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Integrated Policy Strategies and Regional Policy Coordination for Resilient, Green and Transformative Development: Supporting Selected Asian BRI Partner Countries to Achieve 2030 Sustainable Development Agenda

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Özgür Orhangazi
Department of Economics,
Kadir Has University
ozgur.orhangazi@khas.edu.tr

A. Erinç Yeldan
Department of Economics
Kadir Has University
erinc.yeldan@khas.edu.tr

Türkiye: Challenges and Strategies Towards Green Transformation and Sustainable Development

This report presents a comprehensive analysis of Türkiye's climate and energy landscape, highlighting the structural and policy-driven challenges it faces in transitioning toward a sustainable future. It begins with an overview of the macroeconomic context, setting the stage for understanding the interplay between economic dynamics and climate goals. Türkiye's current climate performance is evaluated through a detailed scorecard, identifying key bottlenecks and constraints impeding progress. The report delves into the emissions technology landscape and examines the foundational characteristics of the power sector, uncovering systemic inefficiencies and areas ripe for innovation. A critical assessment of Türkiye's heavy reliance on energy imports underscores its vulnerability and the urgent need for diversification. The evaluation of existing energy policies sheds light on progress and persistent gaps. The analysis then broadens to consider regional cooperation opportunities for climate mitigation and adaptation, exploring shared benefits, strategic risks, and institutional hurdles. The report concludes with a set of forward-looking strategies aimed at fostering resilient, green, and transformative development pathways for Türkiye.

Contents

KEYWORDS: Just Transition, Green Transformation, Türkiye

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Introduction

Economic growth has not generally been decoupled from resource use and environmental quality. The 2013 *Millennium Goals Report* of the United Nations notes, for instance, that "*the present dominant model of development is facing simultaneous multiple crises such as depletion of natural resources and the market failures that have already marked the first decades of the current millennium*" (UN, 2013: 72). Accordingly, this model has been ineffective in enabling productive and decent employment and has exacerbated the phenomenon of climate change with its various facets regarding natural resources depletion, biodiversity loss, energy crisis, food security and so on. UNCTAD's 2019 *Trade and Development Report* further notes that *current trends of resource extraction and consumption patterns are simply not sustainable*; and that, most of the current industrialization and governance problems originate from the *excessive volatility of speculative financial flows* characterizing the current realm of markets. In contrast, the UNCTAD 2019 report proposes "*a globally coordinated reflation strategy with a focus on development and environment recovery, in which the public sector plays a pivotal role*" further noting that "*a significant, well-planned and stable pattern of public expenditure can exert a lasting and positive effect on private investment (crowding-in), support employment creation, decent work conditions and wages, and trigger technological advances for a "green" productive transformation*" (UNCTAD, 2019: 34).

All these observations are central to green growth, a relatively new concept, which has captured the attention of policy makers, researchers, and civil society organizations worldwide to help design and evaluate policies that can achieve environmental sustainability efficiently. This is of particular interest to fast-growing emerging market economies, which are characterized by rapidly increasing ecological footprints and which seek to decouple economic growth from rising energy use and pollution.

As of 2020, Türkiye's per capita emissions of carbon dioxide (CO2) and other greenhouse gasses (CO2 eq.) stand at 6.3 tonnes, while its total CO2 (eq.) emissions per $GDP (in constant USD) reach to 0.524 kg. Accordingly, Türkiye displays relatively lower figures in emissions in both accounts in comparison to the world and OECD averages. However, it is cited among the top three countries that disclose the fastest rate of growth of gaseous emissions, as its CO2 (eq.) emissions increased from 214 million tonnes in 1990, to 523.9 million tonnes in 2020 (recording a cumulative increase of 138%). Projections by the Climate Equity Reference Project (CERP)[1] suggest that Türkiye's total CO2 (eq.) emissions will reach to 680 million tonnes by 2030 under a scenario of "low commitment". This suggests that Türkiye will be on a divergent trend against many of the emerging market developing economies as well as the world averages over the next decades.

Instruments of environmental policy in Türkiye thus far consisted mainly of excise taxes on energy consumption without much concern towards earmarking for environmental abatement. However, it is now a well-documented observation that price instruments, administered through the market alone, will not suffice to achieve the broad objectives of controlling global GHG concentrations, nor maintaining a sustainable and eco-friendly growth path (Acar, Challe, Christopoulos and Christo, 2014). Part of the problem is due to the failure of the market optimizers to catch up with advances of new eco-friendly technologies that typically involve positive spillovers in the form of agglomeration effects, knowledge diffusion, cross-firm externalities, and industry-wide learning. Nevertheless,

[1] Climate Equity Reference Project, Calculator: https://calculator.climateequityreference.org

the decentralized optimization ingrained in the laissez-faire actions of the markets may not be able to capture these positive spillovers. At the root of these problems are market failures for which basic -economic and regulatory- instruments are available, and yet, their systematic use as part of broader policy packages has been lacking.

Türkiye recently had ratified the Paris Agreement and announced her intention to achieve *net zero* status in aggregate emissions by 2053. Against this background, however, Türkiye's official stance still maintains the 2018 Strategic Concept documentation that keeps a fossil fuels-led power generation pathway. Coal-based power stations continue to carry a high burden with roughly one-fifth of electricity production. Yet, Türkiye has very strong potential in renewables-led power generation given her geographical opportunities and wide array of potential gains in technological efficiency in energy production.

In this background paper, we aim to present the key challenges and structural constraints as well as potential strategies towards green transformation. We start in the next section with a brief review of the recent macroeconomic developments and continue in Section 3 with an empirical overview of Türkiye's climate scorecard and energy policies. Opportunities and potential gains from regional cooperation are important issues of policy debate destined for both climate abatement as well as achieving a more just action plan across the advanced economies and the global South. We discuss some of these arrangements and the potential sources of conflicts and bottlenecks in section 4. We evaluate the strategies towards resilient, green, and transformative development and conclude in Section 5.

Macroeconomic Background

Increased instability has characterized the macroeconomic environment in Türkiye since 2018. Even though the real GDP growth in 2021 reached 11 percent and then 5.6 percent in 2022 this high growth came at the expense of sharp currency depreciation (around 40 percent in 2021), rapidly increasing inflation rates (65 percent annualized at the end of December 2022), and without much employment generation as the official unemployment rate still hovers around 12 percent.[2]

Macroeconomic instabilities have been on the rise since the currency crisis of the summer of 2018, when a diplomatic spat between Türkiye and the US triggered sudden outflows that could only be slowed down later by a sharp increase in the central bank interest rates. All these culminated to a recession from late 2018 into early 2019. The renewal of foreign capital inflows in 2019, albeit at lower levels, together with increased public spending and the government's push for a credit expansion helped the economy recover slowly in the second half of 2019. However, high levels of external debt, especially of the private sector, and large current account deficits required higher levels of foreign currency inflows. Yet, the beginning of 2020 was characterized by significant amounts of capital outflows from developing and emerging economies, including Türkiye, even before the Covid-19 shocks. Hence, the Turkish economy faced the demand and supply shocks of the Covid-19 pandemic under significant pressures on its currency.

The policy response to the economic problems generated by the pandemic mostly included lowering the interest rates and providing another round of credit expansion through public banks. The Central Bank attempted to alleviate the depreciation pressures on the currency by using most of its foreign exchange reserves. However, continued capital outflows and the exhaustion of the reserves brought the economy to the brink of a balance of payments crisis towards the end of 2020. Rapid depreciation of the currency was finally stopped by monetary tightening. While this policy change started a new cycle of short-term capital inflows that kept the currency propped, they did not last too long. In the second half of 2021 the government went back to supporting economic growth by lower interest rates and a new round of credit expansion. While these policies might have helped to reinvigoration of the economic activity, they resulted in yet another currency crisis towards the end of 2021. The high exchange rate pass-through resulted in rapidly increasing inflation rates.

The Kahramanmaraş earthquake on February 6th of 2023 hit Türkiye under these adverse economic conditions with severely torn out macro balances, deteriorating personal incomes under an inflationary environment, as well as a widening budget deficit. Initial estimates by the World Bank report that the real economic losses would reach US$45 billion (World Bank, 2023); while TURKONFED (Turkish Enterprise and Business Confederation) reported its estimates to reach as much as US$84.1 billion (TURKONFED, 2023). Most recently, Strategy and Budget Office of the President released a detailed document,[3] noting that total economic losses from the earthquake reach US$103.6 (around 9 percent the GDP). As a ratio, 5.1% of this had been due to the damage in buildings and dwellings (US$59.6 billion; and 1.1% is due to damages in public sector (US$12.9 billion).

