INTERNATIONAL MONETARY FUND

IMF Country Report No. 22/46

SPAIN

SELECTED ISSUES

February 2022

This Selected Issues paper on Spain was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on January 26, 2022.

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International Monetary Fund
Washington, D.C.

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SELECTED ISSUES

January 26, 2022

Approved By
European Department

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ACTIVE LABOR MARKET POLICIES TO SUPPORT THE RECOVERY OF THE SPANISH LABOR MARKET[1]

ALMP resources in Spain have been directed mostly to job creation programs and start-up incentives. While evaluation has been limited, the general perception is that past ALMPs have not been effective. In the new context of significant structural changes, more ALMP resources should be allocated to training and upskilling the labor force. It would also be desirable to strengthen the capacity of the public employment service and reduce the heterogeneity of provision of services to jobseekers at the regional level. Introducing a system of regular evaluations would help assess the effectiveness of ALMP programs. The labor market reforms in the Recovery, Transformation and Resilience Plan include broad goals consistent with these recommendations. A careful design and timely execution of specific policy measures would be necessary for the success of the reforms.

Spanish Labor Market: Structural Challenges and COVID-19 Impact

1. Spain's labor market was facing significant structural challenges even before the pandemic. The unemployment rate in 2019, of about 14 percent, was among the highest in the EU and biased towards the young and long-term unemployed (i.e., persons out of jobs for more than a year). For instance, the youth unemployment rate was 32.5 percent—more than twice the headline rate—and the long-term unemployed, which were 5.3 percent of the labor force against 2.6 percent in EU-27, represented almost 40 percent of total unemployment. Among the employed, the shares of temporary workers and involuntary part-timers were elevated compared to the rest of Europe. Labor mobility was low, not only across regions (Liu, 2018), but possibly also across jobs due to high mobility costs.[2] Furthermore, there was a considerable skill mismatch in the labor force.

2. The COVID-19 crisis exposed the existing vulnerabilities and underscored the need for improvements in the design and targeting of ALMP. While increases in unemployment were limited due to the successful implementation of the short-time work scheme, the pandemic negatively affected the most vulnerable groups. Lariau and Liu (2022) find that women, young, less educated, low skilled and immigrant workers were disproportionately impacted by the COVID shock in terms of job loss rates, even after controlling for individual and job characteristics. Given that these groups of workers were positioned at the lower end of the pre-crisis income distribution, the pandemic may have also increased income inequality. Furthermore, the pandemic triggered an acceleration of automation and other technological adoption, as well as changes in consumers' and workers' preferences from in-person towards online and/or at-home activities, which may lead to significant structural transformation. In this context, it would be critical to design and implement more effective policies to improve the employability of displaced workers and to facilitate sectoral

[1] Prepared by Ana Lariau (EUR).

[2] Artuc et al. (2015) infer mobility costs using a structural econometrics model of costly job adjustment, applied to observed sectoral allocations, and find that labor mobility costs in Spain are above the sample average, which may limit the workers' ability to switch jobs.

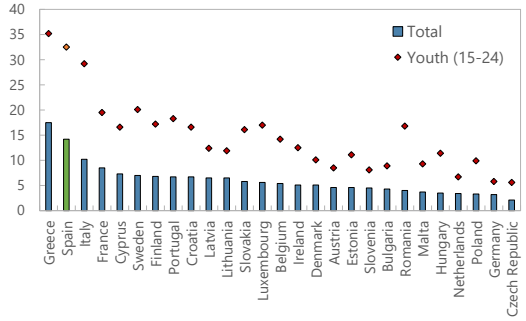
reallocation through acquisition of new skills. This would also reduce the risks of poverty and social exclusion for vulnerable groups.

Figure 1. Pre-COVID Structural Challenges in the Spanish Labor Market

Headline and youth unemployment are among the highest in EU.

Unemployment Rate

(Percent, 2019)

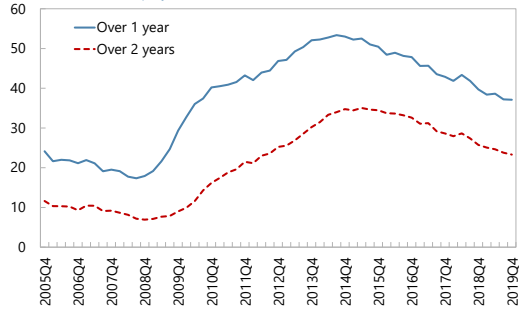


Sources: Haver Analytics and IMF staff calculations.

Despite declining since 2014, the incidence of long-term unemployment remains very high.

Spain: Share of Long-Term Unemployed

(Percent of total unemployment)

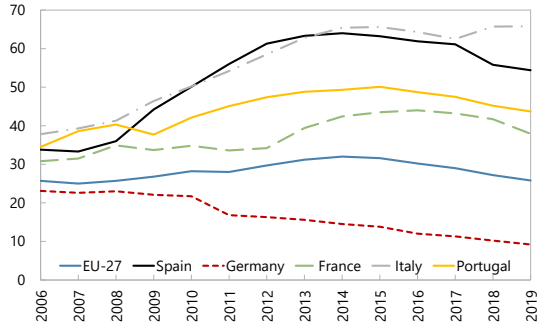


Source: Haver Analytics and IMF staff calculations.

Involuntary part-time employment is well above the EU average.

Involuntary Part-Time Employment

(Percent of total part-time employment)

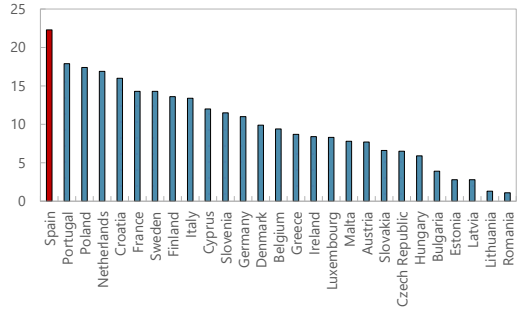


Source: Eurostat and IMF staff calculations.

Spain has the highest share of temporary contracts in the EU.

Temporary Contracts

(Percent of total employment, 2019)

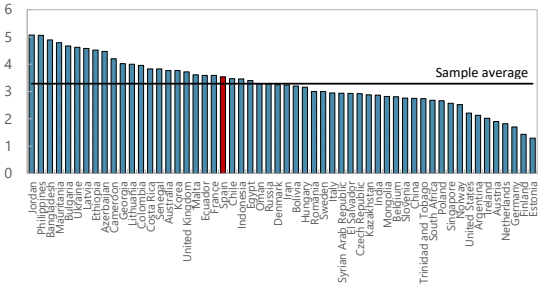


Sources: Eurostat and IMF staff calculations.

Switching jobs in Spain may be difficult due to relatively high mobility costs.

Labor Mobility Costs

(times the annual average wage)

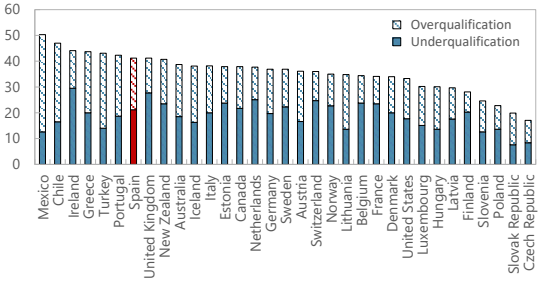


Source: Artuc et al (2015).
Note: A sample average of 3.29 means that, when moving across sectors, the workers face a common utility cost that is equivalent to 3.29 times the annual average wage in the sample.

Spain has a significant qualification mismatch compared to its OECD peers.

Qualification Mismatch

(Percent of total number of workers, 2016)

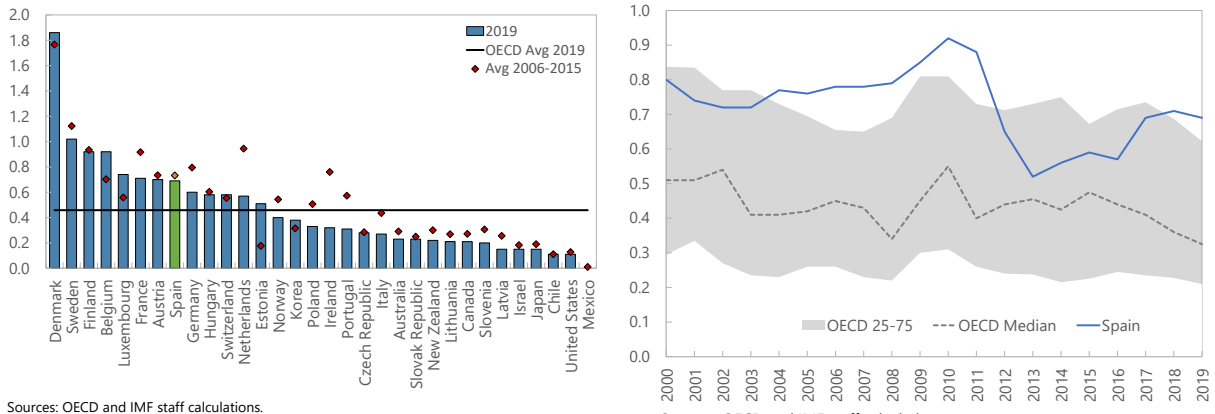


Sources: OECD and IMF staff calculations.
Note: Qualification mismatch arises when workers have an educational attainment that is higher (overqualified) or lower (underqualified) than that required by their job.

Trends in ALMP Spending and Participation

3. Spain spends more than its peers in ALMP and, while the level of expenditure is still lower than in the past, it has been increasing in recent years. Spain's expenditure in ALMP, amounting 0.69 percent of GDP in 2019, is higher than the OECD average (0.46 percent of GDP in 2019). Over the period 2000–19, it has been close to (or even above) the 75th percentile of ALMP expenditure in OECD countries, with the exception of a few years. In terms of its evolution over time, ALMP expenditure in Spain before the GFC was, on average, 0.8 percent of GDP. It declined significantly in 2010–12, by almost ½ percentage point of GDP, due to fiscal consolidation efforts that included limiting public sector hiring and suppressing employment incentives. Since then, it has progressively increased, but it still remains below the pre-GFC levels.

Figure 2. Expenditure in ALMPs
(Percent of GDP)

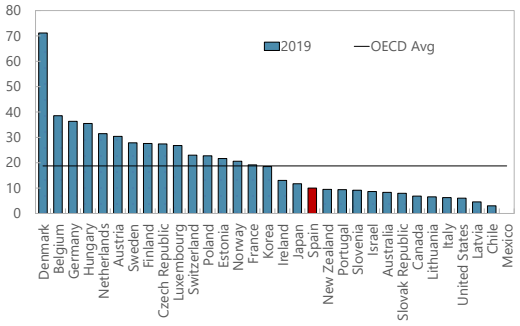


Sources: OECD and IMF staff calculations.
Note: Greece and the U.K. are not included in the chart due to limited data availability.

Sources: OECD and IMF staff calculations.

4. However, in terms of spending per unemployed, Spain ranks very low compared to other OECD countries. Due to the structurally high level of unemployment in Spain, its spending per unemployed tends to be much lower than in peer countries. In 2019, Spain's ALMP spending per unemployed amounted to 10 percent of per capita GDP. This was about half the OECD average and significantly lower than in other large European countries, such as Germany and France. The level of ALMP spending per unemployed in Spain is comparable to the one in Italy, which the OECD (2019b) assessed to be too low to address structural problems similar to the ones faced by Spain.

Figure 3. Expenditure in ALMPs per Unemployed
(Percent of GDP per capita)

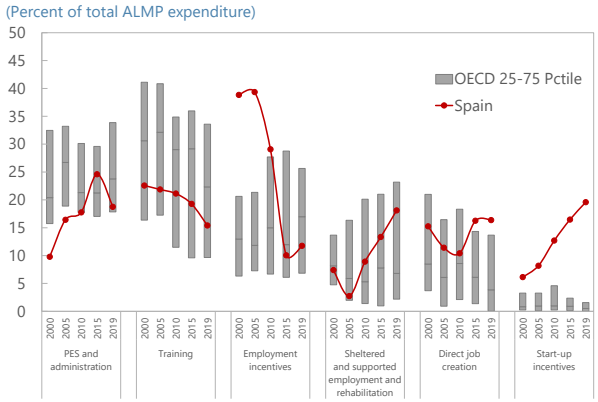


Sources: OECD and IMF staff calculations.
Note: Greece and the U.K. are not included in the chart due to limited data availability.

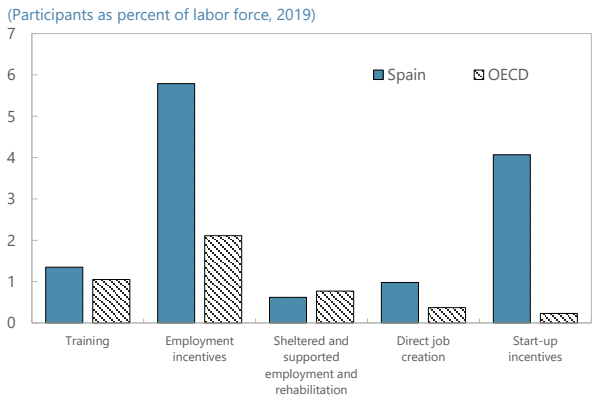
5. Spain allocates more resources to direct job creation programs and start-up incentives and less resources to training than its peers. In 2019, the ALMP resources were relatively evenly distributed across various activation programs: start-up incentives (20 percent), administration and provision of employment services (19 percent), sheltered & supported employment programs

(18 percent), direct job creation programs (16 percent), training (15 percent), and employment incentives (12 percent).[3] Compared to OECD countries, the shares of ALMP spending on direct job creation programs and on start-up incentives were very high in 2019, above the 75th percentile, while the share of ALMP spending on training was among the lowest across OECD countries, close to the 25th percentile. Despite having the lowest share in total ALMP spending in 2019, employment incentives had the largest number of participants, almost three times the OECD average. Participation in start-up incentives programs was also significant.

Figure 4. ALMPs by Program



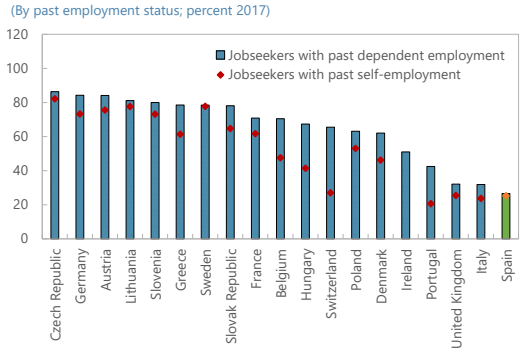
Sources: OECD and IMF staff calculations.



Sources: OECD and IMF staff calculations.

6. Even though employment services have the highest allocation of spending, engagement of jobseekers with the PES tends to be limited. The share of jobseekers in regular contact with the public employment service is among the lowest in the OECD (Figure 4). Limited PES engagement may reflect the availability of alternative job-search channels or the preference for jobs that the PES does not seem to facilitate (OECD, 2019a). In addition, access to PES services might be difficult due to a low degree of digitalization. Finally, there is great heterogeneity in capacity across regional PES (OECD, 2021a), and resources are not allocated based on performance (AIReF, 2018), which may also hinder effectiveness.

Figure 5. Share of Jobseekers in Regular Contact with the Public Employment Service



Source: OECD Employment Outlook 2019.

7. The allocation of ALMP spending in Spain has shifted over time, with more focus on job creation programs and start-up incentives, in detriment of training. The ALMP resources allocated to start-up incentives, direct job creation programs, and sheltered and supported employment programs have increased since 2005. For instance, promotion of entrepreneurship through start-up incentives was one of the cornerstone policies to support employment recovery in the aftermath of the GFC, guided by the Strategy for Entrepreneurship and Youth Employment 2013–

[3] See description of each activation program in Annex I.

16 (European Parliament, 2017). This happened at the expense of employment incentives and training programs. The share of ALMP spending on employment incentives declined sharply, by about 30 percentage points, bringing it closer to the OECD median. The high prevalence of employment incentives in the early 2000s was part of an effort to address labor market duality via deductions in social security contributions for new open-ended contracts and for conversions of temporary into open-ended contracts. This changed with the 2012 labor market reform, which focused on the reduction of severance payments for permanent contracts rather than on employment incentives (European Parliament, 2017). The declining resources devoted to training, which were already low compared to the OECD, is of particular concern, as it could become a barrier to upskilling of the labor force in the future. Furthermore, there is regional heterogeneity in training programs and regions tend to limit the entry of training providers from other regions, with a negative impact on quality and cost (OECD, 2021a).

8. The pandemic forced Spain to make adjustments to its ALMPs, setting the stage for a new wave of reforms. In 2020, funding that was initially allocated to ALMPs could not be fully executed and was re-allocated to employment protection policies. Despite this, Spain made significant efforts to ensure continuity of the services with a growing number of jobseekers and constraints on normal face-to-face operations. Additional PES staff was hired in 2020 and 2021 to process the high number of unemployment benefit and ERTE claims, and many employment services and training started being provided through digital platforms. To support employment, new positions were added to the public sector job creation program (mainly by regional and local governments) and temporary reductions in social security contributions were introduced for the sectors most hit by the pandemic. No changes were introduced to the system of hiring and start-up incentives (OECD, 2021b and 2021e).

Evaluation and Effectiveness of ALMP

9. The overall impact of ALMPs on aggregate employment is found to be limited in Spain. Theoretically, the positive effect of ALMPs on improving the job matching process may be partially offset by substitution and displacement effects on non-participants. Arranz et al (2013) estimate a dynamic panel model and find that employment incentives in the form of incentivized contracts had a positive, but small, impact on transitions from unemployment to employment and from temporary to permanent employment during the period 1987–2010, though stronger for the sub-period 1997–2010 following the 1997 reform.[4,5] Job creation programs and vocational training were found to have little or no effect on aggregate outcomes during the same period. On the other hand, internship, apprenticeship and training contracts helped increase transitions from unemployment to employment, albeit mainly through temporary contracts.

10. At the micro level, evidence on the effectiveness of ALMP is limited since evaluation has been sparse. While there have been some efforts to evaluate ALMP programs, they have not

[4] 'Incentivized contracts' stands for programs to promote permanent jobs by giving firms financial incentives to hire workers on permanent rather than temporary contracts.

[5] The 1997 reform introduced financially incentivized "contracts to promote permanent jobs" in an attempt to reduce the incidence of temporary employment and address duality in the Spanish labor market.

been done systematically or on a regular basis, and the results vary greatly across programs.[6] Examples of recent evaluations include:

- *Employment incentives.* AIReF (2020) reviews employment incentives and concludes that they had a positive effect on employability during crises, but it was modest, temporary and concentrated among workers with higher education rather than vulnerable groups. Font et al (2021) focus on subsidies to employment maintenance and find that they were relatively effective at keeping a higher rate of job maintenance, though at a disproportionate cost.

- *Training.* Blázquez et al (2019) report that participation in orientation and training programs had a positive influence on the employability of jobseekers, particularly among the long-term unemployed. However, AIReF (2018) also finds that the Professional Requalification Program (PREPARA), which provided a temporary subsidy to long-term unemployed participating in training programs, created disincentives to returning to the labor market.

- *Direct job creation.* Rebollo-Sanz and García Pérez (2021) find that direct public job creation initiatives in Andalucia did not increase the employability of young workers but had a positive impact on the employability of workers older than 30 who had extreme difficulty to access the job market by their own (due to lack of experience or lengthy unemployment spell).

- *Public employment services.* Felgueroso et al (2018) estimate a model of unemployment duration and find that guidance on job search tools and professional orientation are the most effective in helping the unemployed to find a job. At the local level, AIReF (2018) studies the service 14A of the Aragon region, based on the individualized assessment of the unemployed to increase their probability of finding a job and finds that those who received the 14A service had a greater probability to be employed than those who did not receive it.

11. Youth-oriented programs, as well as those targeting the long-term unemployed, suffered from low participation in the past. Prior to its revamp in 2021, the Youth Guarantee had been in place in Spain since 2014, targeting the so-called NEET, i.e., young people who are neither working nor in education or training. Even though Spain received the highest share of EU funding to implement this initiative, participation in the program remained subdued. Moreno (2017) argues that this was due to low visibility of the advertising campaigns and limited capacity of the PES for effective outreach to the young population.[7] Additional factors explaining low participation in the program included narrowly defined eligibility criteria and inadequate management systems to

[6] Spain has put in place frameworks to evaluate some ALMPs. First, the evaluation of the performance of the National Employment System (SEPE and the 17 regional PES) has been established through the EVADES program based on the methodology defined at the European level by the PES Network. Second, the evaluation of the entire system of professional training for employment is based on the measurement and analysis of a set of pre-determined indicators on quality, impact, effectiveness and efficiency. These frameworks have been useful to monitor operational performance and achievement of pre-determined objectives. However, they are not suitable to perform counterfactual analysis with experimental methods that would allow to establish causal relationships.

