since the country imports most of its food. However, this policy stands in contrast with the goal to consolidate the sector to improve agricultural efficiency. Rents should follow market prices to ensure a reduction of agricultural emissions from land use (Brady et al., 2017[40]). Moreover, there is a lack of clear rules for converting agricultural state-owned land into buildable land, reflecting that municipalities are responsible for land use. Having clear rules for selling state-owned land can help renewable and housing supply adjust faster to growing demand (Chapter 5).

The polluter-pays principle does not apply to emissions from agriculture. Pricing is not in place for most of the sector's GHG emissions, which consist of methane mostly from livestock and nitrous oxide from soils due to the use of fertilisers. At the same time, the agricultural sector contributes to carbon sinks, with grasslands capturing more emissions than emitting them, although incentives are not in place for carbon sequestration. Thus, bringing agricultural emissions on a downward track will require higher and broader emissions pricing. This could entail a carbon tax or expanding emission trading to include agriculture, as planned in Denmark and New Zealand, although in the latter country explicit carbon pricing has been delayed by successive governments (OECD, 2024[41]). The extension of emission trading will require stronger support for farmers to set up systems to monitor and report emissions (see below). This could be done by diverting agricultural subsidies to support low-income farmers most vulnerable to higher mitigation costs as these often cannot pass on higher costs to consumers. Additional safeguards could ensure that smaller farms are not overburdened with the new carbon pricing framework, including a gradual phase-in and free allowances. An alternative solution is to implement carbon pricing in agriculture at the European level to address carbon leakage concerns, as discussed in the *OECD Economic Survey of the European Union and euro area* (OECD, 2023[6]). A carbon price would also reward carbon removals.

Measuring farm-level emissions is technically challenging. Thus, it is necessary to find proxies, such as livestock numbers and sales of fertiliser and feed. For instance, emission trading could be introduced for upstream suppliers of feed and fertilisers, and for downstream processors of meat and dairy products. These producers are usually larger and in a better position to invest in emission monitoring systems. From an environmental perspective, however, such a system only gives weak emission reduction incentives through a more efficient use of feed and fertilisers, and a switch to less emission-intensive types of crops and meat. To provide stronger emission reduction incentives, farmers could opt in a voluntary calculation of farm-level emissions at their own expense, certified by recognised third parties, as done in New Zealand (Box 4.1). These calculations would allow farmers to demonstrate stronger emission reductions and earn carbon credits. Initially, only farms which would be able to demonstrate significantly lower emissions would find this option attractive. Over time, such a voluntary system may lead to the development of a farm-level emission monitoring system that accounts for how mitigation practice affects emissions. To provide additional mitigation incentives, carbon removals could be integrated in emission trading. To do so, tradable certifications for carbon removals will be important. In this regard, the EU proposed to extend the carbon removal certification framework to agriculture in 2026.

Further research is needed to improve the accuracy of farm-level emission approaches and to ensure actions to reduce emissions are being awarded carbon credits. In New Zealand, for instance, the government supports partnerships between research institutes, farms, and dairy processing companies for better measurement of on-farm emissions, the dissemination of best practices in feed, and the deployment of new techniques such as methane vaccines (OECD, 2024[41]). The EU supports similar partnerships through European Innovation Partnerships.

The government foresees the agricultural sector to reduce emissions by only 3% in 2030. This reflects that measures to reduce farm emissions are voluntary, such as new eco-schemes that provide additional direct payments for farmers to reduce ammonia and livestock emissions and emissions from fertiliser use, among other things. However, eco-schemes remain input-based and do not require a reduction in emissions. To improve cost-efficiency, payments should be made conditional on achieving emission reductions (OECD, 2022[42]). Such results-based payments come with difficulties since emission monitoring and reporting is not in place in agriculture. Initially, outcome-based payments could be introduced to incentivise farms to set up emission monitoring systems (see above).

### Box 4.1. Approaches for calculating farm-level emissions

Methods are available to estimate farm-level agricultural emissions in the European Union and New Zealand.

***European Union:*** The Joint Research Centre developed a calculator for measuring GHG emissions (Tuomisto et al., 2015[43]). The calculator includes farm-level mitigation practices that reduce GHG emissions, such as reducing synthetic fertiliser use, improving manure management, and biogas production. Farm-level emission are calculated for crop residues, manure use and management, fertiliser use, enteric fermentation, feed stuff, and on-farm energy use.

***New Zealand:*** The government and the agricultural sector jointly developed a calculator of farm-level emissions. It considers mitigation practices, including practices that improve production, reduce the feed and fertiliser use, and manage effluents. The use of new mitigation practices such as biogas production, feed additives and methane vaccines is also accounted for. Emissions are calculated for manure use, fertiliser use, enteric fermentation, and feed stuff.