[2] TURKSTAT, Household Labor Force Statistics. https://www.tuik.gov.tr

[3] https://www.sbb.gov.tr/wp-content/uploads/2023/03/2023-Kahramanmaras-ve-Hatay-Depremleri-Raporu.pdf

It has been shown by quite many observers that the macroeconomic conjuncture that Türkiye finds itself in today has its roots in the macroeconomic and policy environment of the previous two decades (*e.g.*, Orhangazi & Yeldan 2021, Boratav & Orhangazi 2022). Following the 2001 crisis, Türkiye implemented a series of structural and institutional reforms under the guidance of the IMF. The macroeconomic framework of the program included central bank independency, inflation targeting, contractionary fiscal policy with primary budget surpluses and floating exchange rates. The aim of the program was to bring stability to the economy through a mix of high interest rates and overvalued exchange rates. These policies were accompanied by a widespread privatization program and a series of deregulations aiming to diffuse "marketization" through all areas of socioeconomic life (Boratav & Orhangazi 2022). They also coincided with the expansion of global liquidity in the early 2000s and contributed to accelerated inflows of foreign capital. High-interest rates drew short-term capital inflows, while privatizations and deregulations attracted foreign direct investment, which in effect was mostly geared towards acquisitions of parastatals (and later to real estate purchases) rather than green field investments. Capital inflows allowed the Central Bank to bring inflation to single digits, while, at the same time, maintaining relatively high interest rates -and letting the Turkish lira appreciate. While the global financial crisis of the 2008 interrupted this bonanza, the quantitative easing (QE) policies of the US Federal Reserve (Fed) created unprecedented amounts of global liquidity, and Türkiye, together with other "developing and emerging economies," began receiving record amounts of capital inflows (Akyüz 2015). Capital inflows kept the real exchange rate at relatively overvalued levels and resulted in widening current account deficits with increasing import dependency of consumption and production. At the same time, low interest rates of the period resulted in rapid debt build up by firms and households.

High current account deficits increased external debt stock, and increasing domestic indebtedness created a series of fragilities. Growth depended on capital inflows. In fact, large foreign capital inflows in the 2000s and in the first half of the 2010s enabled a "success story" based on strong economic growth. However, this "success story" generated a series of structural imbalances and financial fragilities. Debt-led characteristic of growth resulted in fragile balance sheets while the government's focus on a construction-centred growth strategy together with the premature deindustrialization tendency due to overvalued exchange rates put the economy on an unstable growth path characterized by insufficient employment generation and persistent inequalities. Fed's tapering announcement in mid-2013 changed the landscape. The period between 2013 and 2017 witnessed government's attempts to keep the economy growing. However, this resulted in currency depreciation. Interest rate policy was the main tool used in this period together with credit policy using for example the Credit Guarantee Fund. In the face of mounting vulnerabilities, the diplomatic disagreement between Türkiye and the US led to capital outflows and the subsequent currency crisis of 2018 (Orhangazi & Yeldan 2021).

Three general observations can be made on the macroeconomic outlook: First, in the 2000s and 2010s economic growth depended on the pace of foreign capital inflows and the dependence of production on imported inputs have increased. Second, economic growth also took a debt-led character through continuous credit expansion, encouraged and supported directly at times by the government. Third, economic growth relied considerably on the growth of the construction sector, with limited contributions from productive capital accumulation and even raised worries of "premature de-industrialization" (Boratav & Orhangazi 2022). Table 1 summarizes main macroeconomic indicators.

Table 1: Macroeconomic Indicators

	2018	2019	2020	2021	2022
GDP (Billion USD)	779.69	759.45	720.11	817.51	853.49
Growth (%)	2.98	0.89	1.79	10.99	5.6
GDP per capita (USD)	9510	9130	8610	9650	9960
Unemployment (2)	12.7	13.5	13	11.4	10.5
Composite measure of labour underutilization (2)	18.2	18.8	28.6	22.8	22.7
Inflation (3)	20.3	11.84	14.6	36.08	69.97
Budget Balance (IMF definition) as a % of GDP	-3.5	-5.3	-5.2	-4.1	
Foreign Capital Inflows (Billion USD) (4)	5536	19345	11867	49975	15266
Current Account Balance (Billion USD) (5)	-21.74	5.3	-35.54	-13.59	-48.26
Current Account Balance as a % of GDP (5)	-2.8	0.7	-4.9	-1.8	-5.7
External Gross Debt Stock (Billion USD) (6)	426.7	416.0	432.8	441.1	
External Gross Debt Stock as a % of GDP	53.53	54.71	60.38	54.95	

Sources: GDP numbers come from IMF. The rest is based on Turkish Statistical Institute

Notes: *First Quarter **IMF forecast (1) Turkish Statistical Institute. December unemployment rates. 2022 is March unemployment rate. (2) It is the ratio of the sum of unemployed, time-related underemployment and potential labour force to the sum of labour force and potential labour force. (3) Turkish Statistical Institute. 2022 is April. (4) The Central Bank of the Republic of Türkiye (5) IMF (6) Ministry of Treasury and Public Finances

It needs be noted in this juncture that the bottlenecks faced by the economy in the beginning of 2023 are not solely conjunctural, simply subject to the whims of the business cycle. Much of these disequilibria had, in fact, their roots in the foreign (hot money) finance driven, *speculative-led growth* model of the Turkish economy, a la Grabel (1995). Originally set its course with the militarized episodes of neoliberal re-structuring under the Özal governments of the 1980s, and intensified under the ruling JDP governments since 2003, Türkiye had been trapped into an (imported) capital intensive, debt-ridden growth path with a fragmented industrial structure and a declining employment creation capacity.

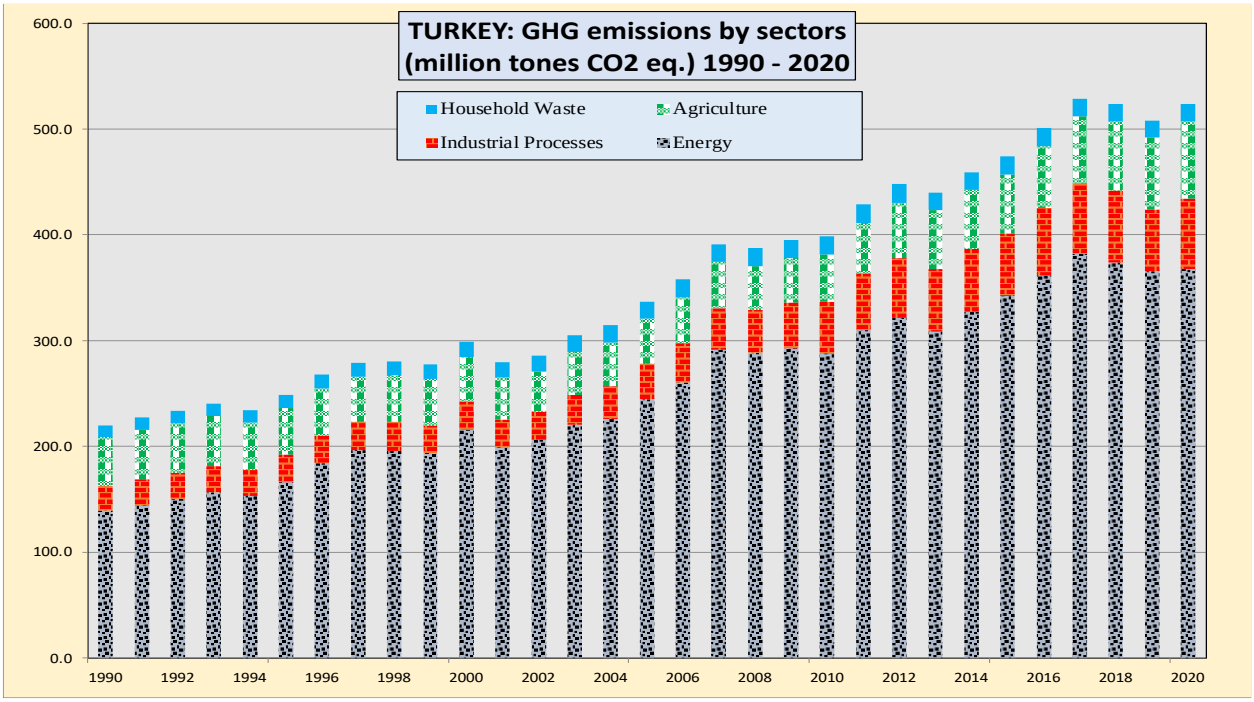
In short, the Turkish economy in 2023 is now characterized by persistently high current account deficits, a relatively high external debt stock, widening public budget deficits, and an unstable currency together with high inflation and unemployment rates. The economy is caught in a situation where a very sharp increase in interest rates could stabilize the currency markets, however, might as well result in a sharp slowdown of economic activity. The government's choice thus far seems to continue keeping the interest rates low to enable accelerations of economic growth, yet, at the expense of continued instability in currency markets and high inflation.

Türkiye is in a conjuncture where the urgency for a new growth model is increasing. Clearly whether a new growth model will eventually arise, and what shape it will take depend on political factors. However, it is possible to argue that further credit-led growth of the construction sector and sustaining the officially declared medium-term target of 5 percent growth are becoming increasingly more difficult. While it is too early to predict how the macroeconomic policies will be shaped, it may be time to consider green transformation as a central part of a new economic growth model.

Türkiye's Climate Scorecard: Challenges and Binding Constraints

Türkiye is grappling with the challenges of ensuring a cost-competitive energy supply for its population and the industrial sectors, while trying to ensure energy security. Even though per capita levels of GHG emissions in Türkiye are still relatively low, growth of per capita emissions is one of the fastest among the OECD countries. Total greenhouse gaseous (GHG) emissions rose from 219.7 mtonnes in 1990 to 523.9 mtonnes in 2020, yielding cumulative increase of 131%. Figure 1 below portrays the path of GHG emissions by sources of origin.