[7] This is confirmed by the analysis of Brugarolas et al (2021), which focuses on the implementation of the Youth Guarantee Initiative in four Spanish regions (autonomous communities of Basque Country, Aragon, and Murcia, and the province of Alicante). Furthermore, the report indicates that targeting was difficult, as the programs reached more effectively the highly educated students rather than those who were neither studying nor working.

monitor its progress (IMF, 2017). Regarding programs targeting the long-term unemployed, the Employment Activation Program, which was an income support program that involved support from a tutor, also faced a lower-than-expected participation. It was in place until 2017 and reportedly helped one third of its participants to find a job; however, it only covered about half of the initially estimated 400,000 participants (IMF, 2017).

12. Even though evidence is limited, the general perception is that past activation strategies have not been effective. Coordination might have been a challenge, given the large number of programs and an institutional structure that favors a decentralized implementation.[8] This institutional setup has also weakened coordination between active and passive labor market policies (the central government manages unemployment benefits, while the provision of ALMPs is done at the regional level), distorting the incentives of the unemployed and hampering the effectiveness of activation strategies. Furthermore, despite recent efforts, targeting of ALMPs has been insufficient, particularly among the most vulnerable groups. Jansen (2016) finds that, in 2015, only 0.5 percent of the low-skilled unemployed for 1–2 years benefited from training programs offered by the Public Employment Services, with an even a smaller fraction of participants in the case of the low-skilled unemployed for more than two years. Since then, new activation programs have been developed for the young and long-term unemployed, but low participation limited their effectiveness (IMF, 2017).

Recent Measures to Strengthen ALMP

13. ALMPs have recently become more targeted, focused on addressing the employment situation of vulnerable groups. The most noteworthy programs have aimed at improving employment prospects of the young population who is inactive or unemployed, as well as the long-term unemployed. The World Bank has monitored the implementation of these programs and has identified good practices in many areas, which have been a reference for the design of investment projects included in the RTRP.

- *Youth*. In end-2018, the government approved the 2019–2021 Action Plan for Youth Employment, aiming at reducing the youth unemployment rate to 23.5 percent. The plan, which had a funding of €2 billion, comprised 50 cross-cutting measures involving provision of guidance, provision of training, creation of employment opportunities, ensuring equal opportunities in access to employment, promotion of entrepreneurship and improving the institutional framework. In June 2021, the government launched *Juventud Avanza*, a strategic plan that brings together all the government actions related to youth employment, with an allocated funding of almost €5 billion. One of the key elements of this plan is the Youth Guarantee Plus Plan 2021–27, which aims at improving the employability and entrepreneurship of the young population, including by fostering the acquisition of the professional and technical skills needed to access the labor market, addressing skill mismatches (both under- and over-qualification). Relative to the Youth Guarantee of 2014, the Youth Guarantee Plus Plan extends

[8] The total number of policies included in the 2020 Annual Employment Policy Plan was 696, of which only 60 were common to all regions and the rest were region-specific. On average, each region implemented 72 different measures and services.

the age limit of young people from 25 to 29 and requires targeted and individualized approaches for vulnerable groups (OECD, 2021f).

Table 1. Spain: Initiatives within the *Juventud Avanza* Strategic Plan

Initiative	Funding (€ million)
Youth Guarantee Plus Plan 2021–27	3,263 1/
Investments in RTRP	937 2/
Plan de Formación en Alternancia con el Empleo 3/	600
Agreement with the Secretary of State of Digitalization and Artificial Intelligence	150
Total	**4,950**

Source: SEPE.
1/ Covered with the European Social Fund.
2/ Includes: *Primeras Experiencias Profesionales* (€330 million); *Investigo* (€315 million); *Tándem* (€120 million); Other (€172 million).
3/ Public employment-training program for unemployed from disadvantaged groups without specific training in a profession.

- *LT Unemployed*. Upon expiration of the regular unemployment benefits, the long-term unemployed may have access not only to extraordinary unemployment benefits but also to the *Renta Activa de Inserción* (RAI), which provides both income support and individualized employment services to certain groups of long-term unemployed with difficulties finding a job. In 2019, the government approved the *Reincorpora-T* Plan 2019–21 for preventing and reducing long-term unemployment. It includes 63 measures with an estimated cost of €4 billion, of which €1.3 billion are allocated to ALMPs, including more guidance counsellors, support for vocational training in rural areas, and training in key digital skills. The rest is allocated to social protection and evaluation measures.

14. The COVID-19 pandemic triggered a much-needed process of digitalization at the PES. In response to the COVID-19 outbreak, the PES accelerated a long-due digitalization process, including by boosting remote channels for ALMP provision. Counselling, career guidance, job matching, and training started being administered via online channels. Remote benefit applications and jobseeker registrations were already in place even before the pandemic, but were revamped with the COVID-19 shock, which facilitated processing speed despite high volumes (OECD, 2021b). The PES adopted SEND@, a digital tool to facilitate individualized orientation services, which will be evaluated by the OECD in 2022. The challenge going forward is to build on the progress made so far and continue investing in digital technologies. Furthermore, while many processes could be automated and digitalized, there will still be areas in which face-to-face interactions will still be needed, particularly when working with vulnerable groups, who to have lower digital skills and more limited access to the Internet and devices (OECD, 2021d).

Policy Recommendations

15. Reforms that ensure an effective use of ALMP resources would help bring down unemployment further and facilitate reallocation. In the aftermath of the COVID-19 crisis, additional investments into ALMPs may be needed to support a rapid return to work of displaced

workers, to facilitate the reallocation of labor from declining to expanding sectors, and to address emerging labor market inequalities. Effective ALMP expenditure helps boost GDP through higher employment and productivity.[9] However, to ensure that ALMPs are scaled up in a timely and effective manner, action is necessary on various fronts, including: (i) addressing capacity constraints in the PES; (ii) simplifying ALMP regulations, bringing agility to the ALMP system; (iii) continuing to provide employment services that take into account the local labor market situation while ensuring that a well-designed accountability framework for regional PES is in place; and (iv) fostering cooperation and coordination between all relevant stakeholders (OECD, 2021b; Lauringson and Lüske, 2021).

16. The allocation of ALMP resources to training should be increased. The meta-analysis of the literature by Card et al (2018) indicates that training programs tend to have larger and more long-lasting positive impacts than other activation policies. Providing training opportunities to vulnerable groups affected by the pandemic, as well as to participants in STW schemes would help improve employability and facilitate reallocation. In order to be relevant, training programs should focus on those sectors and skills in most demand. This requires a deeper engagement with firms to get a better understanding of the current and future skill needs and to adapt existing programs accordingly. Since joint public and private sector programs tend to perform better, an efficient delivery of training requires a stronger coordination with firms, training institutions and vocational education. A more intensive use of digital tools could also facilitate training delivery, particularly in those countries with online training solutions already in place, as suggested by the experience of Estonia, Austria, Denmark, the Netherlands, and some regions of Italy and Belgium (OECD, 2020).

17. Education policies, particularly those related to acquisition of digital skills and vocational training, should complement ALMP efforts. Education policies that mitigate skill mismatches and that facilitate accreditation of professional competences would improve employability of the young and low-skilled. Enhancing digital skills and boosting vocational training would help in this direction. Spain has recently made progress in both areas.

- *Digital skills.* The implementation of the National Plan for Digital Skills, which was approved in January 2021, includes significant investments in the provision of digital skills to the entire population with focus on the vulnerable groups and the unemployed, the digitalization of the education system, and the training of ICT specialists.

- *Vocational training.* The ongoing reform and modernization of vocational training is focused on recognizing existing skills and promoting upskilling and life-long learning. Following the approval of the First Strategic Plan of the Educational System for Vocational Training in November 2019, the next key steps in this direction have been: (i) the approval in March 2021 of Royal Decree 143/2021, which establishes the opening of a permanent procedure for the evaluation and accreditation of professional competences acquired through work experience, or through non-formal training channels; and (ii) the approval of the Draft Law on the Organization

[9] OECD (2021a) finds that a 25-percent increase in the ALMP spending per unemployed (as a share of GDP per capita) would entail an increase in the level of GDP per capita by 0.2 percent within five years and by 0.3 percent within 10 years. These estimates are based on the historical relationships between reforms and growth in OECD countries.

and Integration of Vocational Training in September 2021. The draft law integrates the vocational training for education and for employment into a single system. Furthermore, it regulates the relationship between vocational training and university education, promoting mutual recognition. It would be important to ensure that the acquisition of skills and competences is consistent with those demanded in the job market and to adjust the curriculum accordingly.

18. Strengthening the capacity of PES and addressing regional heterogeneity are needed to provide more individualized and timely support to jobseekers. Caliendo and Schmidl (2016) find that job search assistance is the only ALMP that has unambiguously positive effects on employment outcomes in Europe; the other ALMPs have mixed or even negative effects. This calls for strengthening the PES and improving employment services. Introducing new tools, such as statistical profiling, would help to target employment services to specific groups of jobseekers such as those most affected by the pandemic, to do early interventions, and to tailor services to better serve the needs of individual jobseekers.[10] While the use of statistical profiling tools has become widespread across OECD countries (Desiere et al, 2019), in the case of Spain it would require digitalizing the PES and improving its data systems, as well as strengthening its capacity to provide a more individualized support. Besides the use of statistical tools to improve diagnosis, and adequate provision of individualized services would also require a continued monitoring of the cases, possibly for longer periods. Revamping the collaboration with private job-placement agencies could also help to overcome capacity limitations. Systematic exchanges of best practices and peer review among regions would be useful to address the great heterogeneity in performance at the regional level.

19. Enhanced coordination between active and passive labor market policies would help increase the effectiveness of activation strategies. This would require a reorganization of social and employment services, aligning them around the common goal of achieving social cohesion (Heindrich and Rice, 2016). The adoption of integrated service models, such as one-stop shops, is a strategy that has been pursued in many European countries, with implementation varying greatly depending on the institutional context. Establishing one-stop shops at the regional level, with caseworkers managing both social benefits and ALMP interventions (and a centralized back-office in charge of verifying that eligibility rules for benefits are respected), would increase coordination of active and passive policies and facilitate the provision of a more tailored support to the unemployed. In such a system, caseworkers at the regional PES would have a crucial role and would need to be endowed with the necessary resources and training to perform this task. Giving caseworkers the ability to apply institutional discretion when designing individual activation plans would increase targeting capacity and make service provision more holistic, which would be important to adequately serve groups with more complex employability issues (Rice, 2017).

20. Assessments of the effectiveness of ALMPs are needed through regular evaluations, including cost-benefit considerations. It would be important to establish a system of evaluation of ALMPs, where the gains from each program are contrasted against the resources needed to implement it. Such cost-benefit analysis would allow to prioritize ALMP actions, pursuing only those for which the gains largely outweigh the costs. The results from these evaluations could also be used

[10] Felgueroso et al (2018) for a detailed description of statistical profiling tools and how their implementation can increase the effectiveness of ALMPs.

to establish adequate criteria for the allocation of funding to regional public employment services. The inclusion of evaluation requirements in the relevant legislation, as done in the case of the Minimum Income Scheme, could help to institutionalize the evaluation of ALMPs.

21. The reforms proposed in Spain's RTRP are broadly consistent with most recommendations in this paper. A careful design and timely execution of specific policy measures would be necessary for the success of the reforms. For example, the authorities foresee the adoption of regulation to modernize ALMPs, making them more targeted, focused on the youth and accounting for new trends such as digital and green transition. For instance, the new Employment Law contemplates the development of a national digital job market platform to facilitate labor matching and the provision of individualized employment services to the unemployed. The recovery plan also comprises the digitalization of the PES. While the RTRP does not introduce new hiring subsidies, it proposes the simplification and better administration of the existing ones. Regarding the investments, the plan includes: (i) programs—with a large training component—for the young, women and vulnerable groups (long-term unemployed, disabled, etc.); (ii) training and employment support programs to facilitate a digital and green transition; and (iii) development of a governance structure for ALMPs and training to staff of the National Employment Service. See Table 2 for details. Actions aiming at improving coordination between active and passive labor market policies are not included in the RTRP.

Table 2. ALMPs in Spain's Recovery, Transformation and Resilience Plan

Reform	Adoption of new laws / Changes to existing regulation	Expected implementation
Modernization of ALMPs	1) Approval of Spanish Strategy of Active Support to Employment (2021-24). 2) Modification of Employment Law (RDL 3/2015). 3) Approval of Garantia Juvenil Plus (2021-27). 4) Reform to the law regulating the Professional Training System.	2021-22
Digitalization of PES		2021-23

Investment	Million €			
	2021	2022	2023	Total
Youth Employment Initiative	**355**	**255**	**155**	**765**
A Training programs based on the school-workshop model, in occupations related to green transition, digitalization, local and rural development (Empleo Joven-Tandem)	40	40	40	120
B First professional experience in public administrations (targeted to young people who have completed their studies but remain unemployed)	160	110	60	330
C Employment opportunities for young researchers (Investigo program)	155	105	55	315
Female Employment Initiative and gender mainstreaming in ALMPs	**55**	**35**	**15**	**105**
A Training programs for women entrepreneurs both in urban and rural areas	45	25	5	75
B Training programs, with commitment to hiring, for women who are victims of gender-based violence, trafficking and sexual exploitation	8	8	8	24
C Actions to facilitate gender mainstreaming in all ALMPs	2	2	2	6
Support a digital, green and productive transformation through training and employability of workforce	**146**	**146**	**144**	**435**
A Professional requalification of workers in the tourism sector	40	40	39	119
B Training, with commitment to hiring, of unemployed people registered in the National Employment Service to cover positions in strategic sectors that were vacant due to lack of candidates with adequate skills	40	40	40	120
C Microcredits for training to improve employability	24	24	24	71
D Identification of training needs	2	2	2	6
E Training for workers under ERTE	40	40	39	119
Governance and support to ALMPs	**44**	**27**	**35**	**106**
A Creation of the Network of Public Centers for Guidance, Entrepreneurship, Support and Innovation for Employment, under the umbrella of the National Employment System	23	7	15	44
B Activities of the Network of Public Centers for Guidance, Entrepreneurship, Support and Innovation for Employment, based on annual plans specific to each center	15	15	15	46
C Training plan for staff of the National Employment System	6	5	5	16

Source: Government of Spain (2021).

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Annex I. Classification of OECD Data for Public Expenditure and Participants in ALMP[1]

Public Employment Services and Administration

- *Placement and related services:* Include open information services, referral to opportunities for work, training and other forms of assistance, counselling and case management of jobseekers, financial assistance with the costs of job search or mobility to take up work, and job brokerage and related services for employers, if spending on these functions can be separately identified. Services provided by the main public employment service and by other publicly financed bodies are included.

- *Benefit administration expenditure:* Includes the budget of institutions that manage the unemployment and early retirement benefits, if this spending can be separately identified.

- *Other expenditure:* Includes the budget of institutions whose functions are within the scope of this database, but whose costs cannot be separately identified into the above categories.

Training

- *Training programs:* Comprises institutional training (programs where 75 percent or more of the training time is spent in a training institution), workplace training (programs where 75 percent or more of the training time is spent in the workplace), and alternate training (programs where training time is evenly split between a training institution and the workplace).

- *Special support for apprenticeship:* Programs providing incentives to employers to recruit apprentices from labor market policy target groups, or training allowances for particular disadvantaged groups.

Employment Incentives

- *Recruitment incentives:* Programs making payments for a limited period only to facilitate the recruitment of unemployed persons and other target groups into jobs where the majority of the labor cost is covered by the employer. They include payments to individuals that are conditional upon the take-up of a new job (back-to-work bonus, mobility/relocation allowance or similar) only if they are targeted (restricted to a specific group of people, e.g. the long- term unemployed).

- *Employment maintenance incentives:* Similar to the previous category, but with the purpose of facilitating continuing employment, in a situation of restructuring or similar.

- *Job rotation and job sharing:* Job rotation refers to schemes promoting the full substitution of an employee by an unemployed person or a person from another target group for a fixed period.

[1] Based on OECD data description, available in: https://www.oecd.org/els/emp/Coverage-and-classification-of-OECD-data-2015.pdf.

Job sharing refers to schemes promoting the partial substitution of an employee by an unemployed person or a person from another target group.

Sheltered and Supported Employment and Rehabilitation

- *Sheltered and supported employment:* Consists of subsidies for the productive employment of persons with a permanently (or long-term) reduced capacity to work. These measures typically provide ongoing support and have no planned duration.
- *Rehabilitation:* Vocational rehabilitation for persons with a reduced working capacity which prepares them to move on to work or regular training.

Direct Job Creation

- These programs create additional jobs - usually of community benefit or socially useful, and usually in the public or non-profit sector although similar projects in the private sector may also be eligible—for the long-term unemployed or persons otherwise difficult to place. The majority of the labor cost is covered by public funds.

Start-up Incentives

- Programs that promote entrepreneurship by encouraging the unemployed and target groups to start their own business or to become self-employed.

CLIMATE CHANGE MITIGATION POLICY IN SPAIN[1]

Significant effort will be needed to reach Spain's new more ambitious climate mitigation objectives, as reflected in the authorities' plans. Spain's Law on Climate Change and the Energy Transition establishes the goal of carbon neutrality by 2050, together with an intermediate requirement to reduce emissions by 23 percent relative to 1990 levels by 2030 (about a one third reduction compared to 2018 levels). Carbon price coverage in Spain is comprehensive, but the effective tax rates are low relative to estimates of emission damages, and also tend to be lower than in other euro area economies. Carbon price increases should be gradual, predictable, and complemented with distributive policies to protect vulnerable households. Complementary policies will be essential to address sector-specific obstacles to reducing emissions. Across all sectors, public investment and financial support will be vital where market failures constrain private investment. The authorities' plans to leverage the NGEU funds to support green investments, prioritizing clean energy, sustainable mobility and building efficiency renovations, are welcome.

A. Introduction

1. Rising temperatures pose significant global macroeconomic risks. Macroeconomic risks can stem from the impact of gradual warming (such as rising sea levels and reduced crop yields), extreme weather events (already more frequent), and risks related to the transition to a low carbon economy (Batten 2018, IPCC 2021). A key concern is the possibility of tail risks, notably tipping points—i.e. thresholds that, when crossed, generate large, irreversible changes in natural systems (IPCC 2018, Lenton and others 2019, Weitzman 2011). The scale of the risks will depend on the extent to which global temperatures rise (IPCC 2018). The longer action is delayed, the greater the accumulation of greenhouse gases (GHG) in the atmosphere, and the more abrupt and costly the necessary action to stabilize global temperatures (IMF Fiscal Monitor 2019). Within Europe, Southern countries and regions are disproportionately exposed to the effects of global warming (European Commission 2020).[2]

2. In this context, the European Union has committed to take action to reduce emissions, and has recently significantly increased its climate mitigation ambition. The European Green Deal has set an objective of net zero emissions of greenhouse gases in the EU by 2050. This will require a significant acceleration in emission abatement, as current policies are only projected to yield a 60 percent reduction relative to 1990 levels by that date (European Commission, 2019). More ambitious intermediate targets have also been agreed upon, such as stepping up the previous 40 percent reduction relative to 1990 by 2030 under the Paris agreement to at least 55 percent.

[1] Prepared by Nicolas Arregui (EUR department) and William Oman (MCM department). Thanks to Simon Black, Louis-Gaëtan Giraudet, Dora Iakova, Ian Parry, and counterparts in Spain met during the Article IV mission for comments and suggestions.

[2] While climate change adaptation policies are crucial, this note focuses only on climate change mitigation policies.

The EC has recently unveiled a package of proposals (the "Fit for 55" climate plan) to operationalize its 2030 emission reduction target, which will be legislated over the coming years.[3]

3. The recovery effort from the current crisis provides a unique opportunity to accelerate the shift to a greener, sustainable, and fairer economy. The public health and economic crisis precipitated by the COVID-19 pandemic has not altered the global need for rapidly transitioning to zero carbon energy systems. Global energy-related CO2 emissions in 2020 are estimated to be about 6 percent lower than in 2019, due to both lower GDP and structural shifts in the economy (e.g., more remote working), but high frequency indicators point to a rapid rebound in 2021 as economic activity partially recovered and some of the structural shifts are partially reversed (IEA 2021). It will be important that governments' investment plans to boost their economies are appropriately allocated to low-carbon technologies.

4. Significant effort, as envisioned in the national energy and climate plan, will be needed to reach Spain's new more ambitious objectives. Spain has increased its commitments in line with other EU countries in the context of the European Green Deal, and its 2030 targets are in line with the new EU´s -55 percent 2030 goal.

