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HUNGARY

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June 3, 2021

Approved By
The European Department

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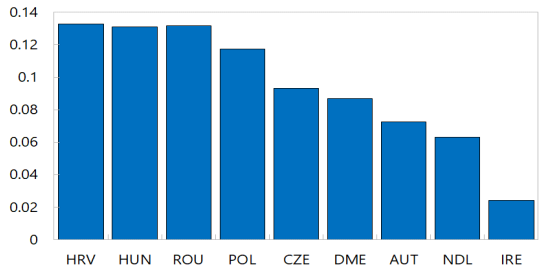
HUNGARY'S CLIMATE MITIGATION AGENDA: GOALS, PROGRESS AND CHALLENGES[1]

Hungary is actively participating in international agreements to mitigate climate change and intends to reach climate neutrality by 2050. It seeks to achieve energy security, climate protection, and economic development in a mutually reinforcing way. The main pillars of its approach include support of renewable and nuclear energy production, recycling, and energy conservation. The approach misses, however, actions to increase the price of carbon emissions and introduce more comprehensive incentives for retrofitting and renovation. Hungary's efforts are to be supported by the Next Generation EU funds.

A. Context

1. Economic development has brought significant benefits but at an environmental cost. While investment is critical for raising living standards, it may also cause harmful side effects for the environment with potentially sizable costs in terms of health and productivity which, ultimately, reduce its impact on growth. Some estimates suggest that, in the absence of mitigating policies, higher greenhouse gas (GHG) emissions will reduce real GDP per capita level by 5 percent, on average, in the EU countries by the end of the 21st century (WEO, 2017). More broadly, pollution is of great concern to many Hungarians as shown by the Eurobarometer's recent poll (2019). Premature mortality due to air pollution-related illnesses is affecting Hungary's already dwindling population (EEA, 2018), and environmental concerns are cited among the reasons for emigration (Eurobarometer, 2019, Figure 1).

Figure 1. Premature Deaths Due to Pollution Exposure, 2016 1/
(Percent of population)



1/ Deaths from PM 2.5 and NO2. PM 2.5 is defined as particulate matter which is a mixture of solid particles and liquid droplets found in the air. It is sized at 2.5 micrometers which are fine inhalable particles. NO2 is defined as nitrogen dioxide from the air burning of fuel.
Source: EEA Air Quality in Europe, 2019.

2. Hungary, domestically and as part of the EU, is committed to reducing carbon emission and promoting a climate-friendly investment. EU's current (2020) commitment under the Paris Agreement is to cut carbon emissions by at least 55 percent by 2030 relative to 1990 levels and achieve net zero emissions by 2050.[2] Hungary set its own target for national emissions reduction, in line with a previous EU-wide target defined in 2015, at 40 percent reduction by 2030 compared to 1990 levels. By 2019, Hungary had already reduced its emissions by 32 percent

[1] Prepared by Svetlana Vtyurina.

[2] It also maps out a comprehensive plan to mobilize investment and to provide financial support for the most affected individuals businesses, and regions to help with the transition (via the Just Transition Mechanism).

compared to 1990 under the Effort Sharing Regulation Decision (ESRD). Additionally, Hungary has, along with a few other EU countries, committed to reaching climate neutrality by 2050, entailing sustained emissions reductions and improving sink and other CO_2 removal capacities in the next three decades.

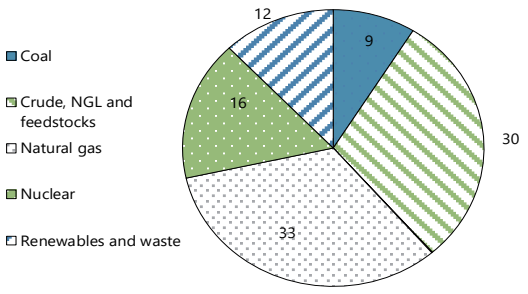
3. Tackling climate issues can help strengthen the post-COVID-19 recovery and build a more resilient and durable economy. The recovery provides an opportunity to shape consensus on actions to support the transition to a more sustainable economy, including carbon pricing, prioritizing public investment and incentivizing private investment in green infrastructure and innovation, reducing subsidies and tax exemptions for emissions-intensive activities, and promoting green finance (IMF, 2020b). Indeed, prior to COVID, the government considered its climate policy as "not (only) a green issue, but a new economic development model (green growth)" (Ministry for Innovation and Technology, 2019). In designing and scaling up national mitigation strategies, it is helpful for governments to have transparent, quantitative frameworks for projecting the emissions commitments, and for assessing the environmental, fiscal, and economic impacts of their mitigation policy options. Hungary is finalizing its long-term low emission development strategy (LTS), which is taking into account the effects of the COVID-19 pandemic as well.

4. This note aims to briefly overview Hungary's mitigation goals, progress, and challenges. It specifically zooms in on areas where changes could be made *unilaterally* in sectors responsible for a large share of carbon emission (e.g., housing, transportation) and suggests options to further incentivize mitigation.[3] It focuses on carbon pricing and other fiscal mitigation instruments that could effectively support green investment. Sector-specific policies and objectives are not discussed in detail in this note as they require large scale adjustments, including through EU agreements, notably carbon-border adjustment to reduce carbon leakage outside the EU.

B. Climate Objectives and Costs

5. The main sources of Hungary's GHG are residential solid fuel combustion, and transport and industrial emissions. Hungary has limited fossil-fuel resources of its own, and its domestic production is declining. More than two-third of its total primary energy supply comes from fossil fuel (Figure 2). The country imports around 90 percent of its oil and natural gas and 30 percent of its electricity supply. Domestic electricity is mostly produced from

Figure 2. Total Primary Energy Supply, 2018 [1/]
(In percent of total energy supply)



1/ 2018 is provisional data; excluding net electricity import.
Sources: IEA; and IMF staff calculations.

[3] More on Hungary's efforts on this can be found in its National Energy and Climate Plan.

nuclear power and coal[4], with natural gas contributing to about a fifth of the total electricity generated in Hungary. The highest emitters among the domestic sectors are industry, transport, residential housing, and agriculture (Figure 3), although Hungary's agriculture is the least methane and NO emitter among European countries (Figure 4).[5] Health costs stemming just from coal-fired power plants are estimated around 0.3-0.5 percent of GDP in 2013 (Schaible et al, 2016).