Figure 1: GHG emissions by sectors, 1990-2020



Source: TURKSTAT, Environmental statistics

Türkiye's CO2 inventory compares favourably in most respects with economies in the region as well as its competitors at the global scale. Internationally comparable data are mainly available for CO2 emissions (rather than total greenhouse gasses). Thereby, focusing on the CO2 emissions, Türkiye is observed to increase its total CO2 responsibility from 216 million tonnes in 2000 to 396 million tonnes by 2020. This gives an average annual rate of increase of 3.19% over this period. Over the same period, total CO2 emissions of the upper middle-income countries as a group rose from 7,252 m.

tonnes to 15,918 m. tonnes, and that of the Middle East and North Africa region rose from 1,331 m tonnes to 2,555 m tonnes (see Table 2). These numbers reveal average rates of annual growth of 4.14% and 3.43% and are higher than Türkiye's average annual increase rate. Over the same period global emissions are observed to rise by 2.01%, reaching 34.344 gigatons in 2020. Türkiye's share in global CO2 emissions stands 1.15% in 2020, compared to 0.9% back in 2000.

Calculations tabulated in Table 2 further reveal that Türkiye's CO2 emission intensities compare favourably with both the upper middle-income group and the Middle East & North Africa regional economies. Its CO2 emissions per dollar GDP (measured in fixed 2015 US$ international prices) declined from 0.523 kg to 0.398 kg over 2000-2020, at a rate of 1.43 per annum. In contrast, CO2 emissions per dollar GDP stand at 0.676 kg for the upper middle-income group and at 0.738 kg for the Middle East & North Africa region. Türkiye's CO2 intensity reduction is outperformed by the Europe & Central Asia region (high income countries excluded). Data in Table 2 underscore that this latter group of countries had succeeded reducing their emissions intensity at an average rate of 3.34%; nevertheless, they still display about three-folds of CO2 emissions per dollar GDP scale.

In comparison with the *per capita* emissions, Türkiye also displays comparably favourable results with those three groups of regions. Türkiye's per capita emissions in 2020 stand at 4.745 kg per person and is lower than its counterparts with upper middle-Income group 6.430 kg; Middle East and North Africa 5.401 and the Europe and Central Asia group 7.364 kg (see Table 2). Yet, it still has to be noted that, both the upper middle-income (3.40%) and Middle East & North Africa (1.39%) regions as well as Türkiye reveal higher rates of growth in their per capita emissions in comparison to the global average annual growth (0.79%). In this indicator, the Europe and Central Asia region displays an annual rate of growth only at 0.29%.

Table 2: CO2 Emissions Intensities: Türkiye and Comparable Regions

CO2 Emissions Intensities: Türkiye and Comparable Regions						
	2000	**2005**	**2010**	**2015**	**2019**	**Annual Rate of Change over 2000-2019**
CO2 emissions (kt)						
Türkiye	216,400.0	235,000.0	297,110.0	351,590.0	396,840.0	3.19
Upper middle income	7,252,670.2	10,185,333.7	13,251,515.6	14,889,729.5	15,918,662.7	4.14
Upper middle income (excluding China)	3,846,860.0	4,291,340.0	4,700,769.9	4,939,900.1	5,131,190.0	1.52
Middle East & North Africa	1,331,978.7	1,691,177.7	2,137,451.1	2,462,903.2	2,555,925.5	3.43
Europe & Central Asia (excluding high income)	2,582,853.9	2,728,718.5	2,846,013.4	2,752,548.4	2,942,675.3	0.69
World	23,445,433.3	27,414,328.0	31,043,477.0	32,995,536.0	34,344,006.1	2.01
CO2 emissions (kg per 2015 US$ of GDP)						
Türkiye	0.523	0.447	0.484	0.407	0.398	-1.43
Upper middle income	0.914	0.958	0.880	0.757	0.676	-1.59
Upper middle income (excluding China)	0.727	0.660	0.586	0.547	0.531	-1.66
Middle East & North Africa	0.743	0.770	0.791	0.778	0.738	-0.03
Europe & Central Asia (excluding high income)	1.706	1.339	1.153	0.942	0.905	-3.34
World	0.485	0.485	0.479	0.439	0.406	-0.94
CO2 emissions (metric tons per capita)						
Türkiye	3.375	3.420	4.059	4.414	4.754	1.80
Upper middle income	3.361	4.540	5.707	6.158	6.409	3.40
Upper middle income (excluding China)	3.145	3.663	3.805	3.786	3.973	1.23
Middle East & North Africa	4.149	4.771	5.371	5.591	5.401	1.39
Europe & Central Asia (excluding high income)	6.969	7.334	7.507	7.027	7.364	0.29
World	3.816	4.184	4.454	4.456	4.436	0.79
CO2 intensity (kg per kg of oil equivalent energy use)						**Annual Rate of Change over 2000-2015**
Türkiye	2.852	2.791	2.786	2.711	--	-0.34
Upper middle income	2.617	2.785	2.852	2.600	--	-0.04
Upper middle income (excluding China)	2.373	2.632	2.325	2.617	--	0.65
Middle East & North Africa	2.703	2.672	2.639	2.841	--	0.33
Europe & Central Asia (excluding high income)	2.457	2.403	2.405	2.711	--	0.66
World	2.391	2.441	2.467	2.264	--	-0.37

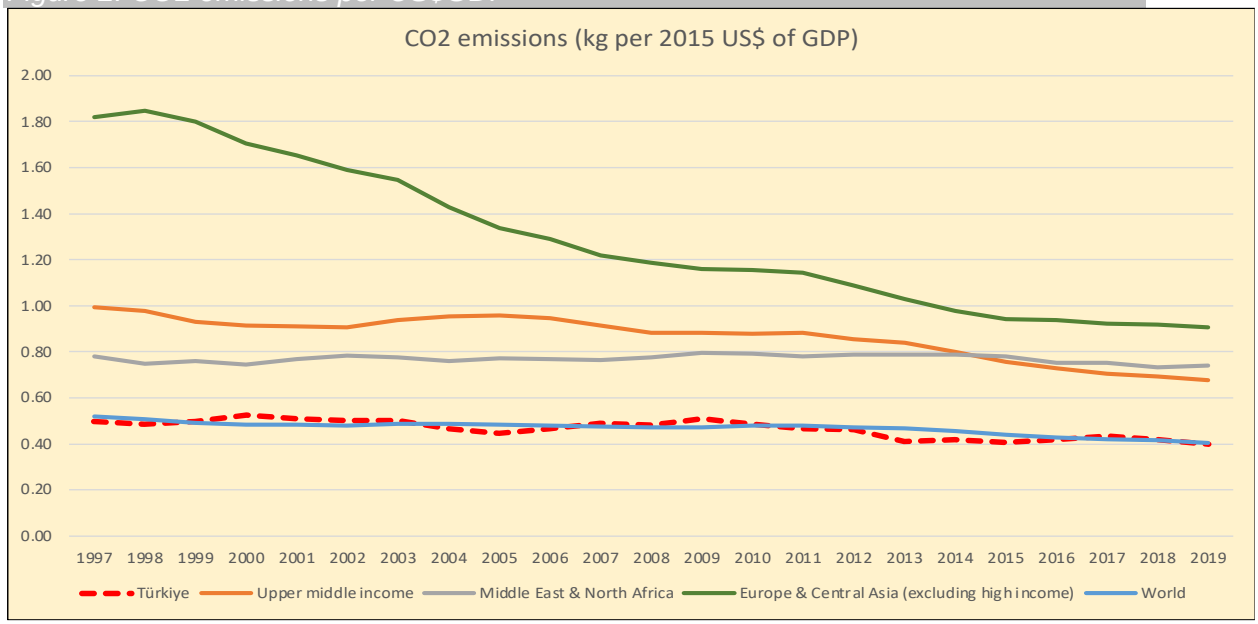
Source: World Development Indicators: https://databank.worldbank.org/source/world-development-indicators#

These numbers carry their qualitative comparisons with respect to emissions intensity in the power sector. Measured in “kg CO2 emissions per kg of oil equivalent energy use” World Bank data disclose that Türkiye’s CO2 intensity in the power sector has declined from 2.852 kg in 2000 to 2.711 kg in 2020, revealing an average rate of decline of 0.04% per annum. As of 2020, this indicator is slightly higher with respect to the upper middle-income region (2.6 kg) and is lower than that of the Middle East and North Africa region (2.8419. The world average, on the other hand, is comparably low at 2.264 kg, and is subject to a decline at an annual average rate of 0.14% per annum. (Table 2).

Detailed pathways of CO2 emissions per dollar GDP across Türkiye and its regions are displayed in Figure 2; while Figure 3 displays that of CO2 emissions per capita across Türkiye and its peers. In Figure 2, Türkiye is observed with its per dollar GDP emissions at par with the world on average, while the Europe and Central Asia region disclosing a remarkable decline in its CO2 emission intensity. Upper middle-income group, even though has higher GDP intensities of CO2 emissions, nevertheless disclose a favourable decline over the 2000s.