- Spain's Law on Climate Change and the Energy Transition, enacted in 2021, establishes the goal of climate neutrality by 2050 at the latest, when the Spanish electricity system must be 100 percent renewable. Furthermore, the Law includes an intermediate target to reduce emissions by 23 percent relative to 1990 levels by 2030, as well as targets for 2030 for renewables to account for 42 percent of the country's energy mix, to generate 74 percent of its electricity (on a primary energy basis), and to reduce primary energy consumption by at least 39.5 percent by 2030.[4]

- The central strategy guiding the country's mitigation policies over the coming decade is the National Integrated Energy and Climate Plan 2021–2030 (NECP).[5] The Plan outlines sectoral actions necessary to meet the 2030 objectives. It envisages increasing renewable power installations and boosting the use of renewable gases in the power sector, modal shifts and electrification in the transport sector, refurbishments and increasing the use of renewable

[3] The proposed package gives a central role to carbon pricing through a reduction in the Emission Trading System (ETS) emissions cap, extension of the scheme to the maritime sector, and the introduction of a new ETS for road transport and buildings. It also establishes a fund to help the most vulnerable households, and proposes an introduction of a carbon border adjustment mechanism starting in 2026.

[4] In addition to the specified targets, Spain's climate law establishes specific policies, such as that no later than 2040 new passenger cars and light commercial vehicles will be vehicles with emissions of 0gCO2/km, and the establishment of low emission zones in urban centers with a population of at least 50 thousand by 2023. The law also strengthens the climate policy framework, with the creation of an Expert Committee tasked with submitting an annual report to Congress with policy evaluation and recommendations, among other elements.

[5] EU legislation requires each member State to adopt a 10-year national energy and climate plan (NECP) to map out how they will contribute to the Union's climate and energy targets for 2030.

heating in the residential and commercial sectors, promoting energy efficiency and fuel switching in the industry sector, and energy efficiency improvements in the agricultural sector.

- The 2030 plan is complemented by a Just Transition Strategy to anticipate and manage the social implications of the ecological transition, and a Long-Term Strategy 2050 to ensure continuity in mitigations efforts beyond 2030.[6]

- Spain's Recovery, Transformation and Resilience Plan seeks to leverage EU funds to support the economic recovery from the Covid-19 crisis while promoting a structural shift to a more inclusive, digital and greener economy. About 40 percent of announced investments (€70 billion, 6.5 percent of GDP) for the period 2021–23 are allocated to green projects, with initial investments prioritizing clean energy, sustainable mobility and building efficiency renovations.

5. While authorities' plans identify the right priorities, implementation details are yet to be defined in certain areas, especially on the role of carbon pricing in driving decarbonization. This note takes stock of Spain's progress to date in reducing emissions. It then assesses the climate mitigation framework, covering current policies as well as future policies envisioned in the authorities' 2030 plan. The focus is on the power, transport and building sectors, reflecting their relevance in terms of emissions and in line with authorities' priorities in both the 2030 strategy and the recovery and resilience plans. The main policy messages are summarized as follows:

- Carbon pricing will need to play a more significant role going forward. While carbon pricing coverage is extensive in Spain, effective carbon rates are low relative to estimates of carbon emission damage, and typically lower than in peer economies.[7] The authorities' review of environmental taxation should provide the foundations for a broad tax reform covering multiple sectors. As carbon pricing for the power sector has increased significantly in 2021 and is expected to continue to increase within the EU ETS framework, it will be important move in tandem in other sectors, to internalize the emission externality and so as not to undermine incentives for electrification (such as the adoption of electric over fossil fuel vehicles, or electric heat pumps over natural gas heating). Higher carbon taxation in the residential and road transport sector could be implemented in various ways, including raising current taxes, introducing a dedicated carbon tax, or via an ETS framework. Increasing carbon pricing ambitions in a predictable and gradual way for the coming years would strengthen incentives for consumers and investors to adjust their behavior, while providing much needed fiscal revenue.

- Climate policy should be mindful of its distributional implications, and protect those most vulnerable households.[8] It will be important to use carbon tax revenues to support low-income

[6] Other recent relevant documents include the Circular Economy Strategy, the Draft Law on Waste, and the National Climate Change Adaptation Plan.

[7] Carbon pricing is interpreted here in a broad sense, not only as explicit carbon pricing (which is limited in Spain beyond that of the EU ETS). It includes specific taxes on energy use, such as fuel duties.

[8] Along this line, the National Strategy Against Energy Poverty launched in 2019 included the first official definition of energy poverty, as well as reduction objectives by 2025.

households mitigate the regressive effect of carbon taxation, and ensure broad social acceptability. Complementary policies should ideally avoid additional burdens or even mitigate some of the distributional effects of carbon prices.

- Complementary policies will be essential to address sector-specific obstacles to reducing emissions. To the extent that higher carbon prices run into acceptability constraints, reinforcing sectoral policies may need to play an even greater role.

- In the road transport sector, vehicle acquisition taxation could be strengthened, as the current schedule is coarse, flat within each bracket, and less ambitious overall compared to peer countries. So-called "feebates"—which combine a sliding scale of taxes on high-emissions vehicles with a sliding scale of subsidies for low-emission ones—can be used to more aggressively shift purchases toward cleaner vehicles. The establishment of low emission zones (LEZ) is a key policy to drive a modal shift in authorities' plans. The implementation of this policy is decentralized, and should be monitored closely to assess the need for further action. Local authorities should consider toll systems as a complement to LEZ, which are consistent with recently released national guidance. Continued improvement in public transportation is also essential for promoting modal shifts.

- In the residential sector, a package of fiscal measures could reinforce carbon pricing. On thermal installations, a tax-subsidy (feebate) scheme involving revenues from an interim tax on gas heating technologies (with rate increasing through mid-2030s) funding subsidies for electric heat pumps. On thermal envelope, differentiating rates of property taxes could further incentivize the take-up of energy efficiency renovations. Feebates could also be applied to electricity consumer products. On the regulatory front, a phased tightening of mandatory energy performance standards for existing buildings could step up the pace a depth of renovations. Attractive financial mechanisms can help overcome the typically large upfront costs of improving residential energy efficiency.

- In the power sector, recent studies suggest that Spain's auction framework appears adequate to support investment in renewable energy.

- Across all sectors, public investment and financial support will be vital where market failures constrain private investment. Spain's 2030 strategy (i.e. the above-mentioned NECP) correctly identifies multiple areas for intervention, including the deployment of transport charging infrastructure, upgrades to rail freight infrastructure, the expansion in coverage and interconnection for electrical grids. Funds available under the NGEU provide a great opportunity to kick start these transformations, as intended under Spain's recovery and resilience plan.

B. Background

Overview of Emissions and Drivers

6. In contrast with most other EU countries, GHG emissions in Spain remain above 1990 levels, despite a material reduction since the global financial crisis. Emissions were 8.5 percent higher in 2019 than in 1990, compared to about 28 percent lower at the EU level.[9] The differing trends reflect more limited progress in decoupling emission and economic growth, as gains in energy emission intensity (emissions per unit of energy) and activity energy intensity (energy consumption in relation to economic activity) have not been enough to offset the growth in population and income per capita (Figure 1). Emissions declined significantly in the aftermath of the global financial crisis, but stabilized since 2013, in line with a recovery in economic growth. In the last two years, emissions have dropped significantly: in 2019 driven by a drop in emissions from power generation, and in 2020 largely driven by the Covid recession.[10] In terms of total emissions, Spain is the fifth largest emitter in the EU. While emissions per capita are lower than the average for advanced European countries, they are higher than in some peer economies like France and Portugal. The increase in consumption-based emissions (chart focused on CO2) is less pronounced, but the diverging trend with most peer economies remains.[11]

7. The transport and (to a lesser degree) building sectors have accounted for the bulk of the increase in emissions. Underperformance relative to the EU aggregate holds across each sector (Figure 1).

- **Transport.** The transport sector is the largest emitter, and the largest contributor to total emission growth since 1990. Emission growth has been fast even compared to peer countries (where it has also typically increased), with material contributions from road transport, aviation, and navigation. The focus in this note is on surface transport, as aviation and navigation policy frameworks are grounded in international agreements, and therefore call for multilateral (global or at least EU-level) policy coordination.

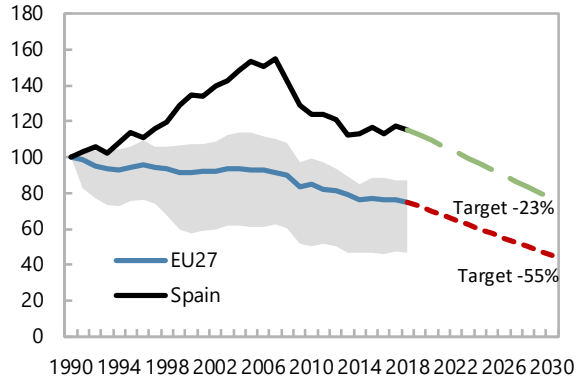
[9] Data refers to total GHG emissions without LULUFC from UNFCCC.

[10] Total GHG emissions dropped by 5.6 percent in 2019, despite about two percent growth in real GDP. According to the approximated 2020 Inventory, GHG emissions dropped by 13.7 percent in 2020.

[11] The standard territorial accounting of greenhouse gas emissions excludes lifecycle emissions from bioenergy grown overseas, Spain's share of international aviation and shipping, plus the CO2 generated when making goods that are imported into Spain (minus that of exports). Spain's imports have more embodied CO2 than exports so the per capita carbon footprint (demand-based CO2 emissions) is higher than actual (production-based) emissions would imply (IMF 2020). Methodologies for estimating consumption emissions are not straightforward, as they require estimates of emissions along international supply chains, and there are no agreed international reporting standards. Moreover, under the Paris Agreement, countries are responsible only for emissions produced within their own borders.

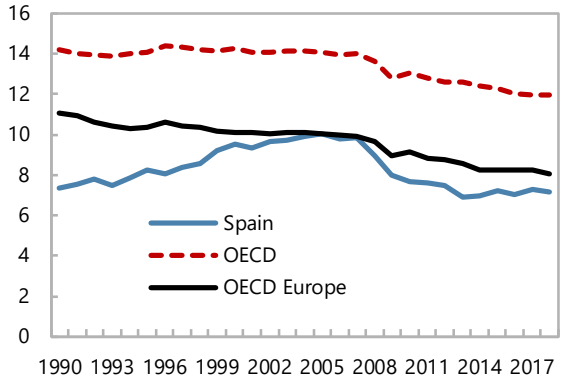
Figure 1. GHG Emissions

GHG Emissions
(Index 1990=100)



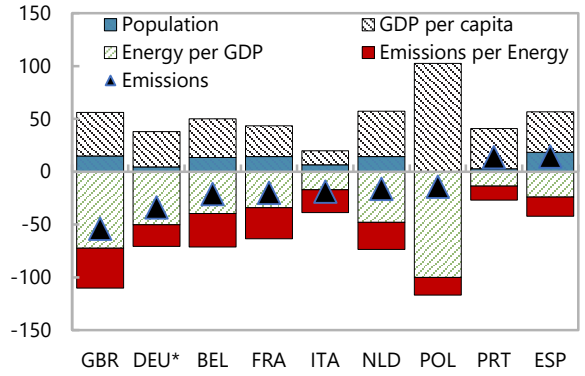
Sources: UNFCCC, and IMF staff calculations.

GHG Emission Intensity
(tonne per capita)



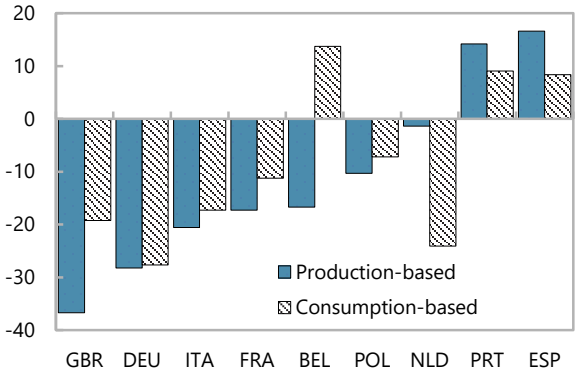
Sources: OECD, and IMF staff calculations.

GHG Emission Growth Drivers
(in percent; 1990-2018)



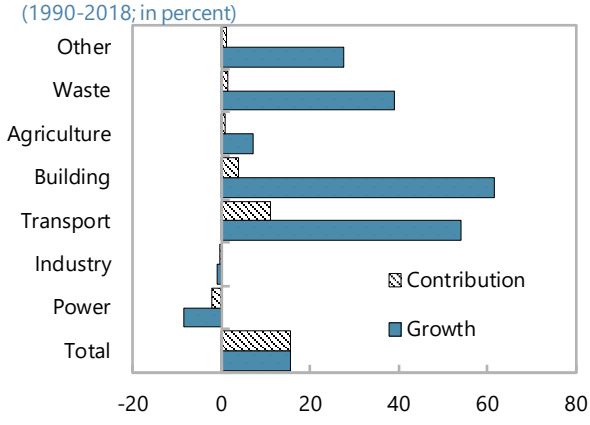
Sources: Haver Analytics, IEA, OECD, and IMF staff calculations.

CO2 Emission Growth
(in percent; 1990-2018)

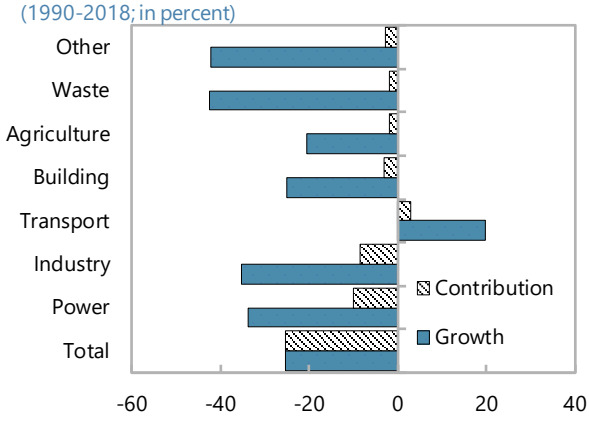


Sources: Global Carbon Project, and IMF staff calculations.

ESP: GHG Emissions Growth by Sector
(1990-2018; in percent)



EU: GHG Emission Growth by Sector
(1990-2018; in percent)

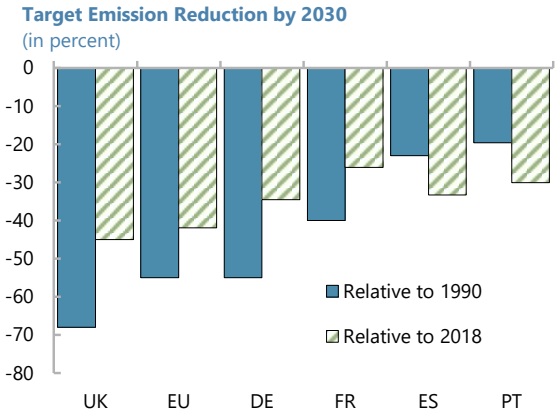


Note: Emissions exclude LULUCF, indirect CO2, and emissions from international maritime and air transport. In chart 1: dashed lines show linear path to 2030 targets, and shaded area show max-min range for large emitters in the region excluding Spain (DE, UK, FR, IT, PO, CZ, BE, RO). In chart 3, growth rates are computed as log-differences. Energy refers to Total Energy Supply, and income is measured as real GDP. Germany growth rates are computed over 1991–2018. Chart 4 covers only CO2 emissions, not total GHG emissions.

- **Buildings.** The building sector (including residential, commercial, and institutional) has been the second largest contributor to total emission growth since 1990. The sector accounts for about one third of final energy consumption, and is therefore critical for improvements in energy efficiency.

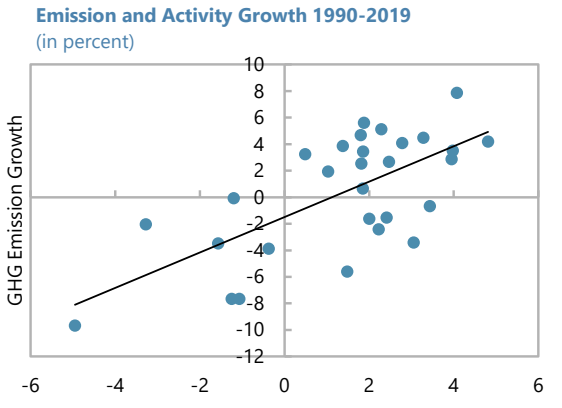
- **Power.**[12] While decarbonizing the power sector has been the main driver in reducing emissions at the EU level, progress until 2018 has been more limited in Spain. Emission reductions have accelerated since 2019 on the back of a significant shift away from coal-generated electricity production (from 14 percent of the total in 2018 to five and two percent in 2019 and 2020, respectively).

8. Spain has committed to cut emissions by at least 23 percent by 2030 relative to 1990. This target is in line with the enhanced EU 2030 climate target of -55 percent (from 1990 levels). The EU framework imposes stronger requirements on emission reductions relative to 1990 for higher-income members. Spain's emission reduction goals relative to 2018 are broadly in line with peer economies. This is explained by the differing trends over the last three decades: EU emissions peaked in 1990, while in Spain the peak did not occur until 2007. Starting in 2023, Spain's new climate law allows for upward revisions in the 2030 target.



Sources: Eurostat/UNFCCC, and IMF staff calculations.

9. Meeting the new climate target will require significant policy efforts. Country projections suggest that, absent additional policy measures, emissions would remain about seven percent above 1990 levels in 2030.[13] Meeting the 2030 target would require a reduction in emissions of about one third compared to current (2018) levels. This is similar in magnitude to the proportional decrease in emissions in the aftermath of the GFC (2007-2013), although at the time it was driven in large part by the contraction in activity. Delivering on the target in a decade of overall economic expansion (despite the initial pandemic-induced contraction) will require large and persistent gains in energy emission intensity and activity energy intensity. Electrification



Sources: Haver Analytics, Eurostat, and IMF staff calculations.

[12] Power refers to "energy industries," which includes public electricity and heat production, petroleum refining, manufacturing of solid fuels and others.

[13] Country projections submitted under the Monitoring Mechanism Regulation (EC No. 525/2013). Projections were submitted before March 2020 and therefore do not account for impact of the Covid-pandemic.

will need to play a crucial role in decarbonizing various sectors (such as road transport, residential heating, and industry). This implies that progress toward a clean energy mix is a pre-condition for progress in many sectors. It also implies that electricity demand will increase significantly over the next decades.

Conceptual Framework

10. Robust environmental taxation should play a crucial role in climate mitigation. Carbon pricing is a key tool in driving the transition to a low-carbon economy in a cost-effective manner. Once emitters are confronted with the full cost of their actions, they will find ways to reduce their carbon output. How exactly they do this is left to them, rather than prescribed by a regulator. This flexibility is associated with economic efficiencies in the form of lower overall abatement costs. More generally, the appeal of carbon pricing is that it provides across the board incentives to reduce energy use and shift toward cleaner energy; it can induce investment and innovation in the absence of non-price barriers; it can mobilize a valuable source of new revenue; and it can be straightforward to administrate.

11. Nonetheless, even with ambitious carbon prices, complementary sectoral policies are essential (High-Level Commission on Carbon Prices 2017, IMF 2020). First, they can help address sector-specific market barriers and frictions other than the climate externality which hinder emission reductions. These may relate, for instance, to the dynamics of innovation (e.g., learning by doing, economies of scale, R&D externalities, network externalities); to the slow adoption of new or existing technologies (e.g. public good provision, asymmetric information, financial constraints, myopia); or other factors.[14] Second, they can play a reinforcing role when carbon pricing is subject to acceptability constraints.[15] Third, they may be needed to meet sectoral targets that are more ambitious than nationwide targets. Decarbonization requires radical change in the main systems of the economy (Stern and Stiglitz 2021). At the same time, several sectors are characterized by technological and institutional inertia, implying that carbon pricing may not be enough to drive the replacement of carbon-intensive capital (Hepburn and others 2020, Rafaty and others 2020, Bhattacharya and others 2021).