6. Recognizing the costs and risks of GHG emissions, over the years Hungary joined several international accords on climate issues and has made progress in meeting its commitments.[6] Hungary reduced its GHG emission by 32 percent between 1990 and 2019, mostly due to the use of new technologies. By 2020, emissions not covered by the EU Emissions Trading System (non-ETS) had decreased by an estimate 9 percent from 2005 levels, while they were allowed to increase by 10 percent under the Effort Sharing Decision (Figure 5).[7,8] Hungary has committed to reducing emissions by 7 percent under the ESR but this target might be subject to revision based on the new, at least 55 percent target.[9] Proposals in that respect are expected in June 2021. Hungary's renewable energy objective is 13 percent of total energy supply. Already, solar generation capacities more than tripled (to 1,825 MW) between 2016 and 2020Q3 (Figure 6). However, progress on energy efficiency target has been less than intended, as in many other EU member states, as both primary and final energy consumption increased over 2014–19 (EC, 2019, 2020). For Hungary, a large increase in final energy consumption was observed in industry. Energy efficiency in the residential sector also remains weak. Thus, Hungary might miss its 2020 energy saving target, largely because household energy consumption per capita remains 12 percent higher than the EU average, even though income levels are considerably lower (Figure 7).

7. At the country level, Hungary has reaffirmed its commitment to combating climate change by adopting a number of action plans and through legislative action. The final National Energy and Climate Plan (NECP) was adopted in January 2020, while the Climate Protection Act (Act XLIV of 2020 on Climate Protection, CPA) and the Climate and Environmental Protection Action Plan (CEPAP) took effect in mid-2020. Additionally, the first Climate Change Action Plan (CCAP) was elaborated, and adopted in 2020, including adaptation, mitigation, and awareness-raising measures.

[4] The coal industry has been relying on heavy direct (now discontinued at the central level) and indirect subsidies in Hungary, which exceed the value added reported by the industry by a vast margin (IMFa, 2019).

[5] Efforts to reduce GHG from agriculture need abatement policies that are multi-pronged and well-calibrated at EU level, but fiscal policies at a national level can also be targeted to improve mitigation.

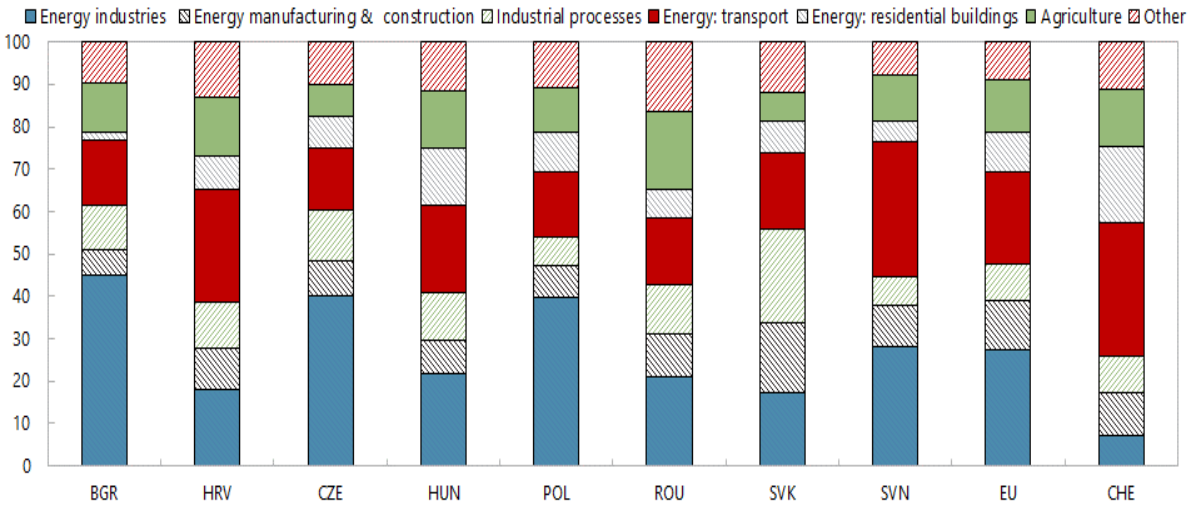
[6] These include: United Nation Framework Convention on Climate Change, Montreal Protocol; Kyoto Agreement (UN); EU obligations including the Effort Sharing for 2013-20 and 2021-2030; 2015 Paris Agreement (UN); and, 2020 EU Green Deal.

[7] OECD (2019).

[8] The Effort Sharing legislation establishes binding annual GHG emission targets for Member States for the periods 2013–20 and 2021–30. The national targets will collectively deliver a reduction of around 10 percent in total EU emissions from the sectors covered by 2020 and of 30 percent by 2030, compared with 2005 levels.

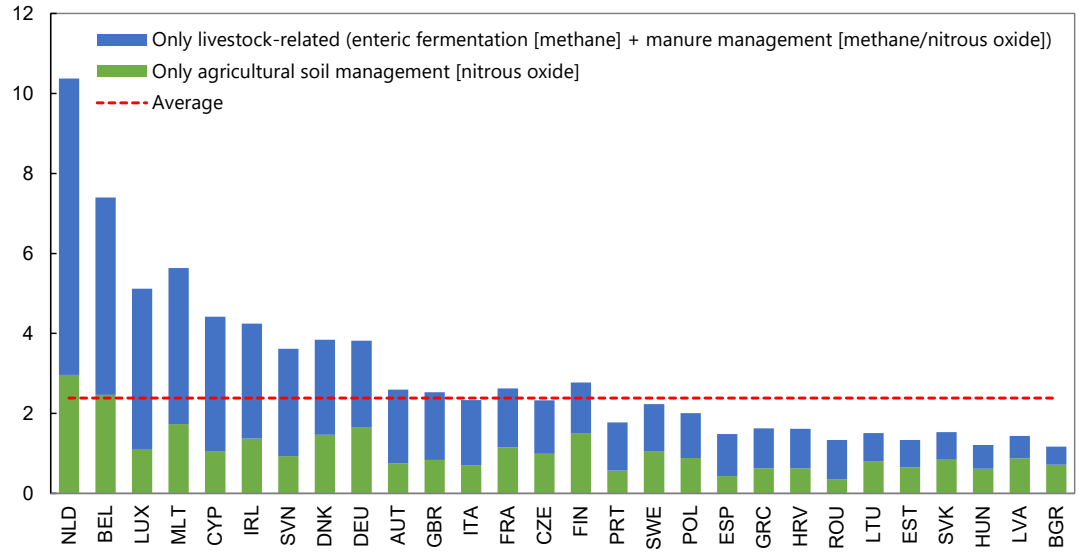
[9] 2020 targets are not under the ESR but governed by the previous Effort Sharing Decision.

Figure 3. Total GHG Emissions by Sector
(Percent of total emission without LULUCM and indirect CO_2)



Sources: UNFCCC database; and IMF staff calculations.