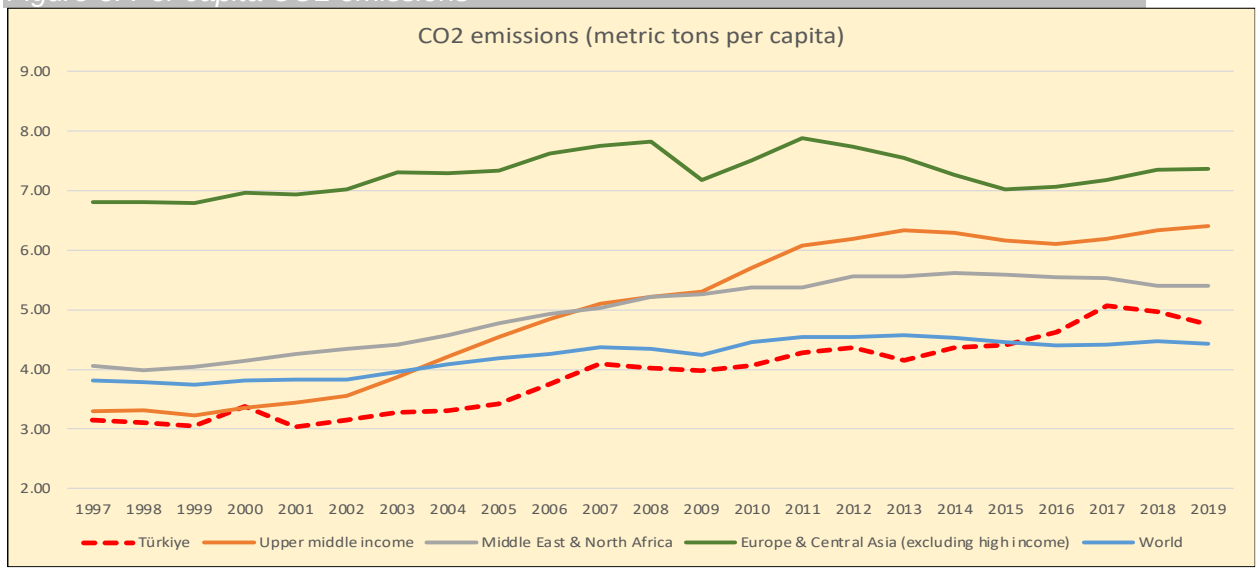
These numbers are significantly reversed for almost all regions (even perhaps as well as the world as a whole) when narrated for emissions *per capita*. (Figure 3). Europe and Central Asia has a fluctuating and significantly high CO2 emissions per capita; while this indicator is on a significant rapid increase in both Türkiye and the upper middle-income group of countries.

Figure 2: CO2 emissions per US$GDP



Source: World Development Indicators: https://databank.worldbank.org/source/world-development-indicators#

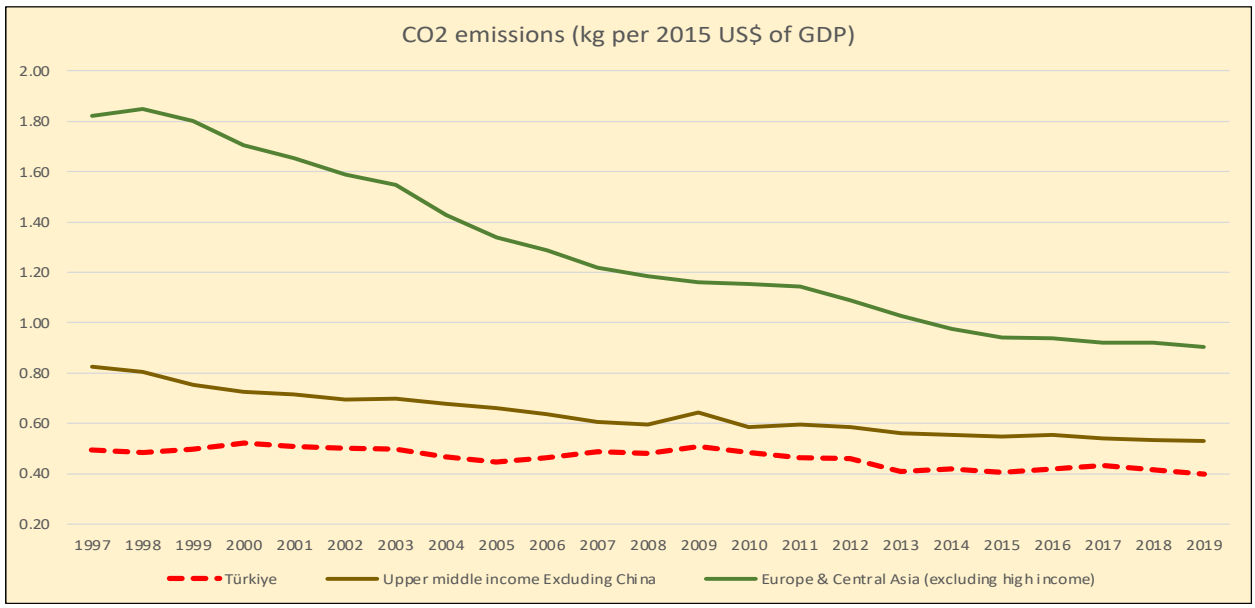
Figure 3: Per capita CO2 emissions



Source: World Development Indicators: https://databank.worldbank.org/source/world-development-indicators#

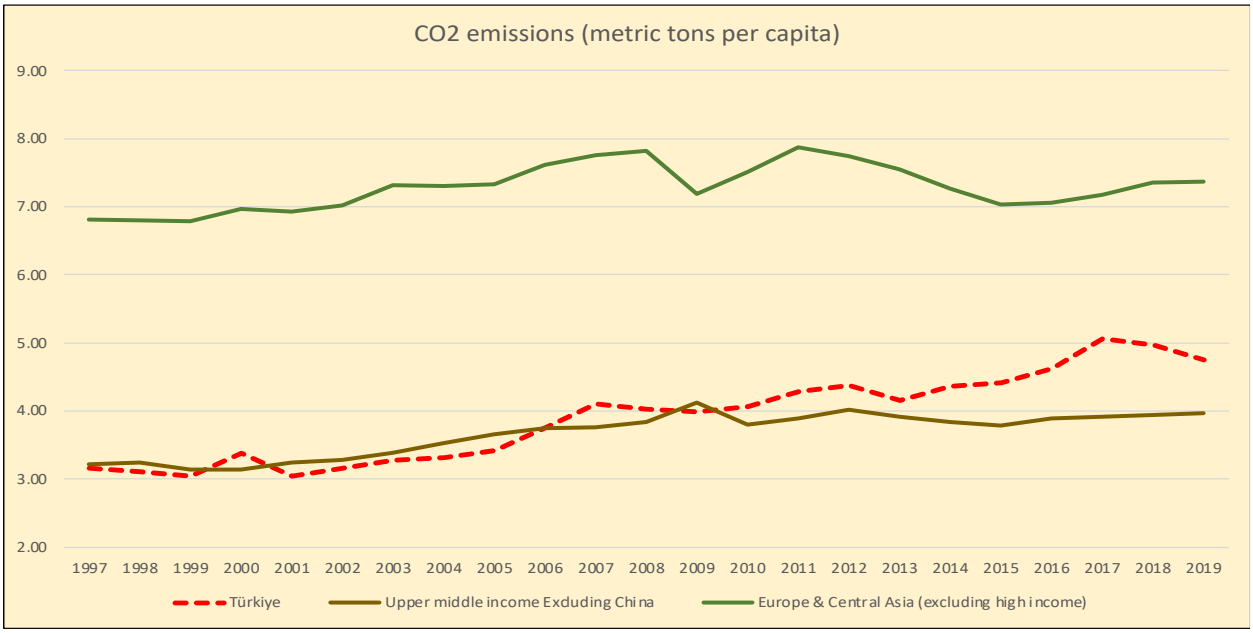
A further note pertaining to Figures 2 and 3 is that the "upper middle income" group of countries include China whose sheer size may lead to biased assessments. In what follows, a closer look at more directly comparable country aggregates (Europe and Central Asia –excluding high income and Upper Middle Income –excluding China) reveal a clearer pathway comparison. This comparison is portrayed in finer detail in Figures 2a and 3b.

Figure 2a: CO2 emissions per US$ GDP: Türkiye, Europe and Central Asia Excluding High Income and Upper Middle Income Excluding China



Source: World Development Indicators: https://databank.worldbank.org/source/world-development-indicators#

Figure 3a: Per capita CO2 emissions: Türkiye, Europe and Central Asia Excluding High Income and Upper Middle Income Excluding China



Source: World Development Indicators: https://databank.worldbank.org/source/world-development-indicators#

Given this revision we observe that, against pathway of the upper middle-income group where China is excluded, Türkiye still fares more robust in terms of per US$ GDP CO2 emissions, yet the gap significantly narrows. As for the comparison on per capita emissions, Türkiye's standing is now worse against the upper middle-income group where China had been excluded (Figure 3a).

Next, we focus on the sources of emissions across production. Table 3. Data disclose that Türkiye has succeeded in reducing its emissions (as a ratio of total fuel consumption) in her manufacturing industrial process with a decline of 4.82% on average per annum between 2000 and 2014. This is in contrast with both the Upper Middle Income (1.14%) and Middle East and North Africa (0.21%) regions, as well as the world average (0.99%). Yet, in other indicators, such as emissions in *transport, residential housing & public services,* and *power sector (electricity and heat production)*, Türkiye's performance has been dismal. World Bank data indicate that, over 2000-2015, Türkiye's CO2 emissions (as a ratio of total fuel consumption) had been increasing at a rate of 1.26% in buildings and public services sectors; 0.99% in transport; and 1.62% in her power sector.