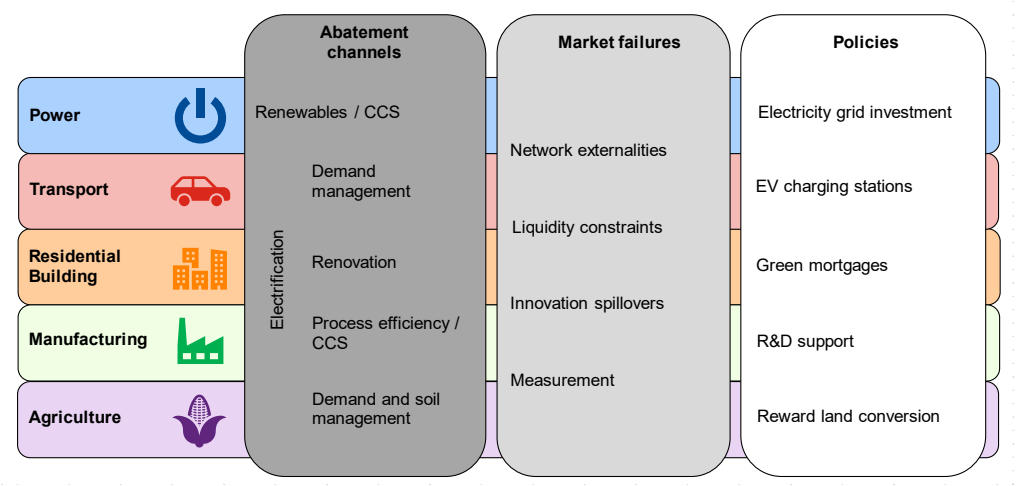
12. Assessing the desirable exact balance between price and non-price policies is difficult in practice and depends on social acceptability. This note follows a pragmatic approach by flagging current gaps in carbon pricing, facilitating the benchmarking of countries relative to one

[14] Complementary policies may be needed to address non-price barriers to otherwise self-financing abatement measures (such as liquidity constraints, awareness). Conversely, some abatement opportunities may be too costly for an early-phase carbon price to unlock without rising to levels that raise concerns over distributional impacts. More targeted policies, such as dedicated technology funds, low-carbon technology mandates, or R&D support, may be needed to bring forward new mitigation options and reduce future abatement costs. See also Krogstrup and Oman (2019).

[15] As discussed below, revenue redistribution should play a significant role mitigating the distributional impact of carbon pricing policies to protect those most vulnerable.

another, and discussing qualitatively the benefits and drawbacks of alternative policies. It also seeks to highlight positive examples and good practices.

Figure 2. Complementary Policies



Source: Arregui and Jobst, 2020.

C. Policy Framework in Spain

13. Spain's climate mitigation framework follows a sectoral approach, involving both the target-setting and the application of the policy toolkit. The main tool for meeting emissions targets in the power and large industry sector is the EU-wide Emissions Trading System (ETS), which provides a unified cross-country carbon pricing framework.[16] Non-ETS sectors (transport, building, agriculture, waste, fluorinated gases and smaller manufacturing industries) are covered under the European Effort Sharing Regulation (ESR), which assigns country-specific emission targets for the non-ETS sectors (with more ambitious targets for richer economies).[17] Within these country-level targets, multiple measures in the non-ETS sectors are set at the national level (e.g. environmental taxes and subsidies, regulations, direct government investment) to complement EU-wide measures such as efficiency standards and tax rate floors. As mentioned above, this note is focused on transport, buildings, and power sectors, and therefore does not analyze Spain's decarbonization strategy in areas that also have a relevant mitigation role (such as agriculture, forestry, fluorinated gases, and waste management).

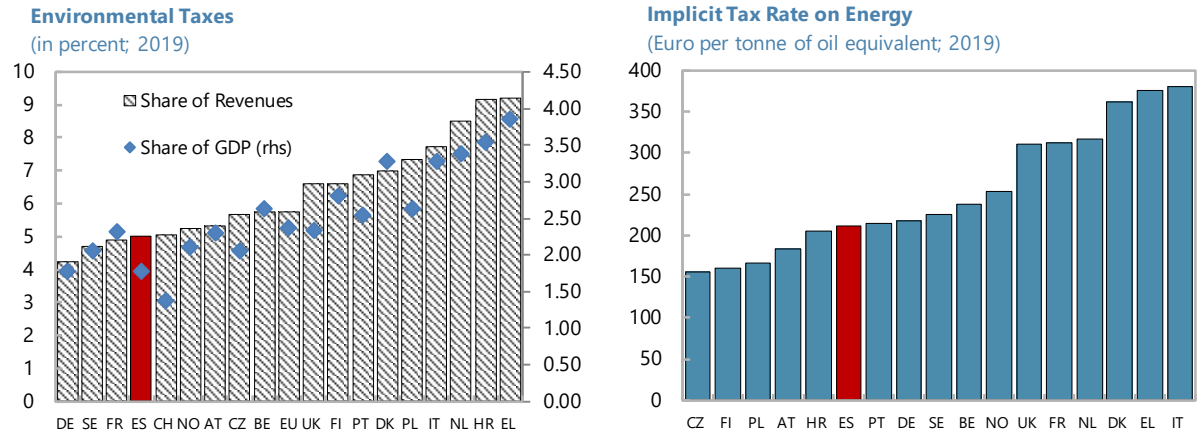
[16] The EU ETS also covers emissions from aviation (flights within the European Economic Area). The ETS covers about 40 percent of Spain's national emissions.

[17] Currently, Spain is required to reduce emissions in the non-ETS sectors by 26 percent in 2030 relative to 2005. Nonetheless, given the country's 2030 target of a 23 percent reduction in total emissions by 2030 relative to 1990, the non-ETS sectors will need to reduce emissions by about 40 percent compared to 2005 levels. This is aligned with the new EU 2030 proposed target to reduce aggregate EU emissions in the non-ETS sectors by 40 percent by 2030 relative to 2005 (based on the EC's reported additional effort requirements in the Fit for 55 proposal).

Carbon Pricing

14. While carbon pricing *coverage* is extensive in Spain, current carbon pricing levels appear to lag behind peers (Figures 3, 4)**.** Most emissions in each major emitting sector are subject to some form of carbon pricing, including via the EU ETS in the power and industry sectors, and via fuel duties in the road transport sector.[18] An explicit domestic carbon tax on fluorinated greenhouse gases has been in place since 2014, covering 3 percent of Spain's total emissions.[19] Nonetheless, effective carbon rates are low relative to estimates of carbon emission damage, and typically lower than in peer economies (in those sectors not covered by a common EU framework).[20] There is also significant variation in levels across sectors. Despite multiple taxes, environmental tax collection as share of total revenues (5 percent) and as a share of GDP (1.8 percent), and the implicit tax rate on energy, are relatively low compared to other European countries.[21]

Figure 3. Environmental Taxation



Sources: Eurostat, and IMF staff calculations.
Note: Environmental taxes include on energy (including explicit CO2 taxes and EU ETS), transport, and pollution/resources. Implicit tax rate on energy is the ratio of energy taxes to final energy consumption.

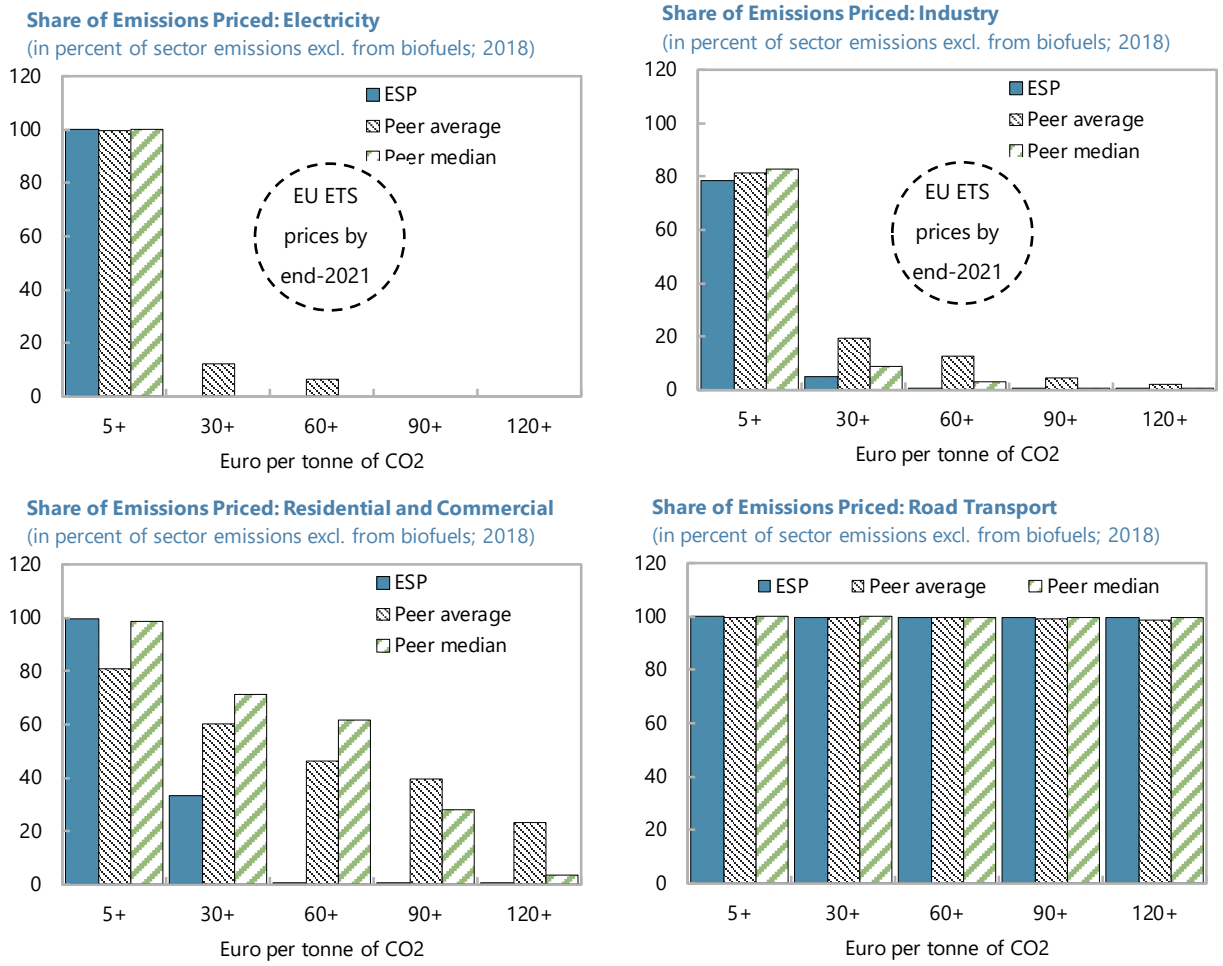
[18] Following the OECD definition of *effective* carbon rates, this includes specific taxes on energy use, emission permit price, and any explicit carbon taxation. There are currently no explicit carbon taxes in Spain. Main energy-use taxes include a tax on hydrocarbons, a special tax on coal, and a special tax on electricity consumption (ad-valorem).

[19] The tax rate is based on the Atmospheric Warming Potential of these gases and the tax is levied on the recharging of the equipment that uses them, allowing for a partial recovery if a correct management of these gases at the end of the useful life of the equipment is accredited. At present, the tax rate is 15 euros per ton CO2-eq and the rate for recycled and regenerated gases is 50 percent of the general rate in order to encourage their use.

[20] For reference, 60 EUR per tonne of CO2eq is a mid-range benchmark of carbon costs in 2020, and low-end benchmark for carbon costs in 2030 (OECD 2021).

[21] The implicit tax rate on energy is defined as the ratio of energy tax revenue to final energy consumption calculated for a calendar year. The implicit rate is a very broad indicator, capturing information on a variety of energy products with different tax rates. It is not influenced by the size of the tax base.

Figure 4. Effective Carbon Pricing



Source: OECD (2021), and IMF staff calculations.
Notes: Peer group includes Austria, Belgium, Switzerland, Czech Republic, Germany, Denmark, Finland, France, United Kingdom, Greece, Italy, Netherlands, Norway, Poland, Portugal, and Sweden. Figure bars do no reflect recent developments with EU carbon permits, which have increased significantly since 2020Q4, reaching about 80 euro per tonne by December 2021.

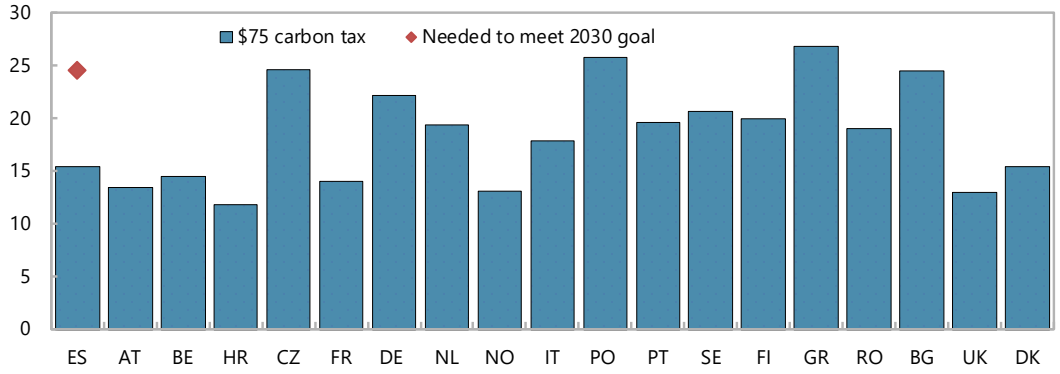
15. Carbon pricing would need to play a more significant role going forward. Indeed, several international bodies (IEA, 2015, 2021; OECD, 2015, 2018, 2021; European Commission 2017), as well as expert committees set up by the Spanish government itself (CERSTE, 2014; CERMFA, 2017; CERSFL, 2017; CETE, 2018) have recommended an increase in energy-environmental taxation. Spain's 2030 NECP acknowledges the potential role of carbon pricing as a policy tool for climate mitigation,[22] and authorities are in the process of conducting an in-depth review of the environmental taxation. Increasing carbon pricing ambitions in a predictable and gradual way for

[22] Environmental taxes are referred to in measure 1.26, measure 1.20 (in the context of the EU ETS), and as a mechanism for the delivery of multiple sector goals, such as the renewal of the vehicle fleet the promotion of electric vehicles, and energy efficiency improvements in the residential sector.

the coming years would strengthen incentives for consumers and investors to adjust their behavior now, while providing much needed fiscal revenue.[23]

16. By itself, even ambitious carbon pricing in the order of US $75 per ton would not be enough to meet Spain's 23 percent emissions reduction target for 2030.[24] If considered as the sole additional tool to drive emissions, such additional carbon price (applied across all sectors) would cut emissions by about 15 percent below the computed business-as-usual baseline levels in 2030 whereas reductions of about 25 percent are needed to meet Spain's emissions pledge (Figure 5).[25]

Figure 5. Carbon Pricing Scenario



Source: IMF staff using Carbon Pricing Assessment Tool. Methodology described in appendix to 2019 Fiscal Monitor: How to Mitigate Climate Change.

17. At the same time, scaling up carbon pricing could be challenging due to political acceptability constraints, in the absence of mitigating measures. Carbon pricing imposes a first-order tax burden, which for most sectors is largely passed forward to consumers, except in trade-exposed industries, where the burden may be largely borne by producers. A US $75 per ton carbon

[23] In a context of still large and negative output gap, the gradual increase in carbon prices should be understood in a broader context of frontloaded investment support as part of the recovery plans.

[24] Estimates are based on the IMF's spreadsheet tool to project emissions on a country-by-country basis and the emissions, fiscal, and economic impacts of carbon pricing and other mitigation instruments. The model starts with recent data (2018) on use of fossil and other fuels by major energy sector (data until 2020 is used for shares of sources used in electricity production) and then projects fuel use forward using (post-COVID) GDP projections and assumptions about: (i) the income elasticity of demand for energy products; (ii) technological progress that improves energy efficiency and the productivity of renewables; and (iii) future international energy prices. The impact of carbon pricing (and other policies) on fuel use depends on their proportionate impact on future energy prices and the price responsiveness of fuel use—price elasticities are between -0.3 to -0.5 based on empirical evidence and results from energy models. There is, however, inherent uncertainty surrounding emissions projections and the responsiveness of emissions to pricing, particularly for large carbon prices, given, for example, that the availability and adoption of future emissions-saving technologies is difficult to accurately project.

[25] This finding holds true across most European peer economies, with differences across countries reflecting differences in both the stringency of pledges (advanced countries tend to have stronger pledges) and the price responsiveness of emissions (which tends to be greater in countries that consume large amounts of coal, like Poland).

price would have a material impact on energy prices, with natural gas, electricity and gasoline increasing by about 43, 13, and 17 percent, respectively (Table 1). Concerns about the associated burden on households and firms may constrain carbon pricing—for example, a recent attempt to increase diesel prices was dropped. The recent adoption of measures to mitigate the steep rise in energy prices illustrate the challenges that higher carbon pricing would need to face.[26]

Table 1. Impact on Energy Prices

Energy Price Impacts for USD75 Carbon Tax p/tCO2e by 2030

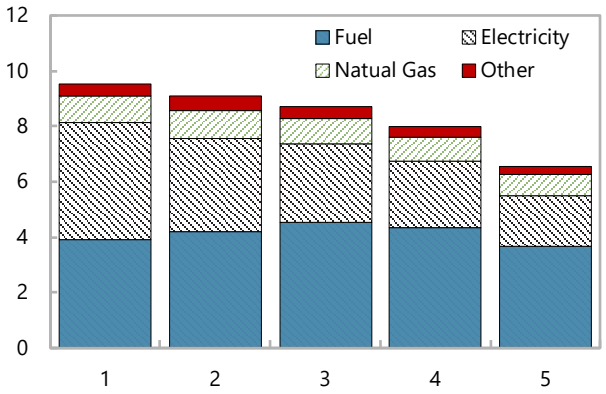
Country	Coal		Natural gas		Electricity		Gasoline	
	BAU price, $/GJ	% increase	BAU price, $/GJ	% increase	BAU price, $/kWh	% increase	BAU price, $/liter	% increase
Spain	4.3	172%	10.7	43%	0.1	13%	1.2	17%
Austria	5.2	132%	14.2	28%	0.1	9%	1.1	16%
Belgium	4.3	169%	11.2	36%	0.1	9%	1.3	14%
Croatia	6.1	150%	12.3	41%	0.1	22%	1.6	15%
Czech Republic	6.6	110%	12.2	29%	0.1	37%	1.0	16%
France	5.5	142%	14.7	31%	0.1	4%	1.2	17%
Germany	5.7	137%	11.8	38%	0.2	16%	1.2	16%
Netherlands	4.6	165%	13.5	35%	0.1	41%	1.3	15%
Norway	5.3	145%	9.2	49%	0.1	2%	1.3	16%
Italy	5.1	157%	14.5	37%	0.1	30%	1.3	16%
Poland	5.3	150%	10.0	37%	0.2	38%	1.0	18%
Portugal	4.5	166%	10.6	40%	0.1	20%	1.3	15%
Sweden	4.0	186%	15.1	24%	0.1	6%	1.2	16%
Finland	5.2	145%	12.5	29%	0.1	12%	1.2	15%
Greece	4.6	189%	11.0	42%	0.1	38%	1.3	18%
Romania	5.4	135%	12.2	36%	0.1	26%	1.3	14%
Bulgaria	6.9	108%	7.5	66%	0.1	37%	1.3	17%
United Kingdom	7.0	110%	11.5	41%	0.2	11%	1.1	17%
Denmark	4.7	177%	13.2	33%	0.1	8%	1.4	17%

Source: IMF staff using Carbon Pricing Assessment Tool. Methodology described in appendix to 2019 Fiscal Monitor: How to Mitigate Climate Change.

[26] In 2021, wholesale electricity prices have increased significantly in Europe, and the passthrough to retail prices has been particularly high in countries with a high prevalence of dynamic pricing, such as Spain. Several measures have been adopted to mitigate the impact on consumers, including temporary reductions in various taxes.

18. Revenues can be used to compensate the most vulnerable, to fund other climate initiatives, cut distortionary taxes, or to mitigate the elevated levels of public indebtedness. A carbon price of US $75 per ton in 2030 would raise additional annual revenues (relative to a zero-carbon price and accounting for the erosion of pre-existing fuel tax bases) of around 0.9 percent of GDP in 2030. The use of the funds would be guided by efficiency, equity and acceptability objectives given a country's economic and political circumstances (Klenert and others 2018). It would be important to support low-income households to offset the regressive effect of carbon taxation, and ensure broad social acceptability. If the goal is to maximize economic efficiency, some of the revenue could be used to decrease (or to avoid the need to raise) distortionary taxes such as labor income taxes and to address critical public investment gaps (Chen and others, 2020).

Household Direct Energy Consumption by Quintile
(mean; in percent of household consumption)



Source: Eurostat microdata, and IMF staff calculations.
Note: Quintiles based on equivalized consumption using OECD scale.