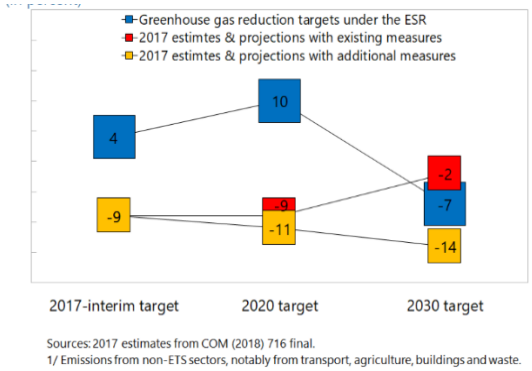
Figure 4. EU+UK: Agriculture—Methane and Nitrous Oxide Emissions per Utilized Agricultural Area, 2015
(In $ktCO_2$ eq. per 1,000 hectares) 1/



Sources: EEA; Eurostat; and IMF staff calculations.
1/ Emissions from agricultural transport and energy use are excluded, as these sectors are not defined as part of the agricultural sector by the current IPCC reporting guidelines (IPCC 1997, IPCC 2000). Data also excludes emissions/removals from LULUCF, enteric fermentation, cultivation, field burning of agricultural residues and other sources.

Figure 5. Greenhouse Gas Emissions Under the Effort Sharing Regulation (ESR)[1/]

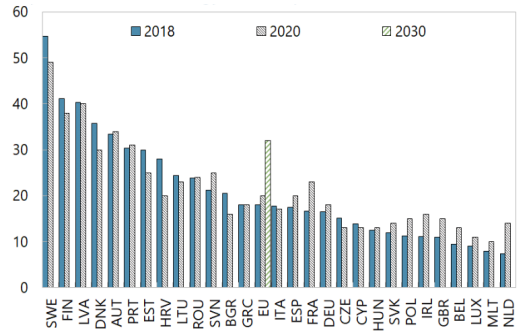
(In percent, compared to 2005)



Sources: 2017 estimates from COM (2018) 716 final.
1/ Emissions from non-ETS sectors, notably from transport, agriculture, buildings and waste.

Figure 6. Share of Renewables in Final Energy Consumption

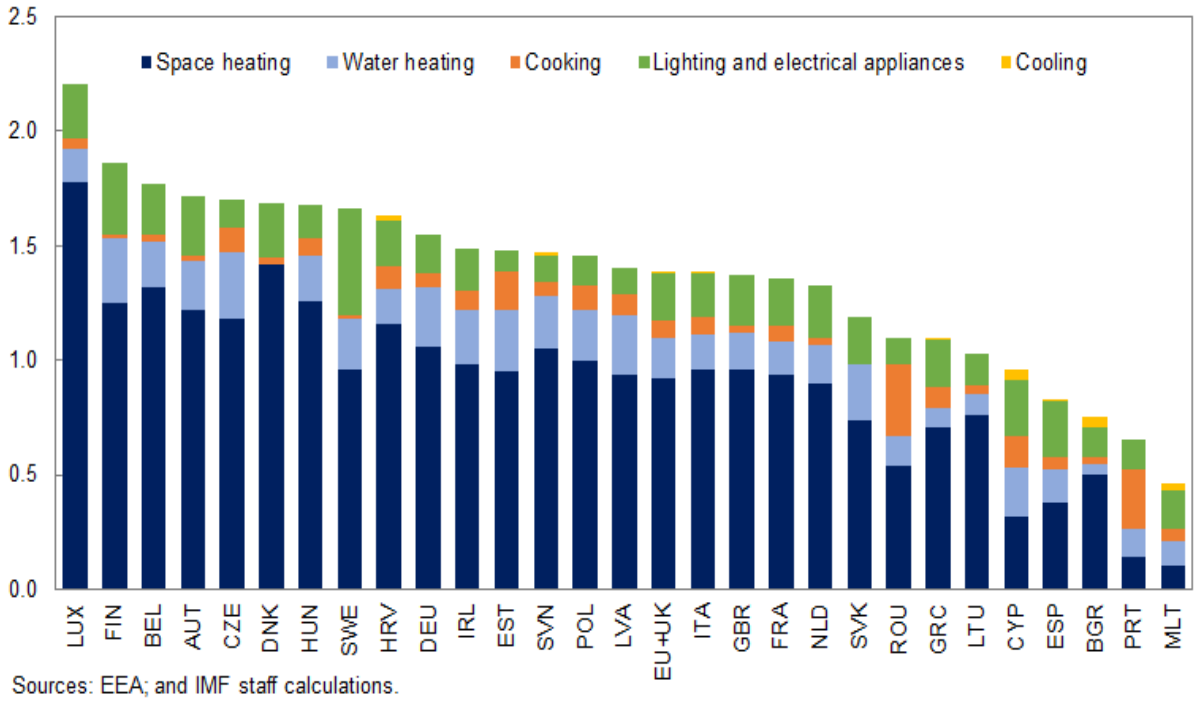
(In percent of total energy consumption)



Source: Eurostat.

Figure 7. EU+UK: Households—Energy Consumption by End Use

(Tons of oil equivalent per dwelling)



Sources: EEA; and IMF staff calculations.

The first and subsequent CCAPs are intended to achieve the short, mid and long-term goals set in the second National Climate Change Strategy (2018). Hungary's main objectives are to:

1) reduce GHG emissions by at least 40 percent by 2030 based on 1990 levels;

2) limit energy consumption in 2030 to the 2005 level (785 PJ), with any excess growth to be achieved only from carbon-neutral energy sources;

3) have renewables constitute at least 21 percent of gross final energy consumption by 2030;

4) have at least 90 percent of domestic power production to be CO2-free by 2030, once the Paks nuclear plant extension and upgrade is complete and solar energy production is further increased. The only large coal-fueled power plant will be to converted to low-carbon fuel use by 2030; and,

5) achieve net-zero emissions (climate neutrality) by 2050.