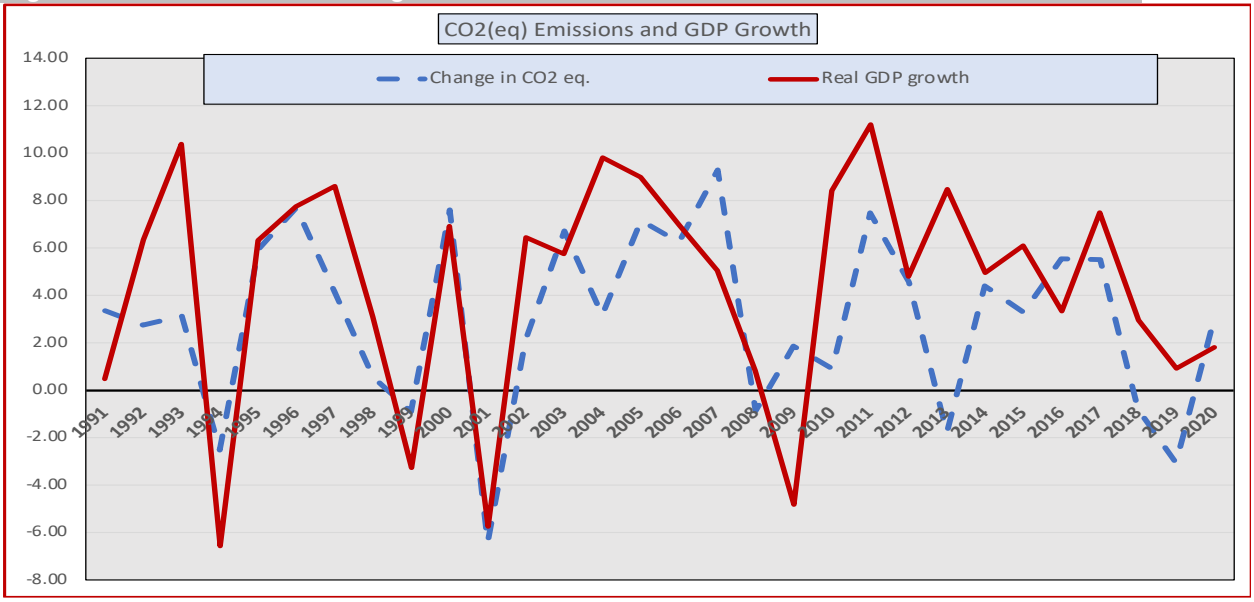
Table 3: CO2 Emissions by Source: Türkiye and Comparable Regions

CO2 Emissions By Source: Türkiye and Comparable Regions					
	2000	2005	2010	2014	Annual Rate of Change over 2000-2014
CO2 emissions from manufacturing industries and construction (% of total fuel combustion)					
Türkiye	28.717	25.459	18.268	14.617	-4.82
Upper middle income	21.923	25.314	26.735	25.702	1.14
Middle East & North Africa	17.857	17.039	19.255	18.391	0.21
Europe & Central Asia (excluding high incom	14.990	14.418	14.245	13.731	-0.63
World	17.365	18.274	19.969	19.960	0.99
CO2 emissions from residential buildings and commercial and public services (% of total fuel combustion)					
Türkiye	12.711	15.662	17.428	15.157	1.26
Upper middle income	8.879	7.396	6.362	6.232	-2.53
Middle East & North Africa	11.897	11.564	9.740	8.727	-2.21
Europe & Central Asia (excluding high incom	12.152	11.232	11.412	11.619	-0.32
World	11.376	10.319	9.205	8.595	-2.00
CO2 emissions from transport (% of total fuel combustion)					
Türkiye	17.3	17.1	16.3	19.833	0.99
Upper middle income	15.0	13.6	12.9	13.671	-0.64
Middle East & North Africa	25.0	24.3	24.3	24.621	-0.10
Europe & Central Asia (excluding high incom	12.3	13.9	14.8	15.537	1.66
World	22.0	21.1	20.0	20.449	-0.53
CO2 emissions from electricity and heat production, total (% of total fuel combustion)					
Türkiye	37.229	37.555	42.599	46.690	1.62
Upper middle income	51.456	51.037	51.700	52.106	0.09
Middle East & North Africa	43.191	44.978	45.026	46.935	0.59
Europe & Central Asia (excluding high incom	57.607	57.858	57.054	56.852	-0.09
World	47.075	48.149	48.767	49.040	0.29

Source: Data from database: World Development Indicators: https://databank.worldbank.org/source/world-development-indicators#

As such, these trends reveal that, similar to other comparable countries, Türkiye has not yet decoupled its economic growth mainly due to her heavy dependence on energy and capital-intensive growth. A simple correlation between annualized rates of GDP growth and CO2 emissions, as depicted in Figure 4, lead to covariance of 0.49; with almost a uniform conformity between the two pathways.

Figure 4: CO2 emissions and growth



Source: Authors' own calculations from TURKSTAT data.

Structure of Emissions Technology

Sectorial data across production activities are not available at the desired disaggregation. In what follows, we rely on independent research available and deduce a sectorially disaggregated informative data set for 2018 from Yeldan *et al.* (2020). Starting from the emissions inventory available and the latest available input-output tables from 2012, Yeldan *et al.* (2020) have disaggregated production side data into a more detailed format. Table 4 is adapted from this study. These data disclose that the major source of emissions derive from the power sector (fuel combustion). Estimated at 321 million tonnes, this figure constituted 61.67% of aggregate gaseous emissions in 2018. Electricity production is revealed as assuming about one third of the whole emissions at 29.74%; followed by Transportation services (15.67%) and Cement production (6.01%).

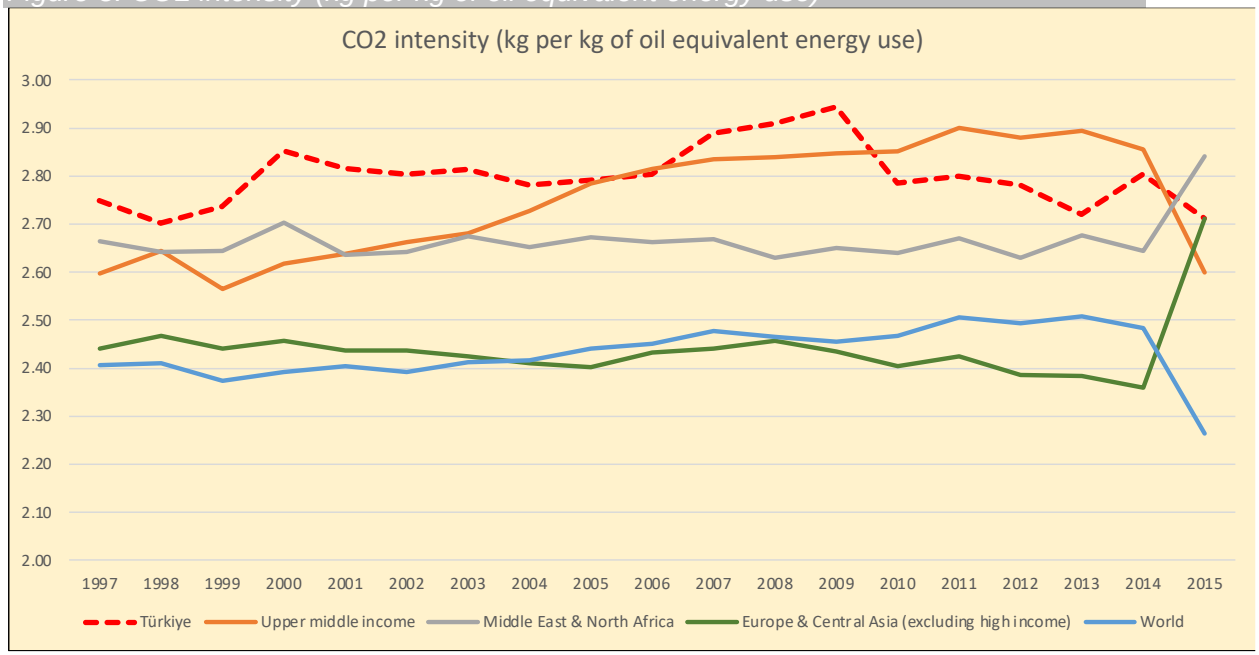
Compared across our regions identified above, CO2 intensity, measured in terms of kg of CO2 per kg of oil equivalent energy use, Türkiye discloses 2.71 kg of CO2 emissions per kg of oil equivalent energy consumption in 2020. This is slightly higher than the Upper Middle Income regional average of 2.599 kg, and lower than the MENA region (2.84 kg), while Europe and Central Asia averages 2.71kg as of 2020. (Figure 5).