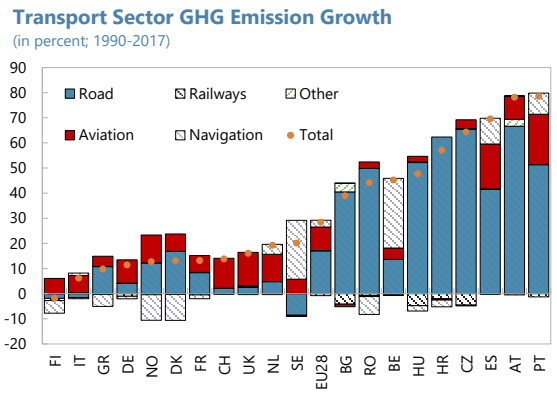
D. Surface Transport

19. Surface transport accounts for about two thirds of the transport sector's emissions (including international transport). It is dominated by passenger cars, and, to a lesser degree, heavy duty trucks (Figure 6). Passenger cars, the largest subsector, have increased emissions significantly, driven by income and population growth, and, in contrast to peer economies, no progress to date in reducing emissions per distance travelled relative to 1995. While some efficiency gains were observed in the aftermath of the GFC, the trend lost momentum and has reversed since 2013.

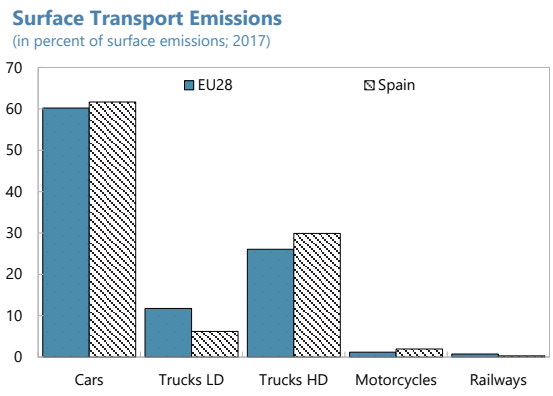
20. A multipronged approach is necessary to pursue a reduction in transport emissions. The scope for significantly reducing the transport sector's reliance on oil and oil products appears limited over the short to medium term., so emission reductions need to rely heavily on demand management, shifting to cleaner transport modes and improving efficiency in existing technologies. However, there is likely a limit to how low emissions of conventional vehicles can go, as ultimately fuel must be burned to produce power. With travel demand closely linked to economic development, attaining ambitious decarbonization objectives will require an accelerated uptake of clean technologies over the coming decade. Greater reliance on less emission-intensive transport modes will also remain crucial over the long term, as some subsectors are hard to decarbonize. Moreover, a move to cleaner technologies will not necessarily mitigate other externalities such as congestion. This section assesses Spain's framework for reducing emissions in surface transport, covering current policies, as well as future policies envisioned in the authorities' 2030 plan.

21. While not the focus of this paper, it should be noted that the challenge faced by the automobile industry of adapting to the green transition goes beyond the domestic decarbonization efforts. Vehicle production and related activities accounts for about 8.5 percent of GDP and 9 percent of employment (ANFAC). About 22 percent of domestic car registrations are produced in Spain. On the other hand, about 80 percent of Spain's production is exported, most of which is destined to European markets, which have shown a strong commitment to emission reduction. For instance, three of the largest export markets have pledged to ban internal combustion engine passenger cars by 2030 (Germany and UK) or 2040 (France, in line with Spain).

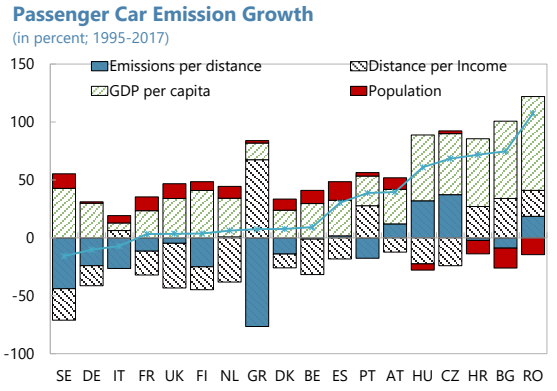
Figure 6. Transport Sector Emissions

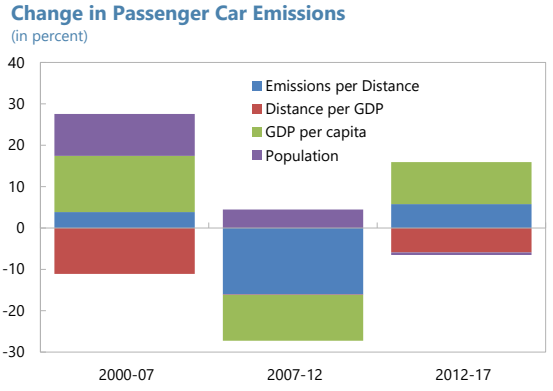


Sources: UNFCCC, and IMF staff calculations.



Sources: UNFCCC, and IMF staff calculations.





Sources: Eurostat, Haver Analytics, UNFCCC, and IMF staff calculations.

Tax Instruments

22. There is room for a more ambitious setting of fuel taxation (Figure 7). Tax instruments proportional to fuel consumption are an efficient instrument to target emission reductions (Arregui and others 2020).

- Fuel taxation is high compared to other goods, but is less ambitious in Spain than in other European countries. Moreover, estimates suggest that retail petrol and diesel prices do not typically reflect the full range of external costs associated with transportation (e.g. climate, local air pollution, traffic congestion, etc.). Higher carbon pricing could be implemented with a dedicated carbon tax, via an ETS framework (such as in the EC Fit for 55 proposal for the road transport and residential sectors), or by higher taxes in proportion to fuel consumption (such as excise taxes).

- Over the last 15 years, uprating nominal duty rates only sporadically has resulted in decreasing real rates over extended periods of time. Lower real duties contribute to congestion, pollution, and emissions, they may come at a significant fiscal cost while, as a redistributive measure, they are poorly targeted. It would be a good practice to uprate fuel duties, at least in line with inflation, more frequently.

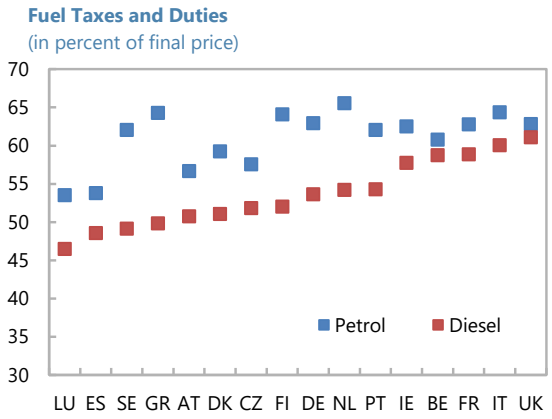
- Taxing diesel at higher rates per liter than gasoline is sound environmental policy (OECD 2019, IMF 2014), but in Spain and across most European countries, diesel taxes per liter are materially lower. This cost advantage increases the demand for diesel cars, which account for about sixty percent of the car fleet in Spain. Diesel has a higher carbon content per liter and is associated with larger non-climate external costs: diesel cars (particularly old diesel models) perform far worse than petrol cars in terms of the local air pollution they generate. Attempts to reduce this "diesel premium" in the 2020 budget failed to get the necessary support.[27]

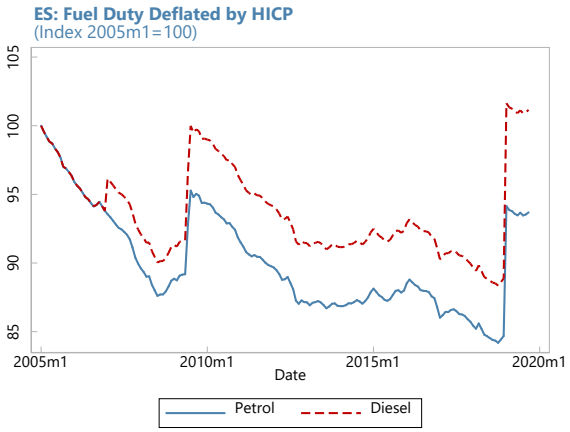
23. Higher carbon taxation can be implemented in various ways, including raising current fuel duties, introducing a dedicated carbon tax, or via an ETS framework.[28] If a new instrument is introduced, it would be important that its impact not be undone with a proportional reduction in other tax instruments. This could be prevented if the increased carbon pricing is set explicitly as an addition to other transport taxes. For instance, the carbon tax rate in Portugal, which is tied to the average EU ETS allowance price in the preceding year, nearly doubled in 2019 but, in anticipation of this increase, the government reduced the tax on gasoline by more than double the amount of the carbon tax increase. Relying solely on fuel taxes for driving an accelerated uptake of cleaner transport technologies (such as electric vehicles) would be politically hard given the already high taxes (compared to other goods), the relatively low near-term elasticity of fuel demand, and their distributional implications.

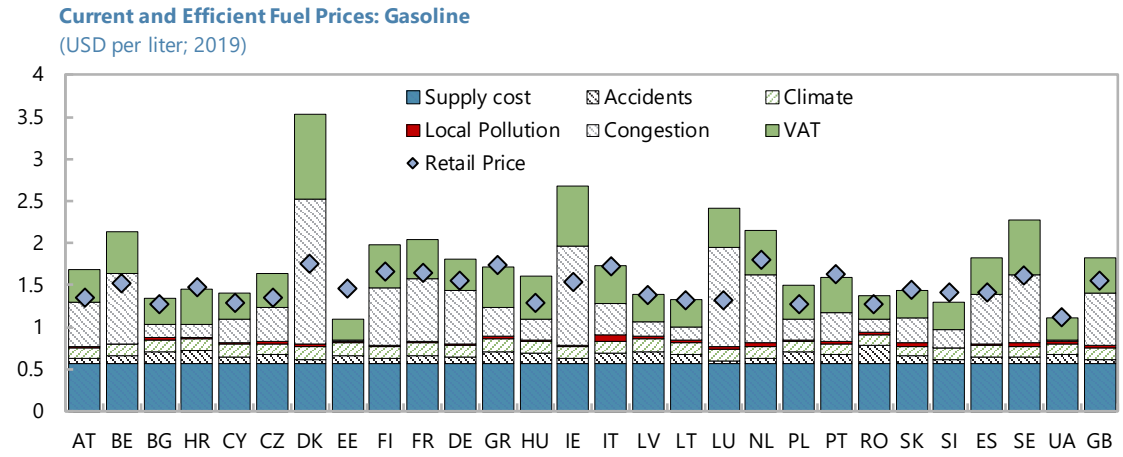
[27] Gago et al (2019) estimate that increasing diesel taxation to converge with gasoline taxation would generate additional 2.6bn in revenues.

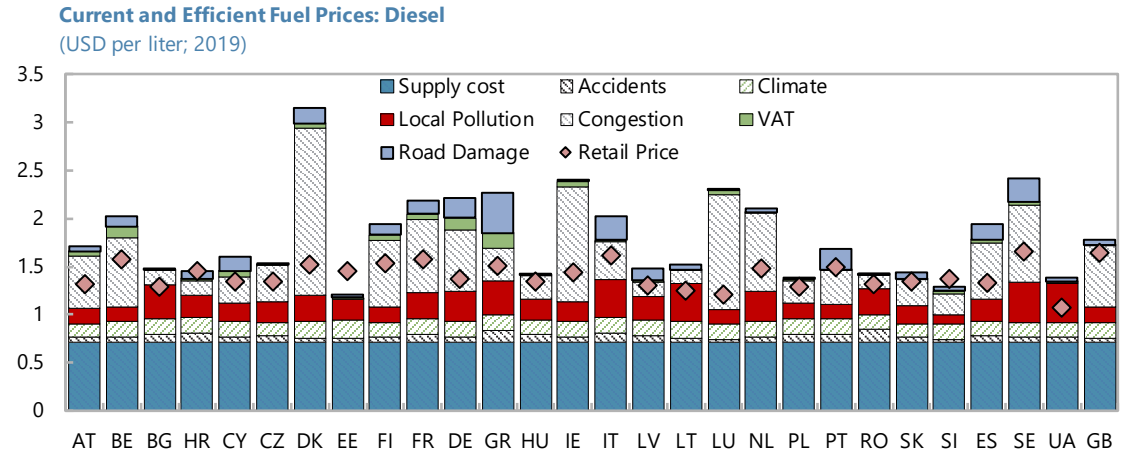
[28] For instance, a dedicated tax framework is used in Ireland, Finland, France, and Sweden, whereas an ETS framework is used in Germany.

Figure 7. Fuel Duties





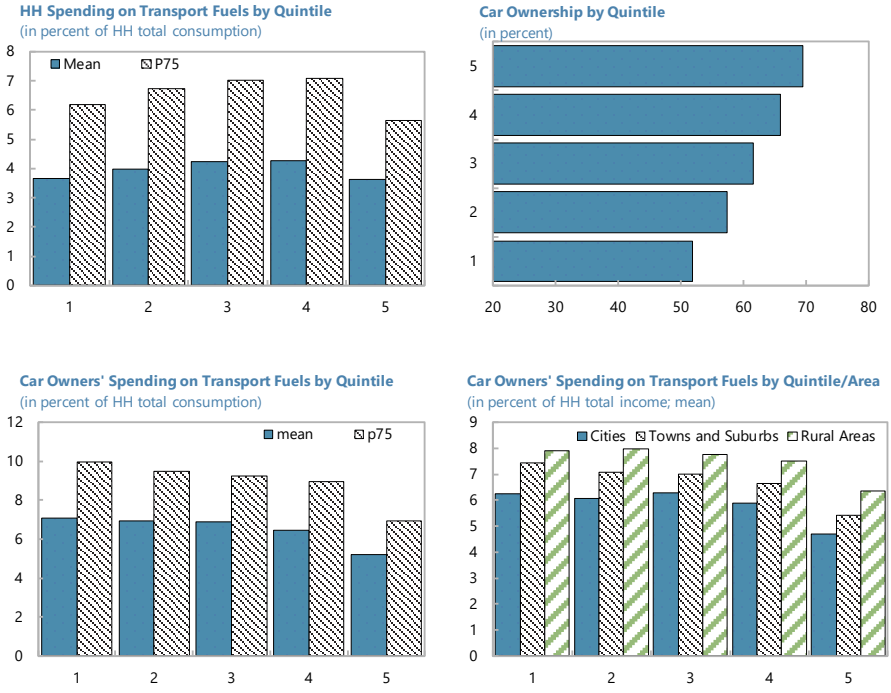




Sources: Coady and others 2019 and 2021, Haver Analytics, Oil Bulletin, and IMF staff calculations.
Note: Efficient prices are computed as the sum of supply costs, a broad range of external costs (including and beyond climate), and corresponding consumption taxes (VAT). While most petrol is consumed by households and subject to VAT, much of diesel consumption is an intermediate input so VAT would be rebated (estimates weight VAT by the share of household consumption in total road diesel consumption). The baseline estimation assumes a carbon price of 45USDtCO2. Monetizing external costs is not straightforward, and estimations are inevitably uncertain.

24. Increasing fuel taxes would not be particularly regressive, but could have a heterogeneous impact across households (Figure 8). Spending on transport fuels as a share of total consumption is relatively flat across quintiles (contrary to spending on domestic energy), and the ultimate distributional impact depends on how the generated revenue is employed. Household heterogeneity is relevant along dimensions beyond income. Car ownership rates are materially lower for poorer households, but for the subset of households that own a car, fuel spending typically accounts for a large share of their total consumption at the bottom of the distribution. There is also a relevant spatial dimension: rural households generally spend a higher share of their income on fuel, presumably to commute longer distances in areas with limited means of public transport. When considering the distributional implications of higher fuel taxes, governments usually take into account not only "vertical" but also "horizontal" implications (that is, treating individuals of a same income level too differently). For instance, Germany has proposed an increased commuters' allowance to compensate for higher fuel costs as a result of CO2 pricing, albeit only for long-distance commuters.[29] The essential tension here is that there is no way of directly compensating high-carbon consumers (such as long-distance travelers) without partly undoing the objective of the carbon tax. Subsidies to certain public transport modes could be considered as an alternative with potentially better distributional implications.[30]

Figure 8. Distributional Implications of Higher Fuel Taxes



Sources: Eurostat microdata (2015), and IMF staff calculations.
Note: Car ownership is proxied by positive spending on transport fuels and lubricants in the household survey. Quintiles based on equivalized consumption using OECD scale.

[29] In the German commuter allowance scheme, anyone travelling more than 20 kilometers to work gets a deduction per kilometer from their income tax in their annual tax return.

[30] See Parry and Small, 2009.

25. Stronger vehicle taxation can provide additional incentives to complement carbon pricing. Acquisition and circulation taxes are not based on actual use, and are therefore less well targeted than fuel duties. Acquisition taxes may play a role if people react more to higher upfront costs than to future lower running costs and may be more politically viable, as they apply on the flow of new cars as opposed to the entire fleet. The rationale for recurring circulation taxes is less clear: its environmental effectiveness appears dominated by a combination of fuel duties and acquisition taxes (Adam and Stroud 2019). Nonetheless, vehicle taxation could be motivated, for instance, by tax collection purposes, or based on the fact that a high tax on the acquisition of new cars could discourage people from replacing their old cars with newer/cleaner ones.

26. Acquisition taxes in Spain are already differentiated based on car emission intensity, but some features of the current schedule could be improved (Figure 9)**.**

- *The current schedule is coarse and flat within each bracket.* The structure therefore does not provide continuous incentives, and may lead to bunching close the upper limit within each bracket. In 2019, about 60 percent of car registrations fell below the lower threshold (120g/km), paying no taxes (0 percent rate). While most of those cars would now fall above this threshold (given a change in the methodology to measure emissions, from lab-based to real-world), it will eventually become necessary to provide some differentiation below 120g/km.[31]

- *Taxation is ad-valorem, which is atypical compared to many of Spain's peers.*[32] This makes tax payments within each bracket a function of car price and not of emission intensity. While on average price and emission intensity are positively correlated, they may not necessarily be well aligned at a disaggregated level. For instance, comparing the two most popular cars sold in 2019 shows that a SEAT Leon would pay significantly more than a DACIA Sandero, despite its lower emission intensity.

- The overall schedule is weaker (flatter) in Spain compared to most other countries.[33]

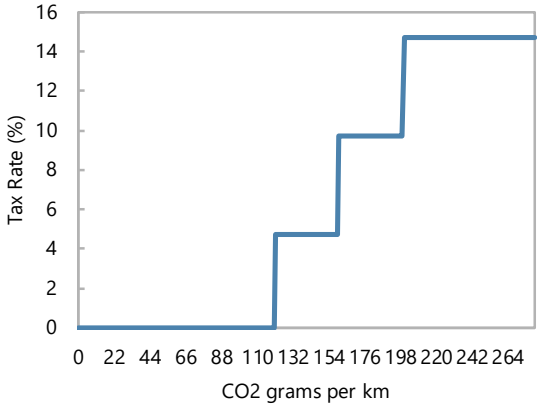
[31] Spain adopted the new methodology for measuring emissions on January 2021. Emissions under the new methodology (WLTP) are typically higher for the same car compared to those measured under the previous methodology (NEDC). Contrary to countries such as France, Italy, and Portugal, Spain did not initially modify the existing schedule to mitigate the implied increase in taxation. Nonetheless, around mid-2021 the tax brackets were relaxed on a temporary basis.

[32] According to ACEA's Tax Guide CO2-based acquisition tax es linked to car prices are used in Austria, Finland, Greece, Ireland, Malta, and Spain. CO2-based acquisition taxes are independent of car prices in Belgium (Flanders, Wallon), Cyprus, France, Italy, Netherlands, Portugal, and UK. In addition, Croatia's acquisition tax depends on car prices, but the CO2 component does not (i.e. there is no interaction).

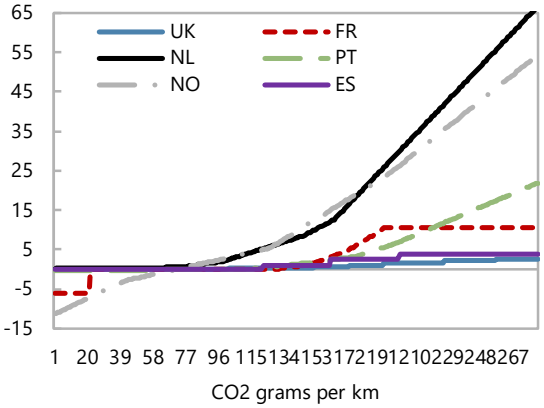
[33] The schedule for Spain is computed using average prices within each bracket to allow for a comparison with other countries in nominal terms.