The agricultural sector already has experience with emission reporting in New Zealand. Companies in the agricultural supply chain (e.g., meat processors, dairy processors, nitrogen fertiliser manufacturers and importers) are required to monitor and report their agricultural emissions within the framework of the ETS. In addition, the government mandated all farmers running 80 hectares or more to know their farm's greenhouse gas emissions by 2023. A range of different calculators have been made available to help farmers calculate their carbon footprint (New Zealand Agricultural Greenhouse Gas Research Centre, 2024[44]).

Source: Trinomics (2023[45]).

### *Further lowering energy emissions while ensuring energy security*

Power generation accounts for a relatively large share of emissions despite the increasing share of renewables, reflecting the expansion of coal (lignite) power since 2015. To reduce emissions, the government announced a phase out of coal generation by 2033. To replace coal-based power, it prioritises domestic renewable production over imports of renewable energy due to energy security concerns, although imports of renewable energy can be cheaper. The Slovenian electricity system is well interconnected with neighbouring countries, which allows to import up to 200 per cent of annual electricity consumption. In contrast, the deployment of renewables is behind schedule. Bottlenecks include lengthy planning procedures, insufficient grid capacity, local resistance to wind farms (which need the approval of municipalities), and a ban on solar and wind farms on agricultural and forest land (or approximately 90% of the country's land surface). Another factor is geographical conditions that are not ideal for wind energy. All these factors increase the costs for domestic renewable production. To reduce the costs of the deployment of renewables, the government plans to abolish municipal restrictions on windmills. It has also announced EUR 3.5 billion (or 7.5% of GDP) in investment in electricity grids until 2032. Such efforts should be complemented by further reductions in permitting times for renewable energy projects. A way forward could be applying silence-is-consent rules and bolstering the resources and staff of permitting authorities as done in Germany (OECD, 2023[46]).

Investment in renewable energy is supported through national and EU funds, mostly benefiting biomass and solar energy (European Commission, 2023[47]). This means that achieving the 2030 renewable energy target will also rely on burning biomass, although biomass can be emission-intensive (Brack, Birdsey and Walker, 2021[48]). Moreover, the government provides direct grants to small producers of solar and wind energy, including EUR 280 per thousand watts of wind capacity installed, while municipalities are eligible for a one-off EUR 200 000 for each megawatt of new wind capacity installed. However, geographical

conditions do not favour wind energy, with many of the more suitable locations lying within environmentally protected areas. In contrast, the potential for an expansion of solar power is greater (Obrecht and Denac, 2013[49]). The government also announced a referendum to be held in autumn 2024 on the construction of a second nuclear power plant to increase energy independence. Subsidies for wind energy and the expansion of nuclear energy may come at a fiscal cost as cheaper energy sources are available, including domestic solar energy and imports of renewable energy. As a small country in Europe, energy security is best ensured through integration within Europe. Investment in renewables should be based on clear cost-benefit analyses.

A positive development has been the move from government-set feed-in-tariffs to auctions via a competitive tender since 2018. Competitive tenders were found to enhance the deployment of renewable capacities, especially of larger projects, and reduce fiscal costs of renewable support in the European Union. In Slovenia, the effect of competitive tenders on the deployment of renewable energy has been somewhat weaker since solar photovoltaic and wind energy projects are mostly small, making them less suited for public tenders (European Commission, 2022[50]).

The announced introduction of direct grants for smaller renewable projects of up to EUR 25 million per beneficiary at the end of 2024 may reduce the attractiveness of the auction system. These grants will be introduced following the temporary relaxation of EU state aid rules in response to the energy crisis and aim to support smaller solar and wind energy projects, while bigger projects will be supported via the auction system. Direct grants can support the development of new technologies that are not yet competitive. However, solar and wind technologies have become cost-competitive over the last decade, reducing the need for government subsidies. Moreover, state-aid will be available only for smaller renewable projects, reducing incentives for larger renewable projects. Hence, direct subsidies for solar and wind should be phased out and rechannelled towards new technologies, as also recommended for the European Union in the latest *OECD Economic Survey of the European Union* (OECD, 2023[6]). This would also strengthen the use of competitive auctions. To lower the costs of domestic renewable production, the government could further reduce permitting times and ease land-use restrictions (see above).

The announced coal phase out by 2033 means that the largest coal plant Šoštanj will have to be decommissioned, although it was only brought online in 2015. The phase out may even proceed ahead of the current 2033 timeline due to economic and business considerations, as projected rising ETS prices make operations more expensive. Such an earlier-than-expected decommissioning is welcome as it will contribute to a significant reduction in emissions. However, it also leads to stranded assets as the state-owned company operating the plant recorded debt and losses in the order of 2% of GDP in 2022 due to the decommissioning (Termoelektrarna Šoštanj, 2023[51]). The closure of the state-owned coal plant will likely lead to fiscal costs. To reduce costs, the government is examining the viability of repurposing the coal plant into small modular nuclear reactor facilities. Going forward, a more cost-effective planning and investment policy could help reduce fiscal costs. This can be achieved by introducing an internal carbon price (or shadow carbon price) to be used for cost-benefit analysis of public energy projects, as done in the United Kingdom, and recommended in the last *Survey* (OECD, 2022[13]). Indeed, such internal carbon prices should be introduced in all public investment, planning, and cost benefit analysis for projects with a carbon impact to secure full cost analysis with an emphasis on environmental aspects.