Table 4: Türkiye: Total CO2(e) Emissions Across Sectors

Türkiye: Total CO2e Emissions By Sectorial Detail, 2018		
2018	Total Million Tonnes	Shares (% of Total)
Sectorial CO2e Emissions from Energy (Fuel Combustion)		
AG: Agriculture	9.769	1.88
MI: Mining	2.389	0.46
FO: Food Processing	5.247	1.01
TE: Textiles, Clothing	0.568	0.11
PA: Paper Products	1.017	0.20
PE: Petroleum Products	6.290	1.21
CH: Chemicals	7.248	1.39
CE: Cement	31.300	6.01
IS: Iron and Steel	4.696	0.90
MW: Machinery, White Goods	0.650	0.12
AU: Automative	0.174	0.03
EL: Electricity	154.942	29.74
CN: Construction	3.033	0.58
RT: Retail trade	1.045	0.20
TR: Transportation	81.657	15.67
AT: Air Transport	3.765	0.72
PS: Postal and Courier Services	0.166	0.03
AF: Accomodation and Food	0.267	0.05
PR: Professional Services	0.705	0.14
FS: Financial and Real Estate Services	1.203	0.23
TS: Tourism	0.158	0.03
ES: Education Services	0.267	0.05
HE: Health Services	0.311	0.06
OE: Other Economy	4.378	0.84
Memo items		
Total CO2e Emissions from Energy (Fuel Combustion)	321.243	61.67
Total CO2e Emissions from Households & Waste	69.622	13.36
Total CO2e Emissions from Industrial Processes	65.204	12.52
Total CO2e Emissions from Agricultural Processes	64.872	12.45
Total (CO2e)	**520.942**	**100.00**

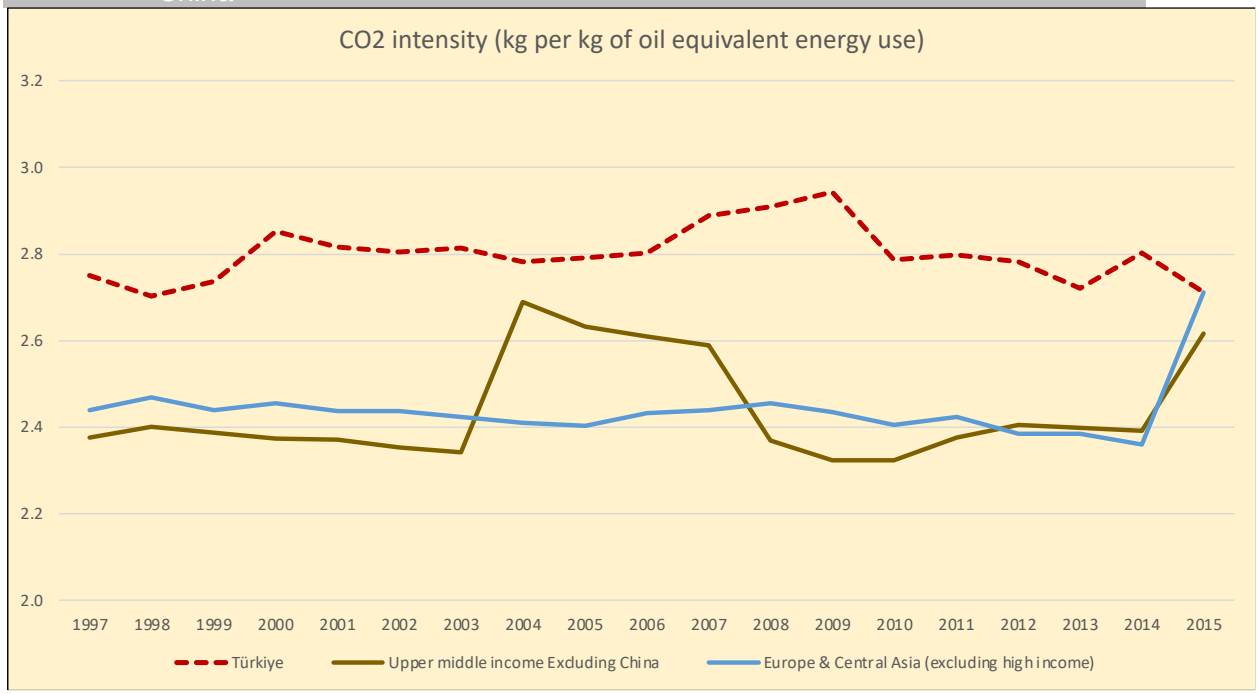
Source: A. Erinç Yeldan, Sevil Acar & Ahmet A. Aşıcı (2021) TÜSİAD Report: The New Climate Regime through the Lens of Economic Indicators, İstanbul, TÜSİAD, September.

Figure 5: CO2 intensity (kg per kg of oil equivalent energy use)



Source: The World Bank, World Development Indicators. https://databank.worldbank.org/source/world-development-indicators

Figure 5a: CO2 intensity (kg per kg of oil equivalent energy use): Türkiye, Europe and Central Asia Excluding High Income and Upper Middle Income Excluding China



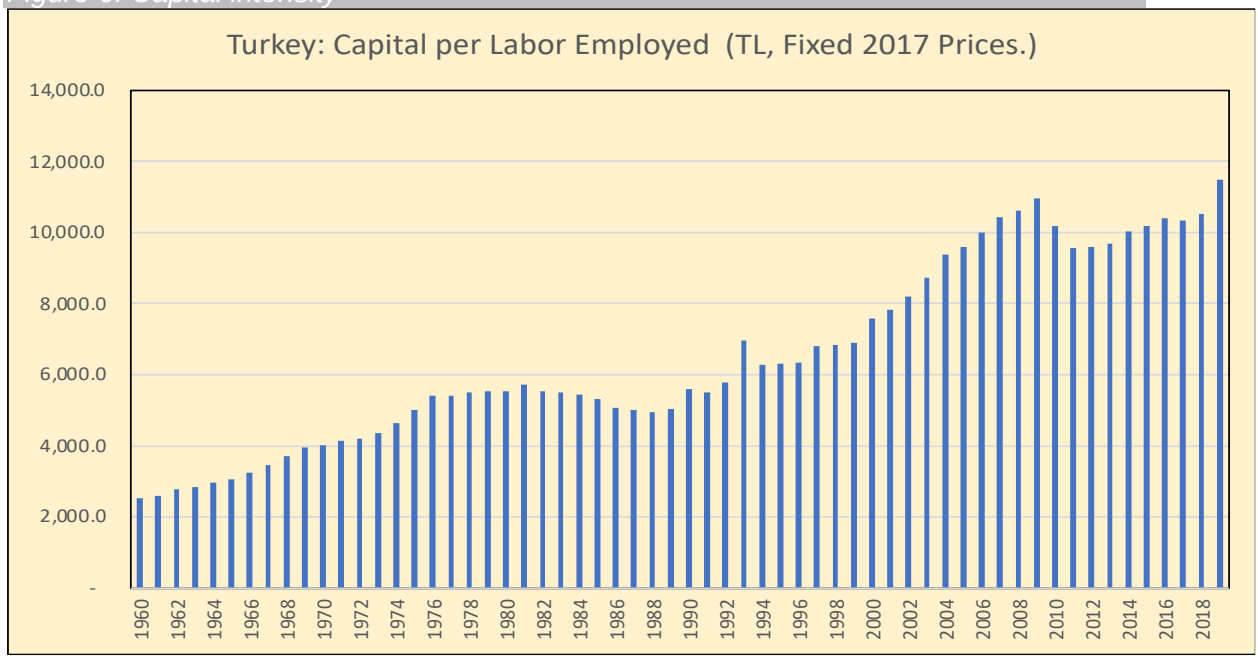
Source: The World Bank, World Development Indicators. https://databank.worldbank.org/source/world-development-indicators

Yet, as above, recasting the same comparison against the upper middle-income group of countries with China being excluded, Türkiye's relatively high standing in CO2 emissions per energy use becomes more pronounced (Figure 5a).

According to TURKSTAT, CO2 emissions from the energy sector have more than doubled since 1990 and are expected to continue to rise significantly in the medium and long term, closely following the growth in energy demand. In fact, the most critical aspect of Türkiye's power sector is its over-reliance and deep dependence on imported sources of energy. As highlighted above, increased import dependence on energy and strategic intermediates is a key problem of not only the power sector, but also the whole economy as it contributes to current account deficits.

The secular rise of capital per unit employment has been an indispensable characteristic of many emerging market, developing economies which had prematurely deregulated their capital accounts in an attempt to integrate with the global financial markets.[4] Figure 6 portrays this assessment for Türkiye's neoliberal transition. Measured in fixed TL prices, utilization of capital per worker employment has doubled from 1989 (completion of Türkiye's capital account deregulation) to the eruption of the global financial crisis in 2008, from 4 thousand TL to 11,600; and then hovered around that rate for the remainder of the 2000s up to date.

Figure 6: Capital intensity



Source: Authors' calculations based on University of Groningen, PWTdata base.