Figure 9. Acquisition Taxes

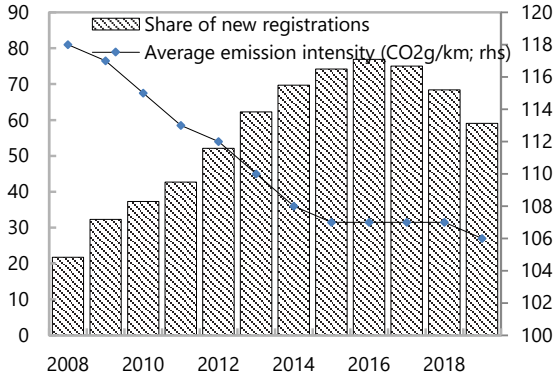
Acquisition Tax Schedule: Spain
(tax rate in percent)



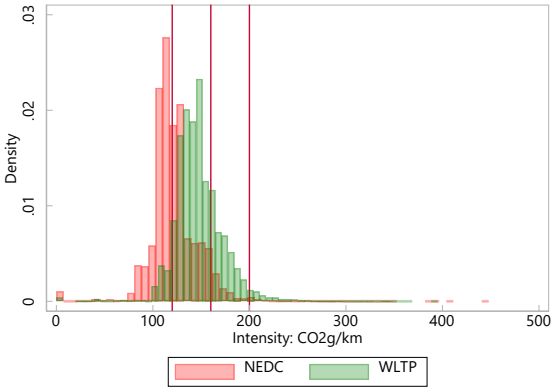
CO2-based Component of Acquisition Tax
(thousand Euro)



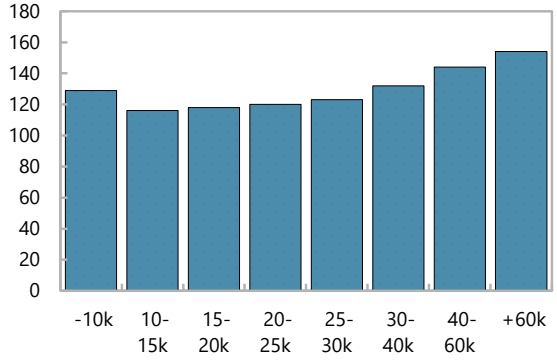
New Passenger Cars facing 0% Acquisition Tax



New Car Emission Intensity
(Spain 2019)



Mean Emission Intensity by Car Price
(gCO2/km; 2019)



Illustrative Comparison within Same Tax Bracket

	Cylinders-Power	WLTP emissions	Price (Euro)
Seat Leon (TSI SS Reference)	1c-90cv	124 g/km	22260
Dacia Sandero (Stepway Essential)	0.9c-90cv	140 g/km	13936

*Comparison based on petrol, manual and 5-door models.

Sources: ACEA, Agencia Tributaria, EEA microdata, and IMF staff calculations.
Note: France includes maximum EUR6k bonus scheme for low emissions cars. UK and Spain do not reflect grants for low emissions. Spain tax rate (Peninsula and Balearic Islands) is applicable on acquisition price of the car. In the second chart, Spain nominal tax computed based on average vehicle price (2019) within each bracket.

28. Authorities could consider a role for feebates. Feebates are a special case of CO2-based acquisition taxes that provide for a sliding scale of fees on vehicles with above average emission rates and a sliding scale of rebates to products or activities with below average emission rates.[34] Feebates promote a wide range of behavioral responses—including shifting from high- to lower mission rate ICEs, from ICEs to biofuel and hydrogen vehicles, and from ICEs to EVs (in contrast, tax incentives for EVs would promote only the last response).[35] Feebates can provide powerful incentives for low-emission investments with no first-order tax burden on the average motorist. Feebates are revenue neutral, and therefore there is no change in revenue with the progressive cleaning of the vehicle fleet (as would be the case in a fixed CO2-based tax scheme). A feebate system could be adapted from the current acquisition tax schedule, without requiring a new capacity for implementation.

29. Vehicle ownership taxation offers an additional policy lever, but could be better aligned with vehicle emission intensity and size/weight (Figure 10)**.** In many European countries, annual circulation taxes are based on vehicles' CO2 emission intensity to incentivize a cleaner fleet. Indeed, those countries tend to have a lower passenger car average age. In Spain, circulation taxes are based on (tax) horsepower.[36] While engine power is positively correlated with CO2 intensity, there is wide dispersion. That is, conditioning for engine power there is typically a broad range of emission intensity vehicles, that would be treated equally for the purpose of this tax. Moreover, many municipalities and regions (including some of the main cities, such as Madrid, Barcelona, and Seville) provide a discount of up to 75 percent for certain vehicles, including electric, hybrids, and vehicles on gas (CNG)/bioethanol.[37] However, this implies that some zero-emission vehicles (BEV) receive the same discount as some other more contaminating vehicles. For instance, some plug-in hybrid SUVs with large engine power may have larger emission intensity than some smaller internal combustion engine vehicles. Additional characteristics, such as vehicle weight and size, correlate with other negative externalities (i.e. pollution and congestion) and could also be taken into account.

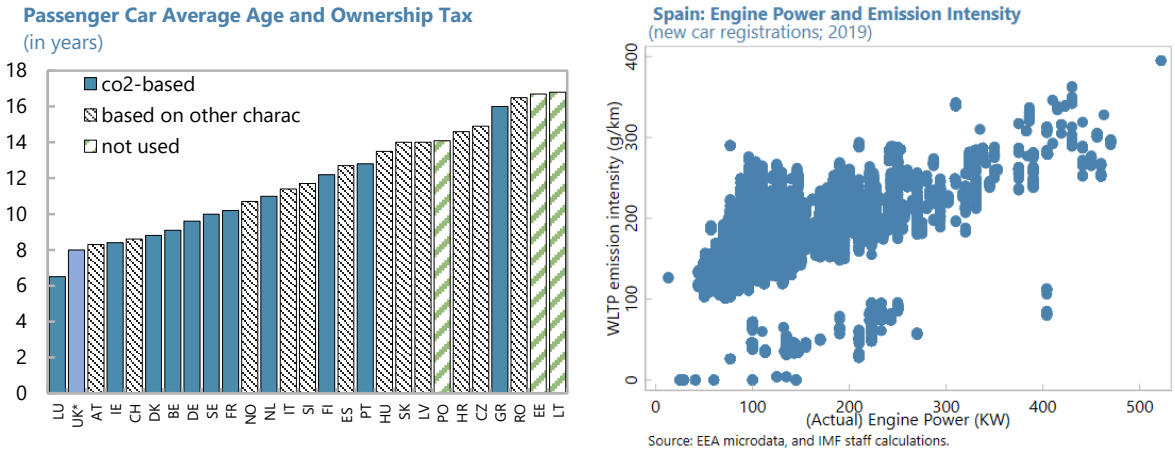
[34] Specifically, a feebate system imposes a charge on new vehicle sales equal to the product of (1) a price on CO2 emissions; (2) the difference between the vehicles CO2 emission rate per mile and the fleetwide average CO2 per mile; and (3) the average lifetime mileage of vehicles. That is, CO2 price × (CO2/mile – fleet average CO2/mile) × lifetime mileage.

[35] Absent frictions other than the climate externality, feebates are less efficient that carbon pricing as they do not promote the same demand response (e.g., reductions in vehicle use) but they are more flexible and cost-effective than regulations. See IMF Fiscal Monitor 2019.

[36] Tax horsepower is based on mathematical formulas and may not reflect actual engine power. As EEA microdata is not available on tax horsepower, engine power is used for comparisons.

[37] The length of time that the reduction rates apply varies significantly across regions.

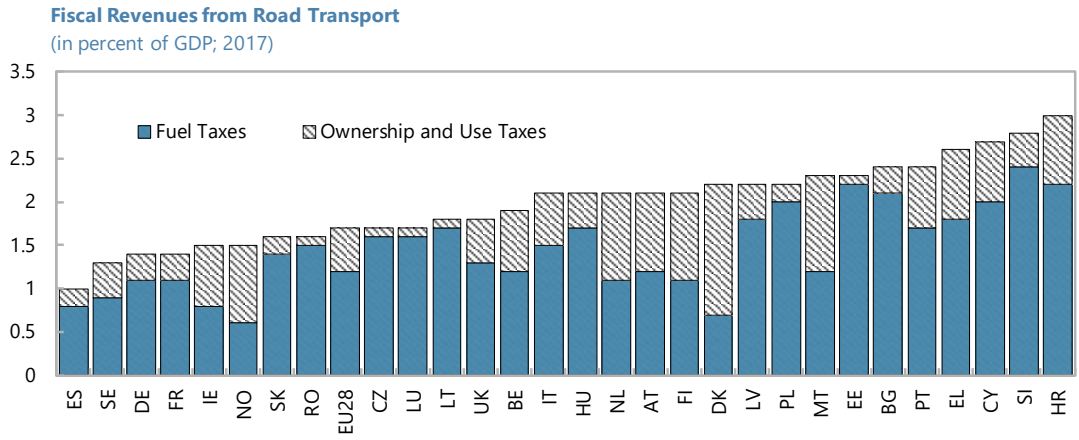
Figure 10. Circulation Tax



Source: ACEA, EEA, and IMF staff calculations.
Note: *In the first chart, UK circulation-tax was CO2-based until 2017, and flat since then.

30. Over the long term, authorities will need to reassess the future of transport taxation, as progress toward decarbonizing the sector erodes the base of the current system (Figure 11)**.** While fuel duties and vehicle taxation are relatively low in Spain compared to other countries, they still represent a non-negligible source of revenue (about one percent of GDP) that will decline over time in line with improvements in vehicle efficiency and fleet electrification. In most countries (including Spain), electricity is taxed at much lower rates than conventional fuels, in part because the tax is not intended to contribute to road financing. Going forward, intelligent road pricing schemes should be considered, as they provide many attractive features: they can address vehicle attributes and actual vehicle use as well as congestion, air pollution and other externalities from road transport (Adam and Stroud 2019). Authorities' plans go in this direction, as they seek to implement tolls systems in highways from 2024 onwards (per measure C1:R2 of the recovery and resilience plan).

Figure 11. Road Transport Fiscal Revenues

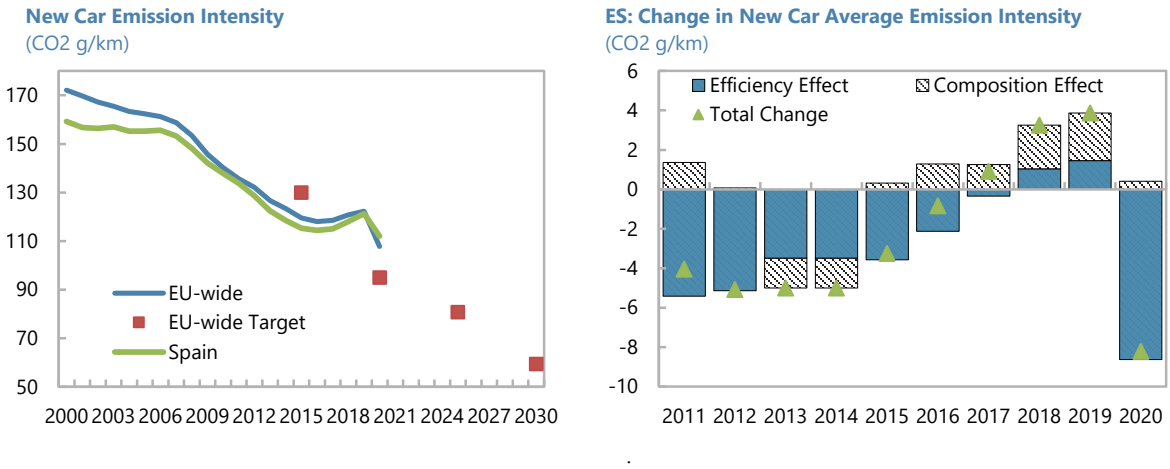


Source:Sources: DG MOVE 2019, and IMF staff calculations

Efficiency Standards

31. Fuel economy standards for new vehicles lie at the center of the EU framework for transport emission mitigation (Figure 12). Standards may be less cost-efficient compared to price-based measures, but typically benefit from lower opposition. Standards prompt people and firms to switch to greener technologies but do not discourage vehicle use, provide little incentive to outperform the given standards, and raise no revenue (which could be used to address distributional concerns). Mandatory efficiency targets set at the EU level have been in place since 2009 for passenger cars and since 2011 for light duty vehicles (for example, vans). The EU has agreed targets for 2025 and 2030 prescribing a reduction in emissions of 15 percent by 2025 and 37.5 percent (31 percent for vans) by 2030, both relative to a 2021 baseline. The existing system of fuel efficiency standards is broadly perceived as effective, notwithstanding past problems in emission testing. The recent adoption of standards for certain heavy-duty vehicles will bring the EU in line with other major countries, such as Canada, China, India, Japan, and the US.[38]

Figure 12. Efficiency Standards



Sources: EEA, Eurostat, and IMF staff calculations.
Note: EU-wide refers to EU, Iceland, Norway, and UK. Passenger car standards for 2020–21 (95 CO2 g/km) are phased in for 95 percent of vehicles in 2020 with 100 percent compliance in 2021. The decomposition is based on registrations for petrol and diesel cars reporting vehicle mass (kg), which is used as a proxy for size. Registrations are split into 40 groups based on fuel type and size. Efficiency effect is a measure of changes within groups (i.e. controlling for size and fuel type), composition effect is a measure of changes across groups. Spain data for 2013 has poor coverage for fuel types, making calculations less representative. Average changes for 2012 to 2014 are shown instead. Data for 2020 is preliminary.

[38] Until recently, the EU had neither mandatory procedures for monitoring fuel efficiency in the sector, nor mandatory targets. The emissions standards for HDVs adopted in 2019 set targets for reducing the average emissions from the highest-emitting HDV segments (accounting for about 65 percent of HDV emissions) for 2025 and 2030 by 15 and 30 percent, respectively, relative to a 2019–20 baseline.

32. EU standards do not guarantee homogeneous progress across member states, so continuous monitoring is necessary to assess consistency with individual country goals. Standards apply at the manufacturer level on the average emission intensity for new cars sold at the EU level and are adjusted based on the average mass of each manufacturer's fleet (with higher emissions allowed for heavier fleets).[39] Moreover, standards are set at five-year intervals (for instance, the 2015 target applied during the entire 2015–19 time period), allowing for a delay in adjustment.[40] Average emission intensity of new cars sold in Spain declined significantly during 2008–2015 (mandatory EU standards were established in 2009), but were on the rise during 2016–19. In line with other European countries, the composition (in terms of size and fuel type) of new cars has played a significant role, shifting away from diesel, and toward larger petrol cars. Preliminary data for 2020 shows a significant drop in car emission intensity with the phase in of the 2020–21 target.[41] Nonetheless, with a relatively smaller drop, Spain average new car emission intensity is now above the EU-fleet average (for the first time since Eurostat data is available). It will be necessary to continue monitoring progress on new car emission intensity, to assess the need for stronger fiscal incentives for cleaner and smaller cars (or penalties for dirtier and larger ones).

Additional Policies to Promote Electromobility

33. Attaining ambitious decarbonization objectives will require an accelerated uptake of clean technologies such as electric vehicles over the coming decade. In 2020, the government announced a goal of 250k electric vehicles (100k charging stations) by 2023. Spain's 2030 plan aims for five million electric vehicles (three million cars) by 2030 (and 500k charging stations).[42] The announcement of credible deadlines for discontinuing conventional cars in the future can be used to signal governments' commitment to decarbonizing the sector and encourage long-term investments. Spain has set a target to discontinue the sale of internal combustion engine passenger cars (and light duty vehicles) by 2040 (as in France). With the average car age in Spain typically higher than a decade, additional efforts would likely be required to discontinue some vehicles to meet the net-zero emissions target by 2050. Several European peers have instead set a more ambitious timeline for phasing out fossil fuel cars: 2025 in Norway, 2030 in Iceland, Germany,

[39] The interaction of standards with other policies is not straightforward. For instance, aggressive policies to accelerate the uptake of electric vehicles may lead to a waterbed effect if compensated with higher emissions by remaining internal combustion engine vehicles.

[40] On the contrary, manufacturers must comply with annual targets in the US.

[41] According to Mock (2021), EU manufacturers took advantage of the five-year interval in the regulation, optimizing their vehicle fleet mix in 2016–2019 towards profits, largely ignoring CO2 emissions and delaying the launch of some electric vehicle models until 2020.

[42] For reference, three million passenger cars amounts to 12 percent of the total passenger cars in use in 2019 (ACEA 2020).

Netherlands, Ireland, Sweden, and UK (2035 for hybrids), and 2035 in Denmark.[43] The recent EC Fit for 55 proposal includes a ban on internal combustion engine passenger vehicles by 2035.

34. Current levels of electromobility adoption in Spain are low compared to most other European peers (Figure 13)**.** Sales of electric vehicles (BEV, PHEV) increased significantly in 2020, accounting for nearly five percent of sales. This was likely influenced by the subsidy program for car purchases put in pace in response to the pandemic crisis, and the phase in of the 2020–21 emission efficiency standards. However, electric vehicles still account for a very small fraction of the total fleet (0.4 percent), significantly behind many of Spain's peers. Analogously, despite a significant improvement in 2020, Spain compares poorly to other European countries in terms of charging infrastructure.[44]

35. Subsidies can promote the adoption of low- or zero-emission vehicles, but may promote a narrower range of behavioral responses than feebates. These instruments are typically justified on the grounds of induced innovation, learning by doing, and economies of scale that would otherwise not be achieved (Gillingham and Stock 2018). As electric vehicles continue to approach cost parity with conventional vehicles, the need for support will decrease.[45]

- Spain has a long history of purchase subsidy programs. Programs typically require or favor the scrappage of older vehicles, and are limited to or favor the purchase of alternative fuel vehicles (Table 2). While assessing the counterfactual is difficult, the programs so far have not resulted in a fundamental transformation of Spain's fleet, as the average car age remains high and the share of "clean" vehicles low. If this will be the instrument of choice, these programs would have to be scaled up to meet the 2030 goals. Along this line, the MOVES III plan announced for the period 2021–23 increases the available funding significantly relative to previous programs. It will be important to closely monitor the take up rates to assess the need for adjustments.

- A challenge for these programs is that these subsidies tend to accrue to richer households, which have a higher rate of car ownership, higher participation in the new car market, and given that the price of BEV/PHEV vehicles remains high (Figure 14). Purchase subsidy programs in Spain do cap the price of eligible vehicles. Limiting the programs to households at the lower quintiles of the income distribution could improve the distributional implications, but would likely drive lower adoption rates.

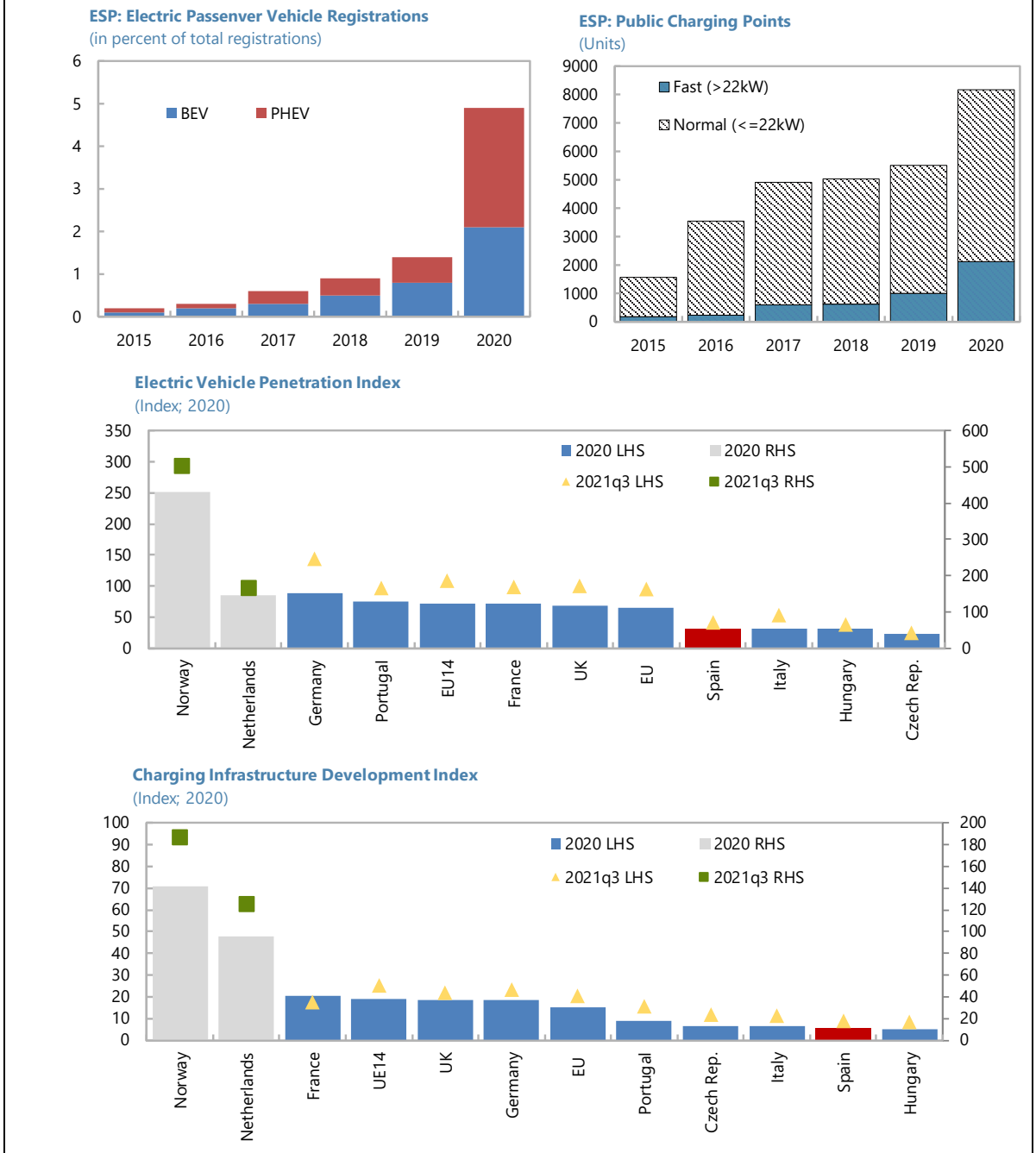
[43] None of the announcements by European countries have been transposed into binding regulation to date, as the latter conflicts with internal market rules. A country-level ban in the EU is deemed to fall within the scope of, and therefore to conflict with, rules including the EU type-approval regulation and the CO2 regulation for new passenger cars and vans (Wappelhorst 2021).