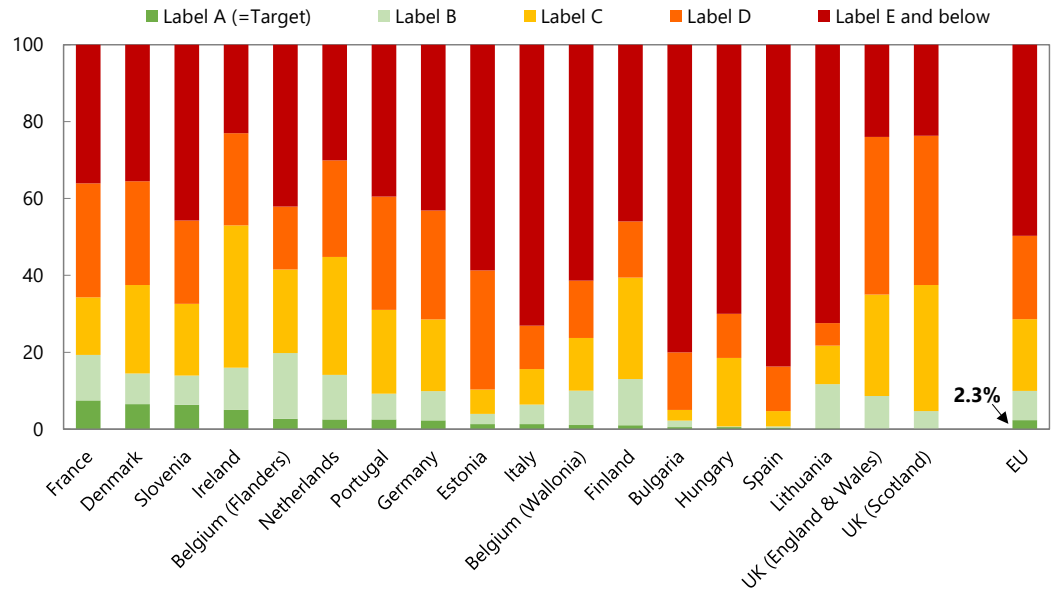
8. Policies envisioned to achieve these goals are multifold. They include tightening the Emissions Trading System (ETS) covering large emitting sectors;[10] requirements for energy efficiency, vehicle CO_2 emission standards, and renewables; and policies to meet national-level targets for small-scale emissions sources outside of the ETS. Specifically, some of the strategic measures include: the establishment of the Energy Efficiency Obligation System (EOS), which helps implement cost-effective energy efficiency solutions and investments, primarily for households; the Green Bus Program, which aims to replace local public buses to reduce the average age of the fleet and buses' emission; programs to support energy innovation aiming to strengthen the security of energy supply and climate-friendly transformation of the energy sector as well as stimulate innovation opportunities important for economic development; promoting housing heating modernization to increase energy efficiency and reduce the carbon emission of residential buildings.

9. The authorities recognize that achieving the 2050 climate neutrality goal via national decarbonization and energy efficiency objectives requires sizable investment. The estimated cost of their plan is €150 billion, i.e., 2–2.5 percent of the annual GDP up to 2050 (Ministry for Innovation and Technology, 2019). The government has determined some preconditions to guide the necessary effort:

- The costs of the transition should primarily be borne by the largest emitters;
- The price of food and energy should remain affordable for final customers;
- Nuclear energy will be essential for sector integration and to reach climate neutral economy.

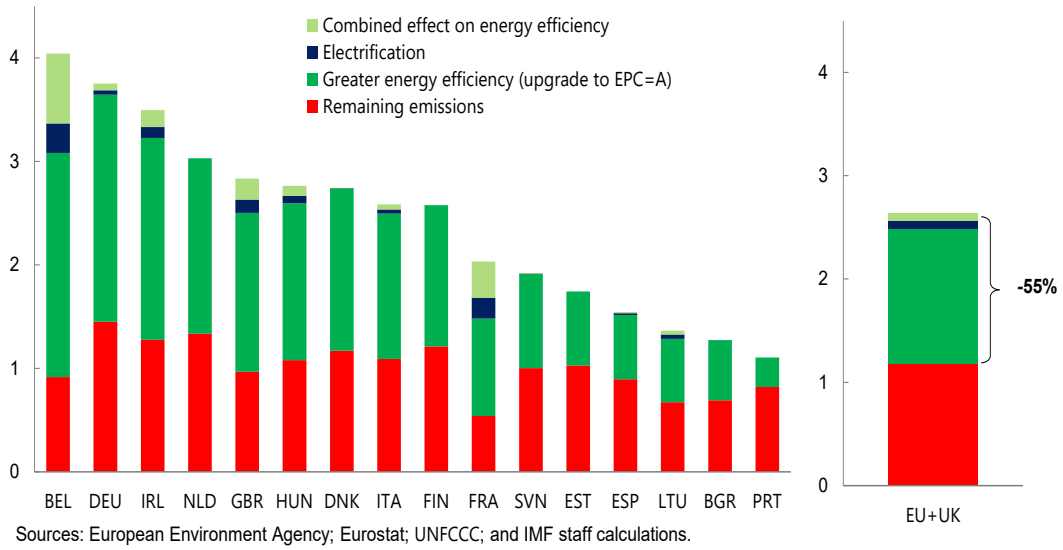
[10] The EU's Emissions Trading System (ETS) aims to reduce carbon emissions by requiring companies in the most polluting sectors to hold a permit for each ton of CO_2 they emit. Companies have to buy permits through auctions and can trade them. The ETS currently covers power stations, energy-intensive industries (e.g., oil refineries, steelworks, and producers of iron, aluminum, cement, paper, and glass) and civil aviation.

Figure 8. EU+UK: Distribution of Building Stock by EPC Class 1/
(Percent of dwellings)



Sources: BPIE; CSO (Ireland); EEA; Eurostat (EU Building Stock Observatory); and IMF staff calculations.
1/ Countries with no central database (e.g., Poland) or with limited information (Czech Republic, Romania, Slovak Republic) are

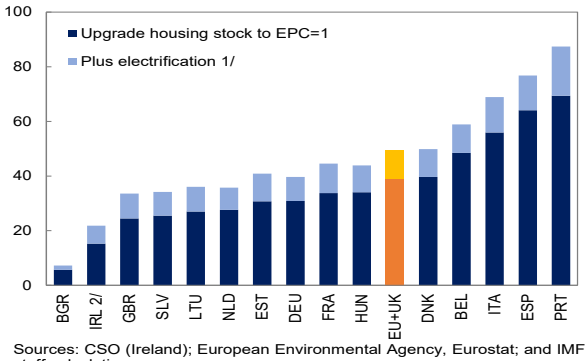
Figure 9. EU+UK: Potential Emission Reduction from Renovation/Retrofitting (EPC=A) and Electrification
(tCO2 per capita, U.N. mean lifecycle emission projection per GWh)



Sources: European Environment Agency; Eurostat; UNFCCC; and IMF staff calculations.