## Table 4.1. Past recommendations on green growth

| Recommendations in previous *Surveys* | Action taken since the 2022 Survey |
|---|---|
| The tax system imposes heterogeneous abatement costs across sectors and activities. | No action taken. |
| Align effective tax rates on different forms of energy to reflect environmental damage. | No action taken. |
| Large parts of the population are exposed to small particles. | Ban on oil boilers was adopted in 2023. The eco-fund provides a replacement bonus for old wood and oil boilers. |
| Introduce congestion charges. | No action taken. |
| Avoid technology biases in renewable-energy subsidies. | No action taken. |
| Upgrade the railway system, and improve efficiency of railways, especially in the freight sector. | New investments from the EU Cohesion Fund and the EU Recovery and Resilience Facility in the second track of the Divača–Koper line.<br>Investments in regional railway networks are focused on upgrading from single track to modern double track standard to allow for increased train capacity and frequency of service. |
| Fragmented budgetary and planning policies impose heterogeneous abatement costs across government programmes. | No action taken. |

## Table 4.2. Recommendations

| Main findings | Recommendations (key ones in bold) |
|---|---|
| **Improve the effectiveness of mitigation policy** | |
| The tax system imposes heterogeneous abatement incentives across sectors and activities. Regulated prices and reduced tax rates for environmentally harmful fossil fuels, including diesel and heating gas, continue to undermine decarbonisation efforts. | **Remove reduced tax rates for diesel and heating gas.**<br>**Swiftly implement the phase out of regulated gas prices.**<br>**Gradually increase carbon taxes in the non-ETS sectors to the ETS price level and compensate social costs.** |
| **Strengthen adaptation to climate risks** | |
| Many households are exposed to climate risks, including floods.<br>The coverage of flood insurance is low. Government compensation in case of floods reduces households' incentives to settle outside of flood areas and to buy flood insurance. | Introduce and enforce stringent land-use planning that prohibits new construction in high-risk flood areas.<br>Develop insurance schemes to lower risks for public finances while aligning incentives for adaptation. |
| **Accelerate emission reductions in agriculture, energy, and transportation** | |
| The market share of public transportation remains low, as the commuting allowance encourages private car use. | **Enhance incentives for the use of public transportation, including by reducing the commuting allowance, introducing congestion-based road pricing and ensuring public transport fares are competitive.** |
| Insufficient charging stations outside urban areas slow the rollout of electric cars. Difficulties in comparing prices reduce the confidence and trust in electric cars. Charging station providers offer better terms of access to customers of their payment providers than to customers of rival payment providers. | Align subsidies to reflect the actual deployment costs of charging stations in underserved areas, using cost-benefit analysis.<br>Review the competitive conditions in the electric charging market, including exclusionary pricing. |
| Agricultural subsidies for diesel continue to promote emissions.<br>Below-market rental prices for state-owned agricultural land keep more agricultural land in use than would otherwise be the case. The lack of clear rules for converting agricultural state-owned land into buildable land slows the adjustment of renewable and housing supply to growing demand. | **Remove agricultural diesel subsidies and redirect funding to support those most affected by higher mitigation costs.**<br>Ensure market-based rents for state-owned agricultural land.<br>Introduce clear rules for selling of state-owned land. |
| The polluter-pays principle does not apply to emissions from agriculture. | Consider introducing carbon pricing in agriculture, for instance by extending emission trading to upstream suppliers of feed and fertilisers, and downstream processors of meat and dairy products.<br>Establish emission monitoring and reporting systems (e.g., for emissions from livestock and fertiliser use). |
| Mitigation measures in agriculture have not led to emission reductions. | Make payments under the eco-schemes conditional on achieving emission reductions. |
| Lengthy permitting times increase the deployment costs of renewables. | **Streamline permitting procedures and lower land use restrictions for renewable energy projects.** |
| Government support for renewables mostly benefits cost-competitive biomass, solar, and wind. Direct grants reduce the use of competitive auctions. | Phase out direct grants for biomass, solar and wind installations, and provide subsidies only for renewable technologies that are not yet competitive. |
| Spending efficiency is a concern for investment in energy projects. | Introduce cost-benefit analysis based on an internal carbon price to identify most cost-efficient investments. |

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