[44] The expansion in charging infrastructure in 2020 has brought Spain in line with the suggestion in the EU Alternative Fuels Infrastructure Directive of at least one charger per 10 vehicles.

[45] Electric vehicles are broadly expected to reach cost parity with conventional vehicles over this decade. There is less consensus as to when over the next decade parity would be reached: BloombergNEF 2019a argues it would be reached by 2022, CCC 2019a expects by mid-2020s, and MIT 2019 contends it would happen only toward the end of the decade (as the cost of raw materials is expected to rise following a sharp increase in demand).

- Integrating a subsidy program into a feebate scheme (see above) can incentivize shifting from fossil fuel to electric vehicles and from high- to low emission rate fossil fuel vehicles, without imposing a fiscal cost (as feebates are revenue neutral).

Figure 13. Electromobility Adoption



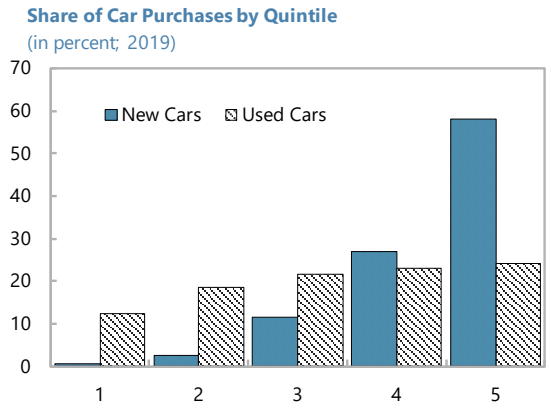
Source: ANFAC, EAFO, and IMF staff calculations.

Table 2. Spain: Vehicle Purchase Subsidy Programs

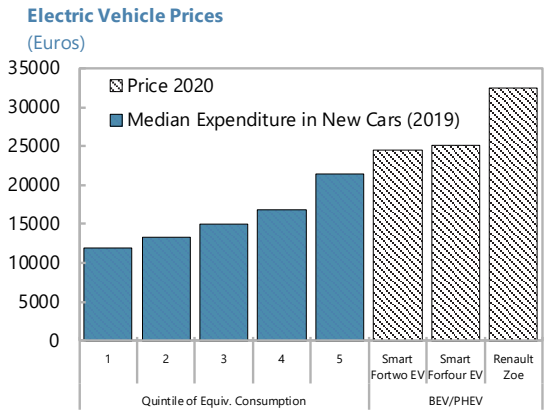
Plan	Period	Type	Scrappage required?	Overall Funding
Renove	1994-1996	Benefits on registration tax	Yes	
PREVER	1997-2007	Benefits on registration tax	Yes	
VIVE	2008-2010	Special financing conditions	No	
Plan 2000E	2009-2010	Grants	Yes	100mn
PIVE 1 to 8	2012-2015	Grants	Yes 10+	1115mn
PIMA Aire*	2012-2015	Grants	Yes 7y+	53mn
MOVELE 14-15	2014-2015	Grants	No	17mn
MOVEA 2017	2017	Grants	Yes, 10+	14.3mn
MOVALT Vehiculos	2017-2018	Grants	No	20mn
MOVES	2019	Grants	Yes 10y+	45mn
MOVES II	2020	Grants	No (but favored; 7y+)	100mn
RENOVE '20	2020	Grants	Yes 10y+	250mn
MOVES III**	2021-2023	Grants	No (but favored; 7y+)	400mn

Source: Authorities, Wappelhorst 2019, and IMF staff.
Note: * For commercial vehicles. ** Funding may be expanded to 800mn.

Figure 14. Purchase Subsidies Distributional Considerations



Sources: INE EPF, and IMF staff calculations.



Sources: Coches.com, EAFO, INE EPF 2019, and IMF staff calc.

Note: The second chart shows the three cheapest vehicles out of the ten most popular BEV and PHEV models in Spain in 2020.

36. There is a strong case for public support for the expansion of charging infrastructure. The lack of charging stations (range anxiety) is often identified as a barrier to the adoption of electric cars. Electric cars currently offer an average range of about 150 miles, which is more than sufficient for most car journeys (for example, the average daily trip distance in Spain is 24 miles) but could be a limitation for longer trips. Network infrastructure requires a coordinated system and is the kind of public good that the market may underprovide in the absence of public support.

37. Spain's 2030 strategy correctly identifies the deployment of charging infrastructure as a priority, and several policy planks are underway. Spain's national plan for the deployment of alternative fuels infrastructure (Directive 2014/94/EU) was approved in 2016 but did not establish specific targets for public accessible recharging points for 2020. Progress has so far been limited, with currently about 11.5k charging points, and very limited development of the superfast charging

network (24 points with >=250kW in five service stations). Going forward, it will be important to set up a multi-annual plan that includes long-term targets (until 2030) paired with public financial support, and mechanisms for auditing progress towards the government's goal of 100k charging points by 2023.[46] The recent adoption of the Law on Climate Change and Energy Transition should help expand the fast charging infrastructure network, as it requires the installation of charging points (>=50kW) in larger service stations. Various commitments under the recovery and resilience plan (both on structural reforms and investments) should also promote the deployment of charging infrastructure.[47]

Modal Shift

38. Further efforts are needed to foster the most efficient transport mode for each journey. Bus rapid transit, rail, and waterborne modes tend to be relatively carbon-efficient per passenger or ton kilometer compared with conventional heavy or light duty road vehicles, or aviation (although this varies with vehicle occupancy rates). Shifting to more sustainable modes of transport could be a cost-effective alternative to private car ownership (CCC 2019a, Economics for Energy 2021). Active transportation, such as walking and cycling, would be associated with additional health co-benefits. In cities, lower requirements for vehicle range and higher population density facilitate the switch to cleaner transport.[48] An adequate pricing of externalities, as discussed above, should promote a shift to lower-emission intensive transport modes. Investments in high quality interconnected public transport, walking and cycling infrastructure will be necessary, as identified in Spain's recovery and resilience plan for the use of EU funds.

39. The establishment of low emission zones constitutes the main driving force behind the modal shift in Spain's strategy. The Law on Climate Change and Energy Transition envisions the establishment from 2023 onwards of low emission zones (i.e. areas of limited access for the most polluting/emitting vehicles) in urban centers with more than 50k inhabitants.[49] This measure accounts for 40 percent of the reduction in transport sector emissions by the end of the decade, according to the authorities' 2030 plan. Low emission zones seek to reduce GHG emissions (the main focus of this note), but also air pollution, and potentially congestion.[50] Air pollution, in particular, has been identified as a significant issue in large urban centers, such as Madrid and

[46] Spain's recovery and resilience plan published in 2021 sets a target of at least 238k electric vehicles and charging points subsidized by 2023.

[47] The EU's Fit for 55 package includes a proposal for a regulation on the deployment of alternative fuels infrastructure (AFIR), which would imply a multi-annual plan for the deployment of publicly available charging points in member countries. The proposed reform to the Directive on Energy Performance of Building includes requirements for recharging infrastructure in private buildings, at home or at workplace.

[48] Urban transport accounts for about 35 percent of ground transportation in Spain (Economics for Energy 2021).

[49] It is also required for urban centers with more than 20k inhabitants with high air pollution levels.

[50] In a strict sense, the climate externality does not call for a geographically differentiated treatment. That is, the climate impact of GHG emissions does not depend on where they are generated. On the contrary, air pollution and congestion do call for a differentiated treatment based on geography (and potentially other dimensions, such as the time of the day).

Barcelona (Figure 15).[51] Air pollution is less of an issue in urban centers with lower population density, which face the related challenge that public transport becomes harder or more expensive to scale up. The impact of low emission zones on congestion may wane over time as the vehicle fleet shifts toward cleaner vehicles.

Figure 15. Population Density, Air Pollution, and Public Transportation

Source: Eurostat, and IMF staff calculations.

40. The implementation of this policy is decentralized, and should be monitored closely to assess any need for further action. The implementation of low emission zones falls under the responsibility of local authorities. The Ministry for the Ecological Transition and Demographic Challenge has recently adopted national guidelines for the implementation of these zones. Guidelines allow for flexibility at the local level, for instance, in terms of the extension of the zones, and the type of vehicle facing access restrictions. If it becomes necessary, the central government could consider establishing stronger guidance on minimum standards, allowing local authorities flexibility to increase the level of ambition. Minimum standards could cover an indication of size (in proportion to city size), level of stringency, enforcement of policies, and any applicable exemptions. The size of low emission zone needs to be large enough to promote a modal shift, instead of just a shift in emission from low emission zones to their surroundings, without a meaningful reduction in total emissions.

41. Local authorities should consider toll systems as a complement to low emission zones. Low emission zones might be considered to be regressive (Perdiguero and Sanz 2020), as richer households are more able to upgrade to eligible vehicles. A complementary way of limiting access to specific zones could be a differentiated toll system that could adjust pricing by time of the day

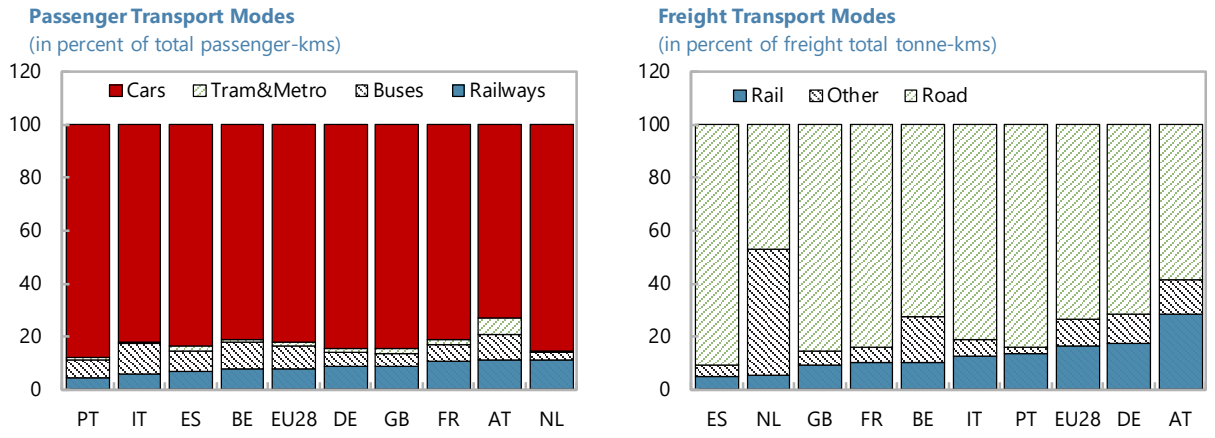
[51] Low-emission zones have been implemented in recent years in Madrid (since November 2018) and Barcelona (since January 2020), but quite lax in current state.

(e.g. based on pollution and congestion levels) and vehicle emission levels. Toll systems are included as a possible complementary measure in the recently released national guidelines for LEZ implementation. Contrary to low emission zones, such a mechanism would also generate revenues that could be recycled into the economy to mitigate distributional concerns. Examples include large European cities such as Milan and London.

42. Progress in decarbonizing freight transportation will also be necessary. Heavy duty vehicles (HDVs) account for about a third of surface transport emissions (one fifth of total transport emissions, including international). While data is generally limited, some analysts suggests that trucks have seen more limited gains in fuel efficiency relative to passenger cars. Only recently has the EU adopted efficiency standards for HDVs. Decarbonization of HDVs is challenging given the higher energy needs (from longer distances and heavier loads). It could be achieved through electrification and use of (sustainably produced) hydrogen fuel. Both alternatives will require scaling up infrastructure investments.

43. Promoting a more significant role of rail in freight transportation should help reduce emissions in the sector. Spain shows a low reliance on trains for merchandise transport (Figure 16). Rail accounts for about 5 percent of total tonne-kms merchandise transport, compared to about 17 percent at the EU level. As discussed above, "getting the price right" in road transportation would promote a shift toward rail. Nonetheless, investment is also needed to allow for greater use of rail for freight transport, including cross-border connections with France and Portugal and connections to ports and logistic hubs (EC 2019, 2020). Funds available under the NGEU provide a great opportunity to upgrade rail freight infrastructure, as intended under Spain's recovery and resilience plan.

Figure 16. Transport Modes

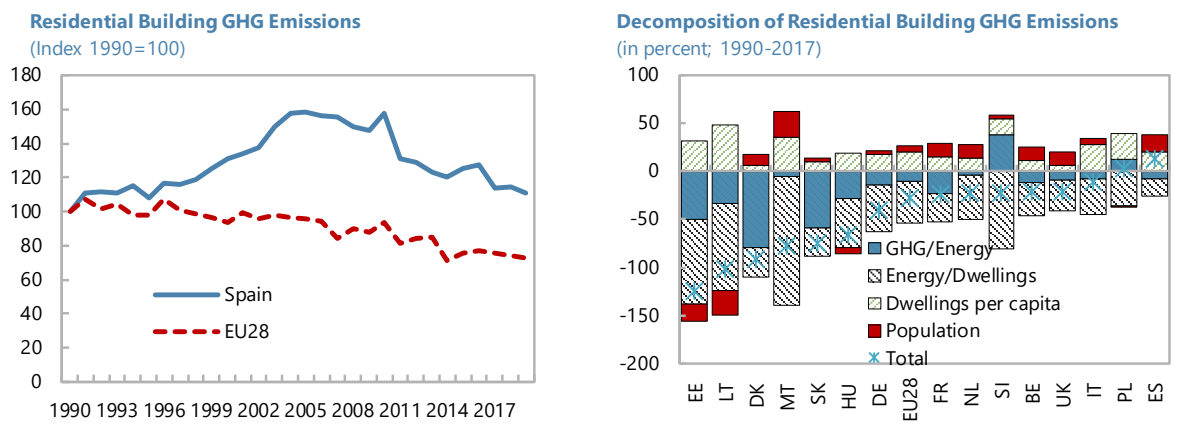


Note: Excludes international and airtravel.

E. Building Sector

44. Residential buildings account for more than half of the emissions in the building sector and are therefore crucial for decarbonizing the sector.[52] Emissions mainly relate to the use of fossil fuels in activities such as water heating and, particularly, space heating.[53] In contrast with most other European countries, residential emissions in Spain have increased relative to 1990 levels. Emissions expanded strongly during the construction boom years, and have partially declined in the aftermath of the global financial crisis. The strong expansion relative to EU28 is explained by higher population growth and a lower reduction in emissions relative to energy use (Figure 17). Increasing energy-efficiency of buildings through better insulation (lower energy consumption), and cleaner and more efficient heating/ cooling equipment, are the main channels through which households can reduce emissions. A move to net zero emissions will require continued progress towards electrification (and a clean power mix; which is discussed in the next section).

Figure 17. Residential Emissions



Source: Eurostat, Haver Analytics, and IMF staff calculations.
Note: Energy refers to final energy consumption by households, excluding electricity and renewables.

45. Promoting improvements in residential energy efficiency is a "low regret" policy with large abatement potential. Spain's residential building stock is one of the most inefficient in Europe, with most dwellings reporting an Energy Performance Certificate (EPC) corresponding to grade of C or worse (text figure).[54] More than half of the country's housing stock was built before 1980, when no energy performance standards were in force, and 75 percent was built before 2000. While abatement measures typically require an upfront cost, in many cases (such as replacing boilers for heat pumps), these are significantly mitigated over time as lower running costs accrue. With

[52] The rest of the sector's emissions are accounted for commercial and institutional subsectors, which have also increased significantly relative to 1990 levels.

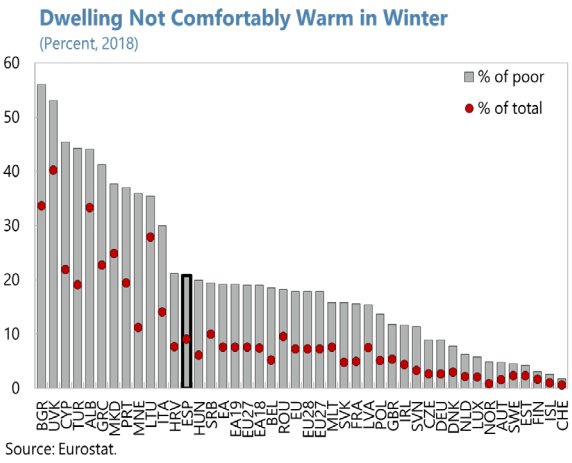
[53] Indirect emissions from the generation of electricity to run appliances, electric space heating or cooling, electric cooking and lighting are covered in the next section, as part of the broader discussion on the power sector.

[54] As a caveat, comparisons are not straightforward, as not always the same letter of EPC corresponds to the same range of efficiency in all countries.

poorer households typically living in less energy efficient homes, improving residential efficiency is likely to have positive distributional implications.

46. Meeting Spain's ambitions will require significant policy action. The 2030 plan targets energy renovations of 1.2 million dwellings (thermal envelope) cumulative over the decade, and an annual average renovation of 300,000 heating and cooling systems, production of domestic hot water and ventilation (thermal installations). As part of its Recovery, Transformation, and Resilience Plan, Spain seeks to renovate at least 355,000 residential dwellings by 2026, achieving on average a primary energy demand reduction of at least 30 percent. More broadly, the plans allocate about €7 billion towards efficiency improvements in the building sector and urban transformation. Strategic documents correctly identify the need for a comprehensive policy package to scale up progress towards the decarbonization targets, including taxation, regulation, investment support, and multiple other structural supportive measures.

47. There is scope for higher carbon pricing in the sector, but policies should be designed to protect the most vulnerable households. As discussed above, emissions in the residential sector show a relatively large "carbon pricing gap" (not in terms on coverage, but in terms of levels). Nonetheless, increasing carbon pricing faces significant challenges. Household pre-tax energy prices are relatively high compared to other European countries. In the absence of compensating mechanism, higher energy prices tend to be regressive. And the fuel poverty rate (as measured by the share of households unable to keep their home warm in winter) is already relatively high in Spain. The recent proposal by the EC to create a standalone ETS system for the residential and transport sector (as part of the recently announced Fit for 55 package) seeks to deliver more robust carbon pricing while allocating dedicated resources to reduce the impact on lower-income households. Alternatively, a similar approach could be implemented based on domestic taxation.[55]



Source: Eurostat.

48. A package of fiscal measures for the residential sector could reinforce carbon pricing. On thermal installations, a tax-subsidy (feebate) scheme involving revenues from an interim tax on gas heating technologies (with rate increasing through mid-2030s) funding subsidies for electric heat pumps. On thermal envelope, differentiating rates of property taxes could further incentivize the take-up of energy efficiency renovations.[56] Feebates could also be applied to electricity consumer products like such as refrigerators and heating systems. Feebates impose a fee equal to

[55] Complementary policies, as discussed below, could also play a significant role in addressing energy poverty. For instance, subsidy programs for energy efficiency investments could be adjusted by negatively linking subsidy rates to recipients' income, as suggested by Bourgeois et al. (2021). In addition, owners of dwellings of the lowest EPC classes (F and G) could be systematically provided with technical and financial advice (see Sichel 2021).