The fragile and volatile nature of economic growth in recent years also led to a severe shortening of the macroeconomic time horizon, negatively affecting fixed investment decisions to upgrade technical change. The result, among many other setbacks, has been the low productivity performance of Türkiye's overall economic activities. Based on these assessments, one can also highlight the dire consequences of this rather poor

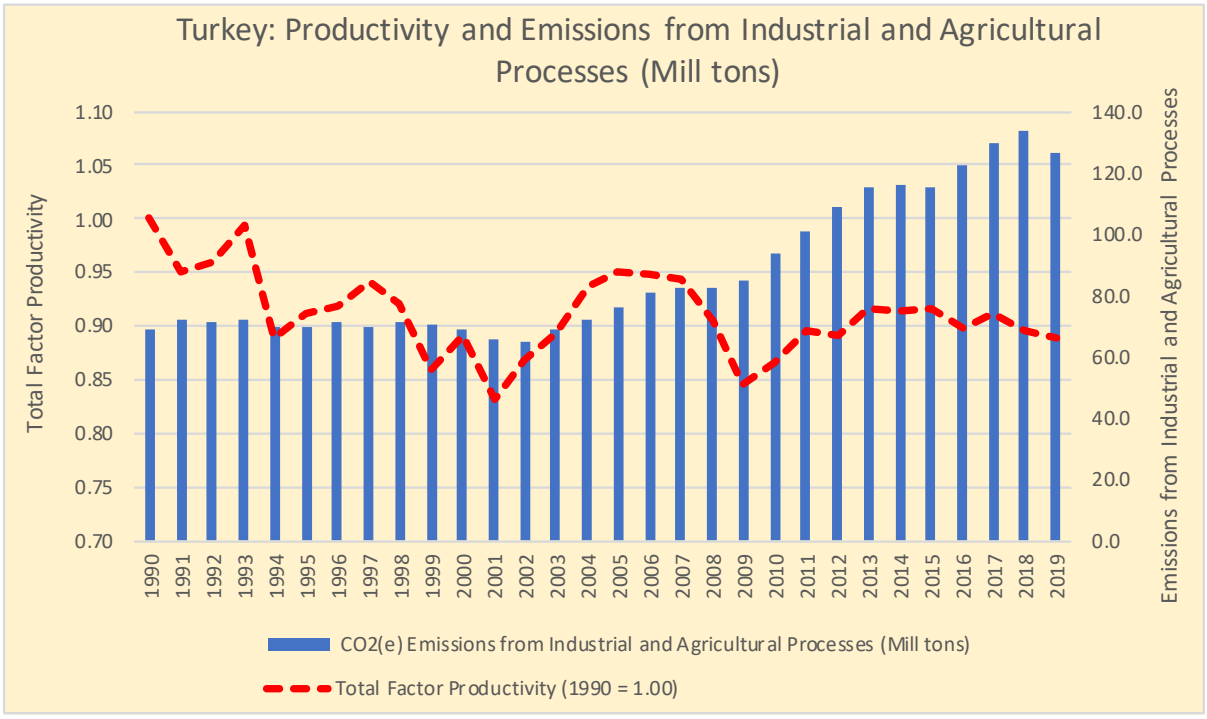
[4] For more elaboration, see., University of Groningen Penn World Tables at https://www.rug.nl/ggdc/productivity/pwt/?lang=en

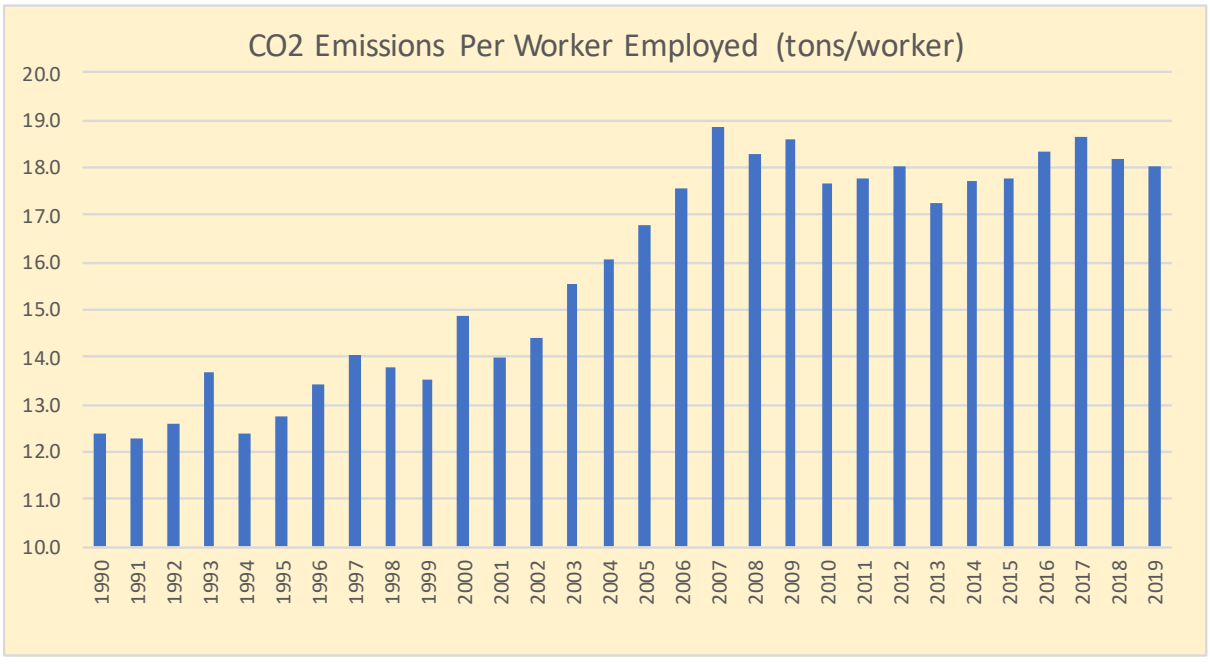
performance on the intensified carbonization patterns of the domestic production structure.

In Figures 7.1 and 7.2 we highlight two Figures pertaining this observation: First, we document the rapid rise of CO2 emissions emanating from industrial and agricultural economic activity. The rapid acceleration of emissions after 2005 is clear, the year when Türkiye's productivity performance starts to crumble. The argument that the capital-intensive production patterns of the speculation-led growth[5] trajectory has been one of the key reasons of inertial structural unemployment was already mentioned. Yet, another key outcome of this capital-biased trajectory has been the rapid rise of emissions per worker. Second, as seen in Figure 7.2, this verdict is pronounced (with perhaps an earlier trend starting as early as 2001); as the emissions per labour employed accelerate rapidly from 13-14 tonnes per worker, to 18 tonnes/worker.

[5] The term "*speculation-led growth"* was first introduced by Irene Gabriel, *viz*, "Speculation-Led Economic Development: A Post-Keynesian Interpretation of Financial Liberalization Programmes in The Third World" *International Review of Applied Economics* 9(2): 127-149, 1995.

Figures 7.1 and 7.2





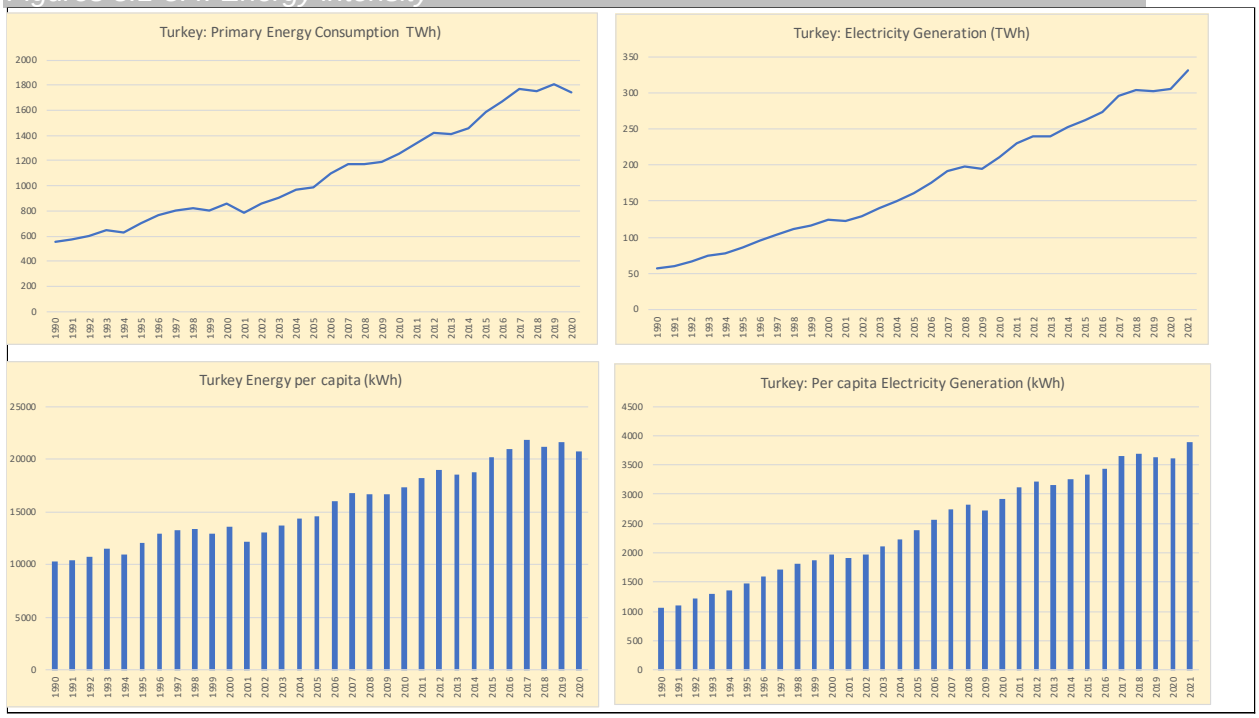
Sources: Authors' calculations from TURKSTAT Environmental Statistics and the University of Groningen, PWT data base.

Structural Characteristics of the Power Sector

Türkiye's post 1980 growth had been strongly energy intensive. Total primary energy consumption has tripled over 1980-2020 from 600 terawatt hours (TWh) to 1,800 TWh. When assessed on a per capita basis, this meant doubling of energy consumption from 10,350 KWh in 1980 to 20,700 KWh by 2020. This rapid rise of energy intensity had found its resonance in electricity generation. Electricity generation rose from 57.4 TWh to 331.8 TWh in 2021, revealing a cumulative rise of 430%. In terms of per capita figures, this discloses a rise by 240% from 1,067 KW per person to 3,895 per person. These data are depicted in Figures 8.1-8.4.