10. Significant carbon-emission reduction could be achieved from retrofitting existing building, but the price tag is high. While energy efficiency standards for new buildings have been strengthened considerably, the existing building stock is largely energy inefficient (Figure 8)[11]. As such, the potential reduction in emissions from retrofitting existing building is large, exceeding 60 percent (Figure 9). However, according to some estimates, total investment only in retrofitting and electrification would be sizable. It could cost a cumulative 40 percent of 2019 GDP by 2050 to meet the targets (Figure 10). Despite the high cost, under current technology standards and prices, energy cost savings are expected to eventually broadly offset the cost of investment for upgrading technologies and renovating buildings at the national level, although at very different horizons across countries. Estimates presented in the NEPC suggest that modernization of the residential building stock, aimed at improved energy efficiency and a growing transition to alternative heating methods can reduce natural gas imports by up to a quarter. The renovation of three percent of the floor area of central government buildings annually is another strategic objective that will bring efficiency savings.

Figure 10. EU+UK: Total Investment Needs for Retrofitting and Electrification
(Percent of GDP)



Sources: CSO (Ireland); European Environmental Agency, Eurostat; and IMF staff calculations.
1/ Includes cost for eletric heatpump only.
2/ Percent of GNI.

11. Various EU funding options are available to help finance Hungary's climate change objectives. According to the NECP, at least 25 percent of €17 billion in Cohesion Funds (2021-27) slated for Hungary should be used for implementing climate change policies.[12] The "Greener, carbon free Europe" policy objective is expected to be financed with €362 million from the Cohesion funds; these will serve, inter alia, the transition to clean energy sources, renewable energy investments, and support of clean vehicles in urban transport. The EU Modernization Fund, operating from 2021, aims to enhance upgrades of energy systems and energy efficiency and will provide around €485 million. The Building Energy Performance Tender Program is also available for financing various climate initiatives. In addition, under the first pillar of the Just Transition Mechanism, Hungary's share of the Just Transition Fund, is €237 million (2018 prices), which may be used to alleviate the impact of the transition in the regions most negatively affected by the achievement of the 2030 and 2050 climate objectives.

12. Furthermore, Hungary has been at the forefront of the EU in issuing green bonds. In 2020, Hungary successfully issued its two (first) sovereign green bonds amounting €1.7billion, which

[11] For instance, one of the National Energy and Climate Plan's (NECP) priorities is to replace fossil-fueled boilers with installations based on renewable or on low carbon-intensive energy sources.

[12] €6,2 billion is available for climate change objectives from the Recovery and Resilience Fund (both grants and loans) and €5,9 billion from the Cohesion Fund and the European Regional Development Fund.

were oversubscribed. The bulk of the funds is earmarked to support, maintain and upgrade the railway system.[13] Furthermore, Hungary issued domestically its third green bond (HUF 30 billion) on Earth Day, April 22, 2021. Hungary recently received the Sovereign Green Market Pioneer Award from the Climate Bond Initiative.

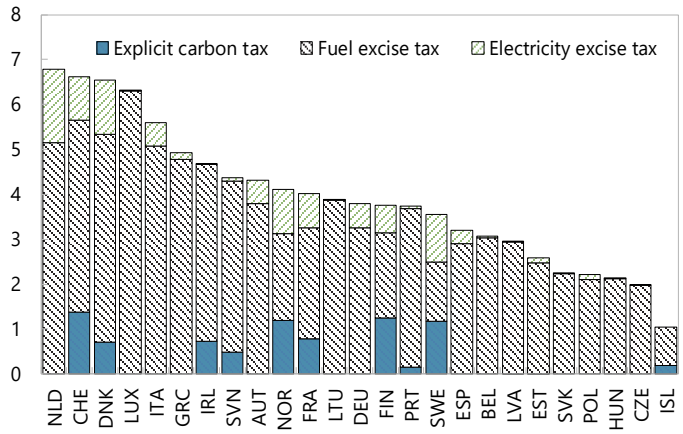
C. Possible Ways to Buttress Hungary's Effort

13. Hungary's strategy for decarbonization, which relies mostly on public investment and subsidies, could be significantly buttressed by carbon pricing. As stated above, the objective of Hungary's NECP is multifold. It aims "to strengthen energy sovereignty and energy security, and to achieve the decarbonization of energy production". The NECP clarifies that this "is possible only through the combined use of nuclear energy and renewable energy." To achieve these objectives, Hungary's strategy relies heavily (and appropriately) on public investment and incentives to foster green private investment. However, it misses a pillar on carbon pricing which, as discussed below, could significantly contribute to reducing GHG emissions. Also, fiscal incentives for green investment could have more impact than those embedded in financial sector regulation.

Strengthening Carbon Pricing

14. Hungary's energy taxation is low. Its *effective* tax rates[14] on carbon emissions are low in comparison to other countries in Europe (Figure 11). Fuel excise tax is below the EU average, and there is no explicit carbon tax. In residential and commercial sector only 18 percent of emissions are taxed at €5 per ton of CO_2.[15] The carbon pricing gap also illustrates Hungary's scope for larger energy taxation.[16] The higher the gap, the more likely it is that mitigation efforts are not cost-effective or

Figure 11. Average Effective Energy Tax Rate, 2019
(Percent)



Source: OECD.

[13] According to the government prospectus, 90 percent of the proceeds will go to transport projects. Of this, 25 percent is to electrify railway lines and 72 percent for other railway expenditure, including routine operating costs like staffing. The bonds were rated by environmental specialist group at "medium green". To be upgraded to "deep green", Hungary would need to fully electrify the railway network, not just parts of it.

[14] The sum of fuel excise taxes, explicit carbon taxes, and electricity excise taxes, net of applicable exemptions, rate reductions, and refunds.

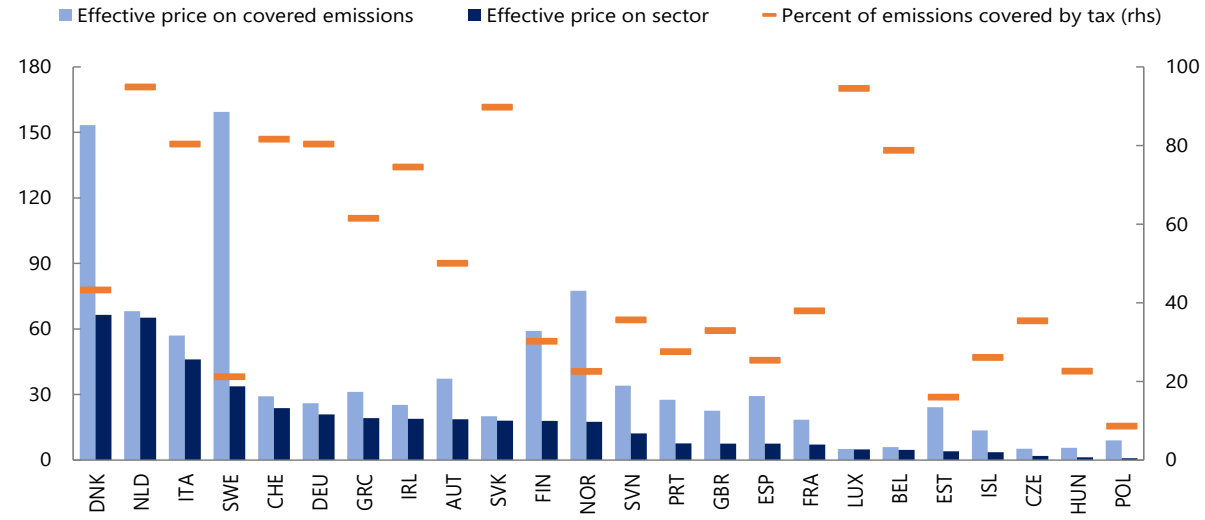
[15] A high percent of emissions (mostly in electricity and industry) are taxed below €5 per ton of CO2.