[56] This alternative has been proposed for consideration by the Committee on Climate Change in the UK (CCC 2020).

the product of: (i) a per unit energy charge; and (ii) the difference between their energy consumption rate and the industry-wide energy consumption rate for that product. As discussed above, feebates have a much smaller impact on electricity or product prices than comparable carbon pricing as they avoid the pass through of carbon tax revenues or allowance rents into higher prices.[57]

49. Carbon pricing needs to be complemented with measures to overcome additional market failures in the building sector. In addition to inadequate price incentives due to limited environmental taxation, renovation rates are typically held back by liquidity constraints, cost-benefit mismatches between owners and renters, unawareness or uncertainty of potential energy savings from renovation, and coordination frictions (Arregui et al. 2020, MITMA 2020, Gago et al. 2013). Some features of Spain's residential sector exacerbate the challenge of decarbonizing the sector. For instance, the share of apartments in dwellings and the share of buildings that are multi-family units are among the highest in Europe (66 and 71 percent, respectively; Figure 18). In these circumstances, decision-making on renovation becomes a more complex collective process.[58] This complexity may condition the application for and granting of public support for renovating collective housing, or loans, such as for communities of owners (MITMA 2020).[59]

50. On the regulatory front, clear trajectories for stronger standards can help boost the adoption of energy efficiency measures. Standards for new dwelling are expected to tighten over time, requiring high energy efficiency and built-in low-carbon heat, but the trajectory for tightening standards has yet to be set out. Actions via new homes takes far too long because of low replacement rate, implying that decarbonization requires renovating the existing housing stock (most of the buildings that will be standing in 2050 exist today). The rate of renovation is relatively low in Spain, and tends to be dominated by "light renovations" that yield energy savings of less than 30 percent.[60] Only 0.3 percent of energy renovations of residential buildings completed in Spain over 2012–2016 were deep renovations that meet the "Nearly Zero Energy Building" (NZEB) criteria (Economidou et al 2019), and only 56,000 dwellings have undergone a deep energy renovation, which provide energy savings higher than 60 percent (MITMA 2020). A phased tightening of mandatory minimum energy performance standards for existing buildings, as proposed in the EC's

[57] The authorities' plan the introduction of tax deductions for dwellings that improve their EPC rating. These measures could be complemented by pilots to assess whether alternative measures (such as e.g., rebates or cash paid to contractors who install heat pumps) are more cost effective.

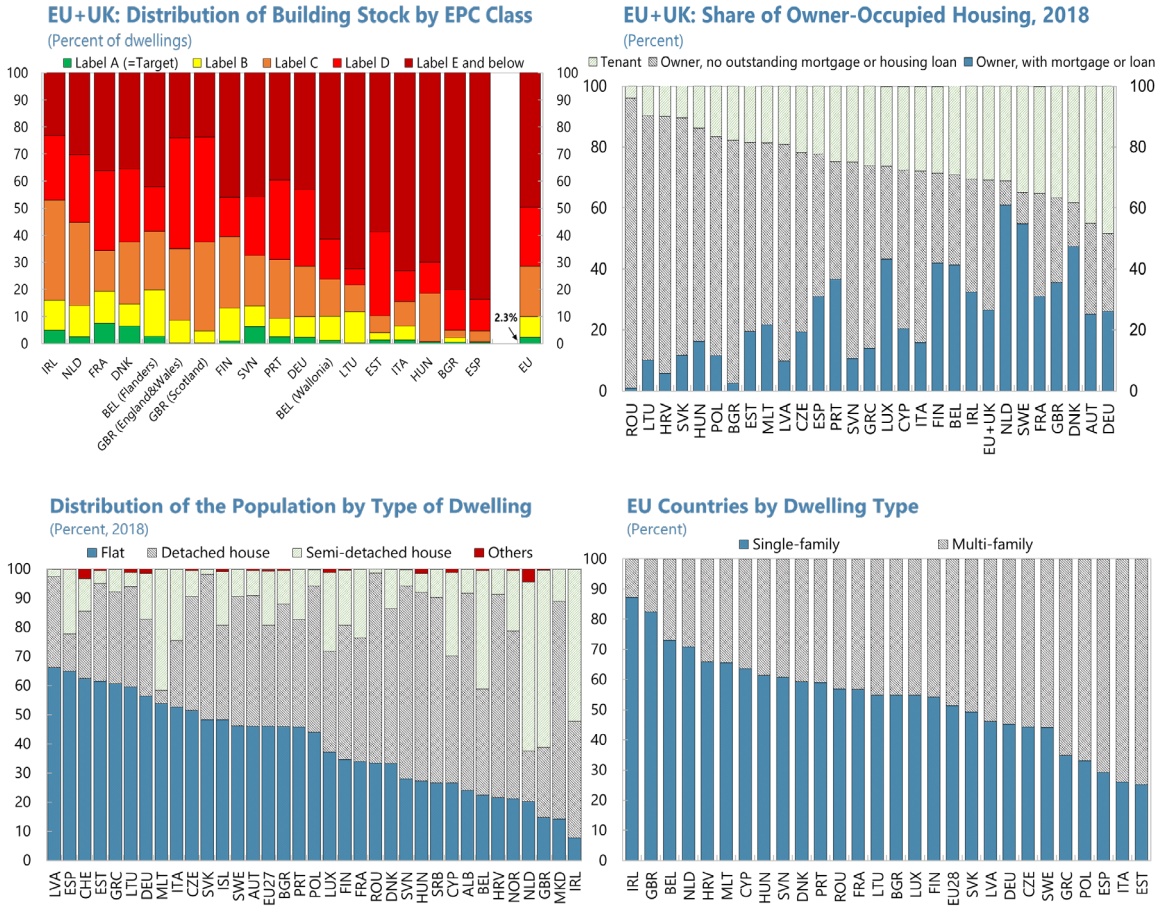
[58] Collective decision making is subject to rules (including a system of majorities depending on the type of work to be undertaken) regulated by the Horizontal Property Law.

[59] On the other hand, the relatively high home ownership rate in Spain (about 80 percent) suggests that frictions related to investor/user barriers are likely less of a concern than in countries where renters are more predominant.

[60] The current rate of renovation is 30,000 dwellings per year (0.2 percent of the residential housing stock)—about five times less than strong performers like France and Germany (Climate, 2021), and far below the rate recommended by the European Commission (2–3 percent).

Renovation Wave strategy (and the proposed revision of the EPBD by end-2021), could step up the pace and depth of renovations.[61, 62]

Figure 18. Housing Stock Characteristics



Sources: BPIE, Eurostat, European Commission, and IMF staff calculations.

51. Attractive financial mechanisms can help overcome the typically large up-front costs of improving residential energy efficiency.

[61] Energy performance requirements for renovations of existing buildings are regulated in the Technical Building Code (CTE). The CTE requires that deep renovations comply with energy performance requirements for new buildings. A review of the CTE is planned, in order to increase energy efficiency and renewable energy requirements, as well as the minimum requirements for thermal installations via the Regulations on Thermal Installations in Buildings for all new buildings and renovations.

[62] The EPD revision proposes a minimum energy performance standard, with a welcome focus on worst performing buildings (i.e. class of F or G). The proposed standard requires an improvement by one or two EPC classes only over the next decade. Member states are empowered to set national minimum standards in addition to the EU-wide ones.

- ***Financial public support programs.***[63] Public support through grants and financing have been used in the past, generally making aid conditional on achieving certain efficiency requirements.[64] Lines of aid would need to be augmented to achieve the leap in scale needed to meet the objectives. The availability of EU funds provides an opportunity to so, as committed in Spain's recovery and resilience plans (measure C2.I2). Given their fiscal costs, it would be sensible for these programs to prioritize the most vulnerable households and "hard to treat" dwellings, as well as to require sufficiently deep renovations consistent with longer term decarbonization objectives. Ex-post verification mechanisms could be introduced to verify the quality of completed renovation projects that have benefited from public support. Periodic evaluations of the effectiveness of public support schemes would be advisable.

- ***Green financing mechanisms.*** Private finance mechanisms would also need to be scaled up. The development of "green mortgages" would benefit from comprehensive and consistent data on energy efficiency and the development of active strategies for monitoring financial risks, notably "greenwashing" (IMF 2021, Alogoskoufis and others, 2021), consistent with the EU Taxonomy on Sustainable Activities. Energy efficiency investments could be boosted by "on-bill financing" of energy efficiency investments, which can help address split incentives between owners and renters (Arregui et al. 2020, IMF 2021).[65] Finally, enabling private finance may require removing barriers, as in the case of Spain and its case of the Horizontal Property Law (de Arriba Asegurado 2021). The recent reform of the Horizontal Property Law seeks to improve access to finance for communities of property owners and make majority votes on energy renovations of buildings binding (which is relevant given the predominance of multi-family homes in Spain, as discussed above).

52. The planned introduction of "one-stop-shops" is welcome.[66] Renovation Offices can play a key role in reducing information asymmetries that hinder decarbonization of the residential sector (Arregui et al. 2020). These offices should be budgeted and implemented as part of a comprehensive national strategy to introduce a centralized public digital platform that is compatible with existing public information systems related to the building sector and can be used by both households and other relevant stakeholders (regional and local governments, banks, renovation professionals). Such a platform could be used throughout renovation projects, with household use likely accounting for only a fraction. A public digital platform would be a key tool to address information barriers and asymmetries that have been found to be major factors, across countries, in

[63] Support mechanisms include grants, subsidized and guaranteed loans, and tax incentives to reduce non-renewable energy use (e.g. property and construction tax rebates for buildings with solar facilities, tax deductibility of renovations from personal income taxes if at least a 30 percent primary energy demand reduction is achieved).

[64] Examples include the PAREER aid programs, MITMA's State Housing Plan, and the ICO lines for companies and entrepreneurs.

[65] This is in line with the recently proposed revision of the EPBD (EC 2021).

[66] See Spain's RRP reform C2.R5.

hampering investment in energy efficiency projects.[67] It would be important to make guidelines on best practices for energy renovations publicly accessible.

53. "One-stop-shops" could be complemented by centralized price lists. While the NECP plans for the development of guides on energy renovations, the authorities could consider introducing energy renovation price lists. Centralized price lists would complement other information policies. They could be created and monitored by either a public or private actor, and would make prices of goods and services related to energy renovations comparable (e.g., within the same region), thus helping to contain costs and reducing information asymmetries. The construction of price lists via surveys, supplemented by expert estimates, would have two advantages (Missemer et al. 2020): mitigating information asymmetries between owners and renovation professionals, and supporting new professionals in construction and retrofitting markets determine their prices/services. Price lists could be adapted regionally and could help the authorities better target public support and mitigate windfall effects, thereby increasing cost effectiveness.

54. To address structural supply constraints, the government could consider introducing certification and training programs for construction and residential sector professionals. Such policies could increase the supply of skills required for the emergence of an industrial sector that is able to provide retrofitting solutions that are understandable for owners and tenants and that can sustain high rates of retrofitting (Arregui et al., 2020). Relevant factors include the availability of skilled workers, cooperation between different trades, and the creation of certifications and advisory structures.

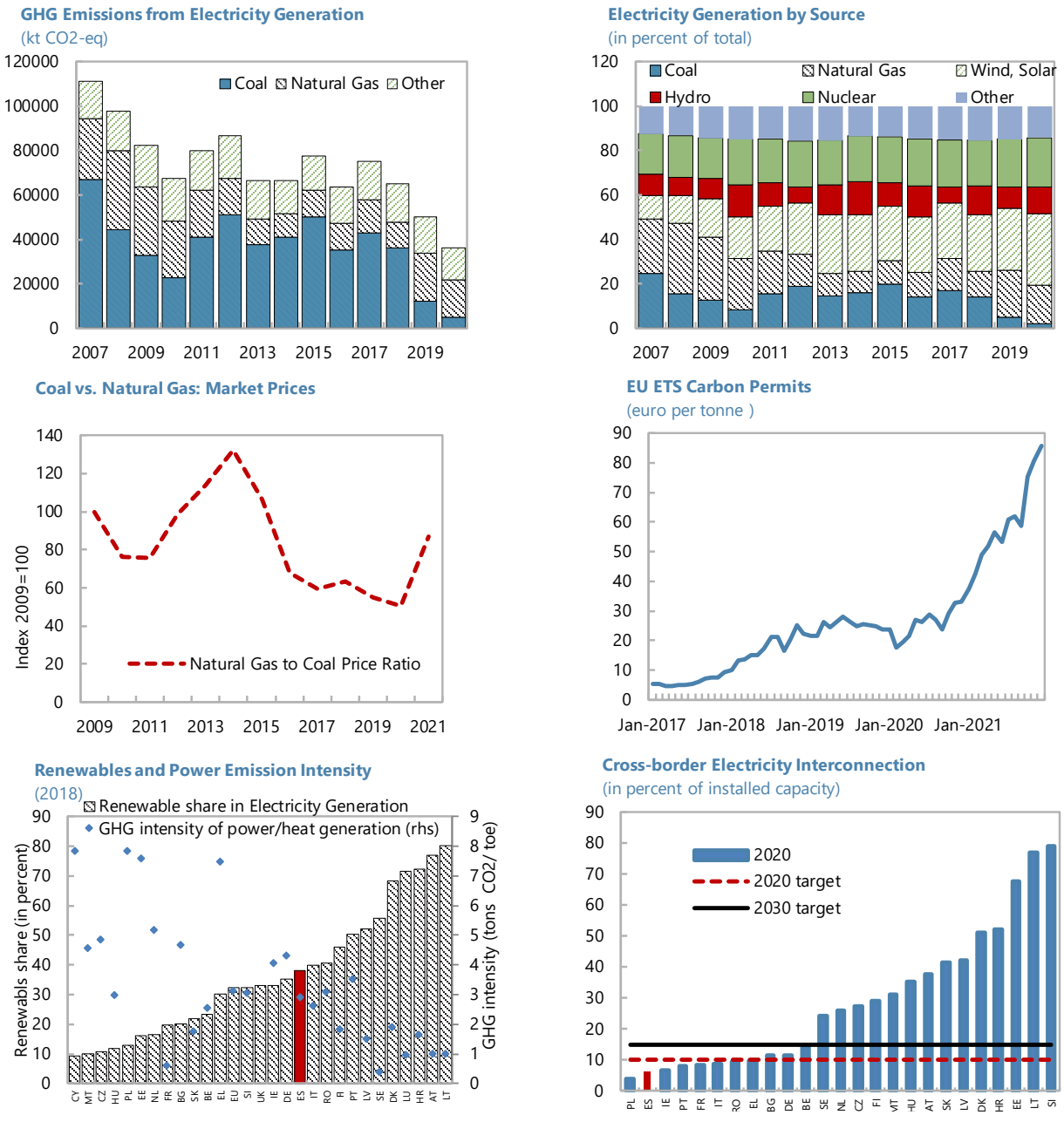
F. Power Sector

55. Progress toward a clean energy mix is a pre-condition for progress in other sectors. Electrification will need to play a crucial role in decarbonizing various sectors (such as road transport, residential, and industry. This implies that electricity demand will increase significantly over the next decades. At the same time, sectoral energy efficiency measures (for example, lighter and more aerodynamic vehicles, residential insulation, etc.) will help reduce the increase in electricity demand.

56. Emissions from the power sector have dropped significantly in recent years following a faster than anticipated shift away from coal as an underlying source (Figure 19)**.** This, in turn, has been driven by a combination of policy and market forces, including the closure of coal mines following the discontinuation of state aid in observance of EU regulation, the closure of most coal-fired power plants to avoid violating a European environmental directive forcing such plants to adopt technology to clean up the gases they emit, the relatively low natural gas prices in 2019–20, and the escalation in the price of carbon allowances in the EU ETS (that increase the cost of coal-fired electricity relative to alternatives like natural gas or renewable energy).

[67] For a detailed proposal, see Sichel (2021).

Figure 19. Power Sector



Source: DG-Energy, MITECO, REE, and IMF staff calculations.
Note: Natural Gas refers to combined-cycle plants. In chart 2, wind-solar includes all renewables other than hydro.

57. Further reducing emissions in power generation will require continuing the transition from fossil fuels to renewables. A substitution of coal with gas helps in the short term, but would not allow to attain the ultimate EU target of zero net emissions by 2050. Barring an expansion of nuclear energy, which poses potential environmental issues other than GHG emissions, further

increasing the share of renewables is the only way to achieve a meaningful reduction in emissions per energy consumed.[68] The share of electricity generation from renewable sources has increased significantly to about 40 percent of total, above the EU average, up from 15 percent 15 years ago. A continued expansion of the renewable sector will be required to meet the government target of accounting for 74 percent of electricity production by 2030.

58. Accommodating an increasing transition to renewables and the electrification of downstream sectors will demand upgrading electrical infrastructure. The need for further investments in energy infrastructures (EC 2019 and 2020) constitutes a main pillar in Spain's 2030 strategy and intended reforms and investments under the country's recovery and resilience plans.

- The decentralized and intermittent nature of some renewable sources such as solar and offshore wind requires developing smart grids and renewable electricity storage to better manage the demand. Solutions that enhance system flexibility (for example, "smart" vehicle charging or building heating and cooling), will be important to ensure that power demand peaks are manageable and enable maximum use of renewable generation. There is also an increasing need for coverage and interconnection of electrical grids. At 6.5 percent, Spain is one of the few countries that have not met the 10 percent electricity interconnectivity (cross-country) EU target by 2020 (15 percent by 2030).[69] Progress in market integration should also introduce more competition (EC 2020).

- Further pressure comes from the expected increase in demand for electricity as other sectors such as transport and industry move from combustion to electrical engines and buildings from onsite heating to electrification (see respective sections). Anticipatory investments to upgrade electricity networks will be required, so grid capacity constraints do not hold back the needed accelerated uptake of electric vehicles.[70] Spain's 2030 plans envision an expansion in the total installed capacity in the electricity sector from 103.7GW in 2018 to 161GW in 2030.

59. Carbon pricing within the EU ETS has strengthened in recent years and should help support the deployment and integration of renewable energies.[71] Emissions in the power sector are adequately covered under within the EU ETS framework. While prices have been relatively low

[68] Nuclear energy is emission free but not classified as renewable energy by the EU. Spain plans a phased closure of nuclear power generation (accounting for about 20 percent of total power generation in 2019) starting in 2027, and to be completed by 2035.

[69] The agreed cross-border capacity ratio corresponds to the import capacity over installed generation capacity for Member States.

[70] Solutions that enhance system flexibility (for example, "smart" vehicle charging or building heating and cooling), will be important to ensure that power demand peaks are manageable and enable maximum use of renewable generation

[71] Beyond the electricity sector, the government plans to expand self-consumption of renewables and distributed generation, as well as promote the use of renewables in the industry and heating sectors.

and volatile over the last decade, they have strengthened significantly in recent years.[72] Levels are now above 50 euros per ton, nearly double from the 2020 average, and ten times the value in 2016–17. Chen and others (2020) have argued that the EU ETS framework could further be strengthened with the introduction of a predictable carbon price floor that provides more certainty on future pricing. If price uncertainty was assessed to be a significant deterrent of clean technology investment, a national level floor (as used in the UK) could also be considered (Labandeira 2018). Unilateral action is nonetheless a second-best approach as it could have a "waterbed effect" on the EU ETS, and it may have an impact on competitiveness.

60. As discussed above, a broader tax reform covering multiple sectors would be desirable. As carbon pricing for the power sector are expected to continue to increase, it will be important to incorporate equivalent pricing into other sectors, to internalize the emission externality and so as not to undermine incentives for electrification (such as the adoption of electric over fossil fuel vehicles, or electric heat pumps over natural gas heating).

61. Policies complementary to carbon pricing are also necessary, and Spain's auction framework appears adequate. Countries have implemented various policies to support investment in renewable energy. Given the large scale of these projects, an important aspect is predictability and stability of revenues, in order to facilitate the investment decision and its financing. Spain's 2030 strategy establishes an auction framework as the main tool for the development of these technologies. A new auction scheme has been adopted in Spain, and the first auction with the new scheme was conducted in January 2021. Auctions have become the most widespread tool at the national level across EU countries. IEA (2021) has assessed that Spain's updated auction mechanisms are a step in the right direction to provide a stable, long-term remuneration framework for supporting the growth of renewables. A recent study of the new auction scheme in Spain suggests that the design is generally in line with international practice and is appropriate to achieve the goals set in the 2030 strategy (del Rio 2021).

[72] A Market Stability Reserve (MSR) was introduced in January 2019 to reduce the volatility of ETS prices. A large accumulated surplus of allowances weakens the carbon price signal. The MSR puts a fraction of surplus allowances into a reserve when the surplus exceeds a certain threshold. Following the announcement of the MSR, the ETS price has strengthened.

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