[16] The carbon pricing gap measures how much OECD and G20 economies fall short of pricing carbon emissions in line with a benchmark value for carbon prices. It describes the state of carbon pricing and can be tracked across time and compared across sectors (OECD, 2018).

remain limited. In 2015, the gap varied considerably across countries with Switzerland at 27 percent, and Russia at 100. It stood at 66 for Hungary. In particular, the housing sector in Hungary has one of the highest carbon pricing gaps. Figure 12 illustrates how low the effective price on residential emissions is in Hungary. The transport sector, however, is priced at above €60 per ton of CO_2 (cumulative) in Hungary, as in almost half of the sampled countries (Figure 13).

Figure 12. Residential Emission Price

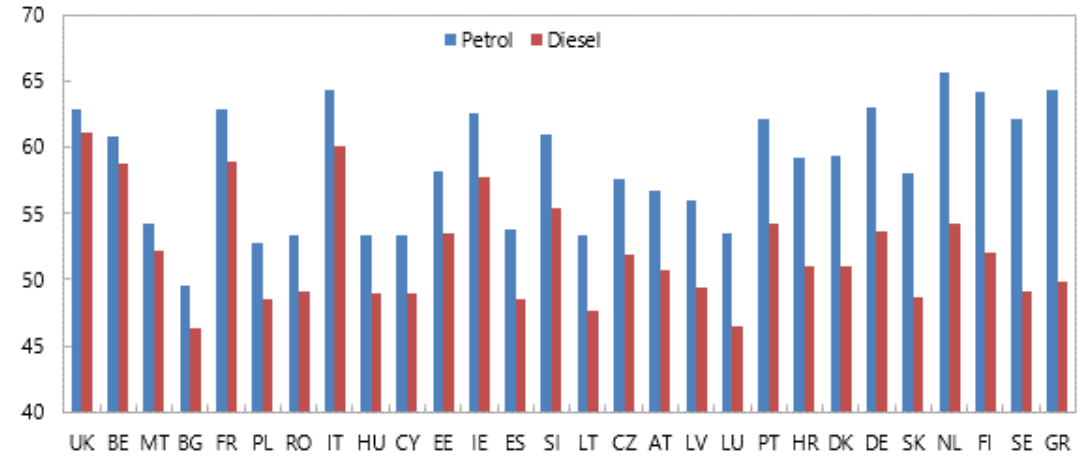
(Euro per t CO2)



Sources: OECD; and IMF staff calculations.

Figure 13. Fuel Taxes and Duties

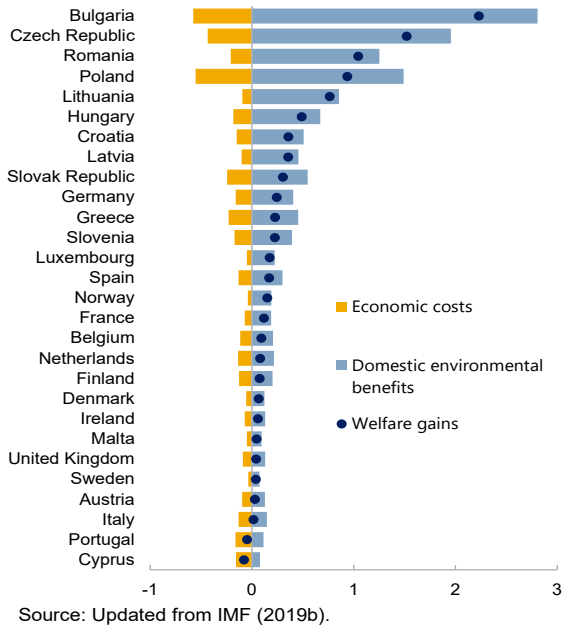
(Percent of pre-tax price)



Source: Oil Bulletin and IMF staff calculations.

15. An explicit carbon tax could bring welfare gains. Carbon pricing, which is not envisaged to be strengthened under the NEPC, is deemed to be the most powerful and effective way to reduce GHG (IMF, 2020b). Carbon pricing stimulates improvements in energy efficiency, reduces the demand for energy-consuming products, and promotes innovation. Furthermore, carbon pricing would bring much welcome fiscal revenue, which could be used to help finance the greening of the economy and compensate the most vulnerable users for higher energy costs. This widely accepted measure should be key in implementing mitigation pledges in both advanced and emerging market economies. The *IMF's mitigation tool* helps estimate the domestic environmental costs of different fossil fuels at a country level. This tool projects fuel use and emissions by energy sector and assesses the emissions, fiscal, and economic welfare impacts of carbon pricing and a range of other carbon mitigation policies.[17] For Hungary, as for most EU countries, the domestic environmental benefits of a (nationwide) €50 carbon price per ton in 2030 would exceed the domestic costs (Figure 14). In top beneficiaries, including Hungary, as discussed above, this finding reflects the general lack of pre-existing taxes to price the local air pollution costs of coal use, and general under-taxing of gasoline and diesel fuel for the full range of environmental costs from vehicle use (despite high road fuel excises).

Figure 14. Costs and Domestic Net Benefits of a €50/Ton Carbon Price in 2030, Selected Countries
(Percent of GDP)



Source: Updated from IMF (2019b).

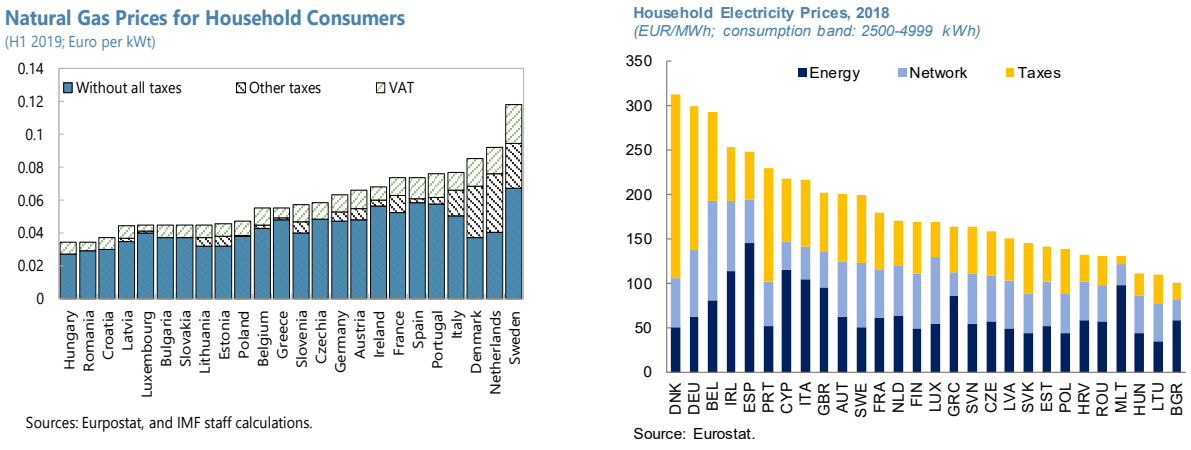
16. Augmenting existing energy taxes with an explicit carbon tax would help meaningfully reduce GHG. A tool developed by the IMF Fiscal Affairs Department allows to simulate various pricing scenarios to evaluate the impact of carbon taxation as well as the policy trade-offs related to implementing complementary measures. With usual caveats regarding simulations and assumptions, under a business-as-usual assumptions, that is *not* considering the authorities' planned/recently announced measures, the model projects a significant shortfall in needed emissions reduction across the EU. Worse, for Hungary, at current zero pricing, emissions are projected to *increase* from 45 to 50 million tons (mts) by 2030. The simulations indicate that introducing a carbon tax and increasing it by $6 per ton annually over the next decade would reduce

[17] Welfare effects reflect the economic efficiency costs of mitigation policies, as measured by changes in consumer and producer surplus in fossil fuel markets (accounting for pre-existing fuel taxes) and domestic environmental co-benefits (IMF, 2020b).

emission to 43 mt, while a $9 annual increase would allow Hungary to meet reach 39 mts. A similar increase is suggested for other countries in the EU, on average.

17. Hungary's fairly low retail energy pricing, reflecting the government's policy to ensure affordability, but this may be discouraging energy conservation efforts.[18] Retail electricity and gas prices at the household sector level are the lowest in EU comparison (Figure 15). This is largely owing to end-user price regulation, which does not recognize some cost elements in the final prices. This results in higher prices for non-household customers, as utilities try to recover costs in this latter segment, and less energy conservation by households. Hungary's wholesale electricity market prices are higher compared to those of their neighbors, primarily due to higher domestic electricity generation costs. Hungary could consider gradually raising household energy prices to incentivize energy saving. For electricity and domestic gas consumption, this could be achieved by leaving broadly untouched prices for the lowest consumption tranches, to shield the poorest consumers from the impact of the increases.

Figure 15. Household Energy Prices



18. Hungary's concerns about energy affordability could be addressed notwithstanding an overall increase in carbon pricing. Besides investments in renewable energy, scaling electricity and domestic gas prices through trenches (prices increase with the level of energy consumption) would protect the most vulnerable while decreasing wasteful consumption from higher income groups. Many countries have implemented broad-based energy subsidy reforms that included specific compensatory measures to protect the poorest. This is a more effective and transparent use of public funds rather than across-the-board subsidization of prices (IMF, 2013). More broadly, concerns about purchasing power of the lower income groups can be addressed through other fiscal tools (e.g., strengthen safety nets, redistributive tax policies, etc.)

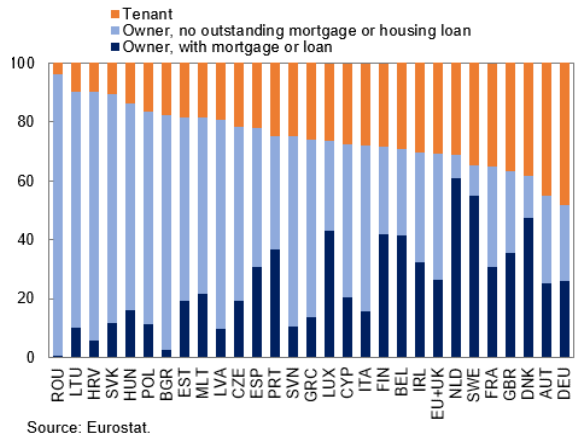
[18] Hungary Country Report (EC, 2019).

Fostering Green Finance

19. The government can play a key role in fostering green finance. Promoting green financing products such as green deposits and green-oriented pension funds, which are not yet widely offered by financial institutions in CEE, would increase climate awareness and demand from customers in the region. Provision of green grants and green loans, which carry a lower rate, has been rising in the advanced economies, from state development agencies (e.g., BAFA and the KFW in Germany). In response to the urgent requirement for climate-friendly buildings, many private European banks have also started offering green mortgages. The European Mortgage Federation (EMF), in concert with a consortium of mortgage lenders, has piloted a new scheme that could help develop a pan-European standard approach for green mortgages under the Energy Efficient Mortgages Initiative (EEMI), which will both assemble and analyze more data as well as developing a green mortgage design (IMF, 2020c). Hungarian authorities and banks are already closely monitoring developments and should adopt best practices in this area to ensure that green lending is promoted with transparent government programs through development banks and/or private banks on the condition of the cost of the program to be borne by the government.

20. Fiscal subsidies would be preferable to incentives embedded in financial regulations. In 2021, The Hungarian's National Bank introduced an initiative to improve financing conditions for domestic renewable energy production by introducing preferential capital requirements for green corporate financing (under pillar II capital charge).[19] This follows a similar program started in 2020, which provides banks with capital relief incentives for extending energy efficiency household loans till end-2024.[20] As elaborated above, it is important to provide incentives for improving energy efficiency. An economic argument for capital relief can be made that that energy savings from green investment will increase the borrower's net disposable income, and, thus, reduce the default risk, with the investment cost being amortized over the life of the mortgage (Bank of England, 2020). Energy efficient collateral may also have a higher and more stable value over the long-term (MNB, 2019). However, placing a "green discount factor" for capital requirement comes with risks: (1) there is not yet a final

Figure 16. EU+UK: Share of Owner-Occupied Housing, 2018
(Percent)



Source: Eurostat.

[19] The preferential capital requirement program will initially cover the financing of renewable energy production (as defined by the EU taxonomy), as well as investment in green bonds. The list of eligible exposures will gradually be expanded in 2021.

[20] The capital relief amounts to 5–7 percent of the total green loan volume, depending on the energy class of the respective properties. It is also conditional on the loan interest rates being at least 0.3pps lower than on conventional mortgages.

regulatory agreement on what qualifies as "green mortgages", which is also complicated by different energy efficiency standards/certification processes,[21] (2) there is no global consensus on how big such as discount should reliably be; and (3) while green investment is rewarded, there is no provision currently for transition or damage risk that may affect the collateral. Furthermore, incentives for the green investment set through financial regulations only apply to credit-financed investment and exclude investment that is self (equity) financed. For all these reasons, it may be preferable at this stage to incentivize green investment through transparent fiscal subsidies, accounted for in the budget, and applying equally to self or credit-financed investment, while a more comprehensive framework is developed at the EU level. In Hungary, most of the housing is owner occupied, thus fiscal owner incentives could be very attractive (Figure 16).

21. Improving energy efficiency regulation can support those efforts.[22] Informational awareness campaigns as well as labeling initiatives and energy efficiency saving certification (that may be tradable) should be considered.[23] In particular, it would useful to harmonize the definition and certification process, which should reduce asymmetric information regarding *ex ante* energy savings and renovation cost;[24] ensure that the requirement for energy performance certificates when a building is sold or rented is strictly enforced and expand current obligation to any bank lending collateralized by real estate; and establish incentives for inspection schemes for heating and air conditioning systems (IMF, 2020c).[25,26]

D. Conclusion

22. Hungary commitments to mitigating climate change are laudable and can mutually reinforce policies to entrench the recovery from the Covid crisis. In particular, the current plans

[21] A decision to provide capital relief for green loans would require a taxonomy/harmonized definition and implementation, clear parameters for eligibility, and coordination (ideally via the Basel Committee or the Network for Greening the Financial System).

[22] Hungary introduced the Energy Efficiency Obligation scheme on January 1st, 2021, which encourages providers to make energy efficiency improvements or pay the energy efficiency contribution.

[23] Energy savings certificates (ESCs) are tradable certificates, similar to renewable energy certificates (RECs), that typically represent one megawatt-hour (MWh) of energy savings from efficiency projects. ESCs can offer utilities a flexible means of achieving energy efficiency targets while rewarding commercial and industrial companies that are successful in reducing energy use with an additional revenue stream that may improve the economics of a project.

[24] The harmonization of energy efficiency ratings could also be combined with a smart readiness indicator that will measure a building's capacity to use new technologies for greater digitalization, to optimize energy use through more efficient operation and interaction with the energy grid; this would also encourage more automation and control systems to make them operate more efficiently.

[25] The certification price of EPC ratings varies dramatically across Member States, which could impact the design and implementation of financial incentives for renovation. While transaction costs have fallen over time, they remain very high and variable in several countries with a particularly low efficiency of the building stock, such as the Czech Republic, Italy, and Slovenia. The Swedish system of certified experts provides a good example of how the transition to a market-driven price can be effectively managed (see http://bpie.eu/wp-content/uploads/2015/10/Energy-Performance-Certificates-EPC-across-the-EU.-A-mapping-of-national-approaches-2014.pdf.)

[26] As core elements of the recently amended energy efficiency laws, the government has decided to go forward with the inspection system, the legal and financial background of which was established in the framework of the new law.

for green public investment, supported by EU funds, can play a crucial role in lifting growth and the resilience of the economy. In staff views, the authorities' effort would be significantly buttressed by:

- ***Raising carbon pricing, which could be achieved in different ways.*** Hungary could apply a domestic carbon surcharge to emissions covered by the ETS to meet an escalating target price for these emissions and setting the domestic carbon tax (for other emissions sources) equal to this price. There is merit in introducing an explicit carbon tax, including by sector, phasing it in gradually since countries with lower income per capita bear higher costs from carbon tax increases (paragraph 15). If raising carbon prices beyond a certain point proves to be politically difficult, policymakers could consider complementary tools such as feebates, subsidies, or regulations (IMF, 2020c). These instruments reduce the explicit carbon price necessary to achieve climate goals but tend to be less economically efficient as they cover only a subset of emission sources and do not generate fiscal revenue. Consideration should also be given to increasing retail electricity and gas prices for households (see Annex I on recent energy saving measures for consumers). Efforts to raise carbon prices (as well as any carbon border adjustment mechanism) should ideally be made in coordination with European partners to limit the impact on competitiveness. Revenues from carbon pricing could be used to finance investment gaps, compensate vulnerable households, and/or offset distortionary taxes such as labor and other special (sectoral) taxes (IMF, 2019; 2020c).

- ***Prioritizing fiscal incentives over incentives embedded in the financial prudential framework***. Incentives to spur green credit through capital requirement relief are beneficial but may not account for all climate-related risks and miss self-financed investment. In addition, fiscal incentives would have a broader coverage. By being transparently accounted for in the budget, they may also be better subjected to ex-post cost-benefit analysis to ensure maximum efficiency of public policies. Such fiscal incentives can take different forms. For instance, for households, energy-dependent property taxes, other tax incentives, and subsidies for renovation loans or renewable energy-based appliances/heating/cooling systems can help spur conservation.[27]

[27] In some countries, like the US, installing energy efficient equipment on a property may qualify for a tax credit. The investment tax credit (ITC), also known as the federal solar tax credit, allow to deduct 26 percent of the cost of installing a solar energy system from federal taxes. The ITC applies to both residential and commercial systems, and there is no cap on its value.

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Annex I. Measures Focusing on Increasing the Effectiveness of Private Energy Consumption

1. We place the Hungarian consumers in the focus of the new national energy strategy *(orange: priority proposals green: on-going projects with positive results)*

	Strategic goals	Projects
1	Keep energy price affordable for consumers	Enhancing competition in wholesale electricity and natural gas product markets
		Introduction of energy efficiency obligation scheme to stimulate consumers' energy-savings
		Upgrading price regulation in the electricity, gas and district heating sectors while preserving the results of the existing policy to keep energy price affordable
2	Support local, decentralized RES production and self- consumption	Promotion of renewable energy utilization in households
		Encouraging the establishment of energy communities
		Supporting local, renewable energy-based investments
3	Empower consumers to choose and control their consumption	Smart metering program in the electricity and gas sector
		Equip households connected to district heating with heat cost allocators making their consumption measurable and controllable
		Digitalization of supply service
		Encouraging demand response (DSR); new regulations to help independent aggregators to enter into the market
		Creating differentiated Universal Service Packages in the electricity and gas sectors

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Source: Ministry for Innovation and Technology.