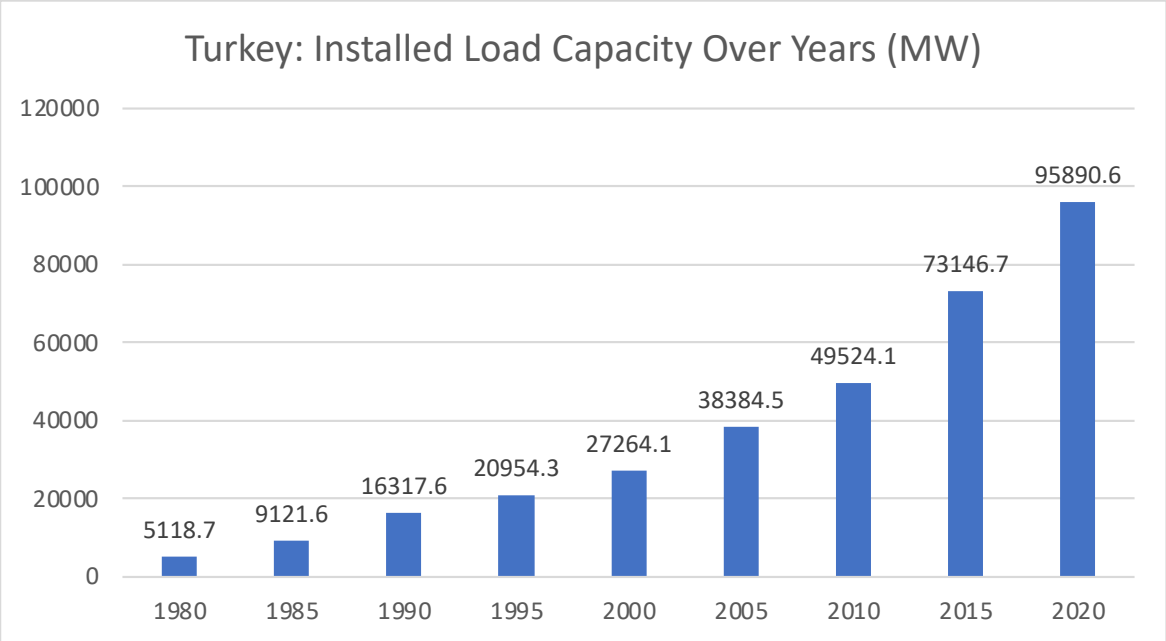
The background of these developments is the expansion of the installed load base. Türkiye's installed load capacity (*i.e.* the capacity of the system to continue to perform its intended function) was 5118.7 MegaWatts back in 1980; and rose to 95,890 MegaWatts by 2020 as can be observed in Figure 9.

Figures 8.1-8.4: Energy intensity



Source: Authors' calculations from Min of Energy and Natural Resources (https://enerji.gov.tr/bilgi-merkezi-enerji)

Figure 9: Installed load capacity

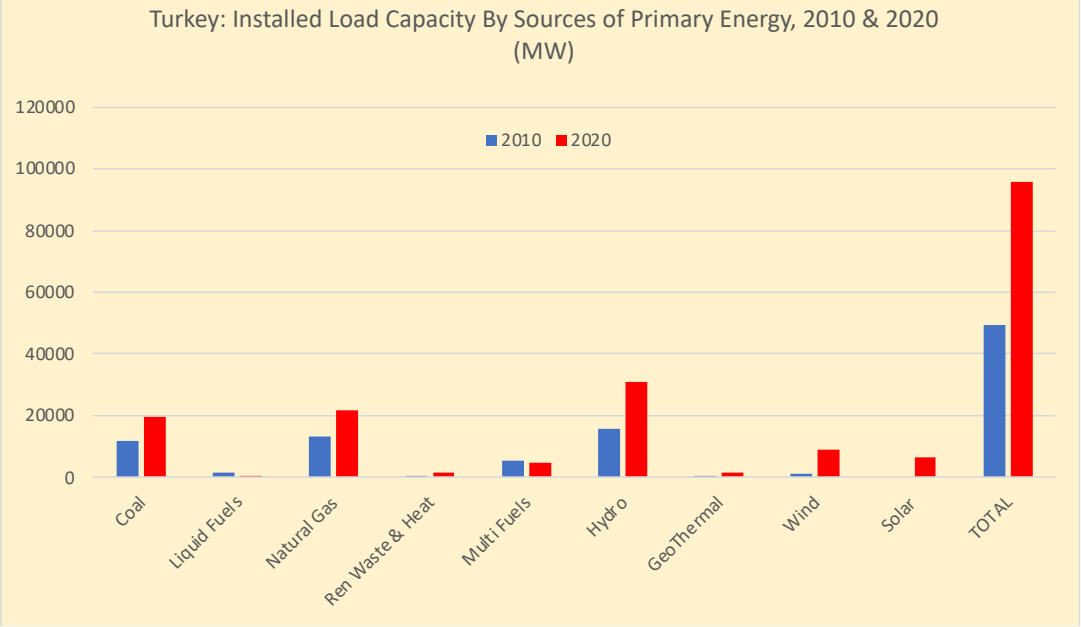


Source: Turkish Electricity Transmission Corporation (TEIAS)

As of 2020, the distribution of this load capacity is portrayed in Figure 10. Türkiye's total installed load capacity has almost doubled in the last decade, from 49,524 MW in 1990 to 95,890 MW in 2020. Over this period Türkiye was able to reduce the dependence of load capacity on coal from %24 to 20.5, albeit very sluggishly. In 1990 imported coal was 28.5% of the coal plants, and its share rose to 44.2% in 2020 (8.994 MW imported coal based, out of 20.330MW total). Total emissions due to coal-powered plants currently stand at 165 million tonnes. Compared to the coal-based emissions of 61 mtonnes back in 1990, this means a cumulative increase of 168%. The share of natural gas in load capacity has also been reduced by 4 percentage points from 26.8% to 22.5%, while the share of hydro-based plants stayed roughly the same at 31%. The share of wind has more than tripled and rose to 9.2%. But the biggest success story pertains to the installation of Photovoltaic solar panels. Share of solar load was virtually zero in 1990 and with a series of generous subsidization and support measures, solar plants now have a load capacity of 6,667MW, or 6.9% of the total capacity.

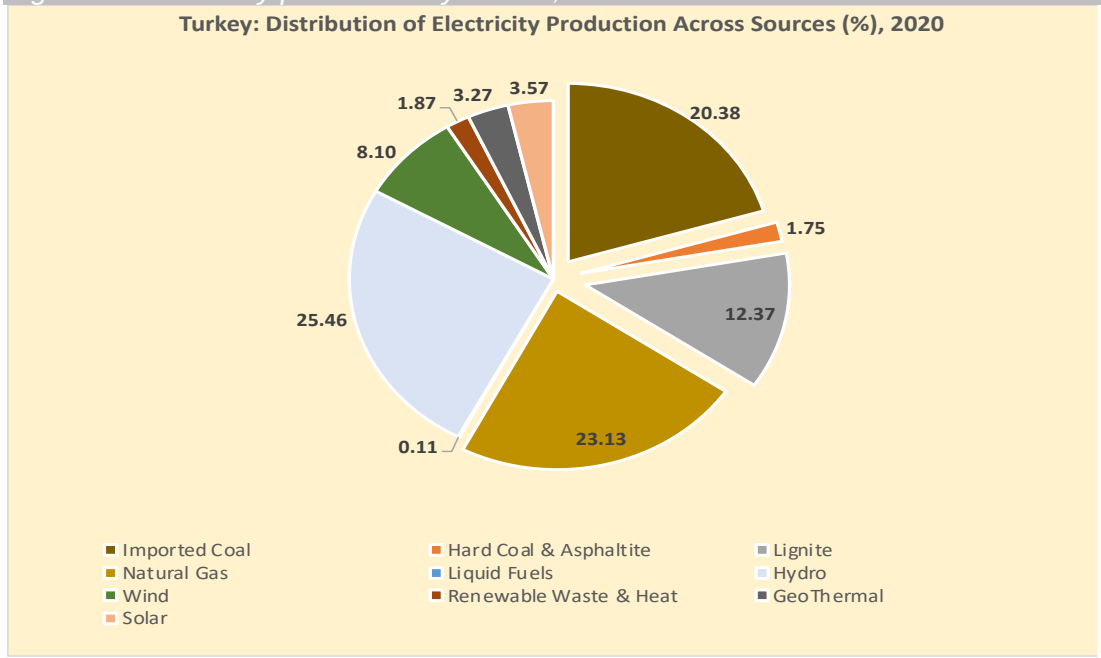
Sources of electricity production followed this overall pattern. Figure 11 documents this distribution. Imports still play a key role, as imported coal and natural gas plants yield a share of 20.4% and 23.1%, respectively. Fossil-based sources add up to 57.7 of total electricity output. Hydro's share is put at roughly a quarter. Türkiye's success in rapid deployment of solar plus wind plants document a share of 16.8% of renewables-based production.

Figure 10: Installed load capacity by sources of primary energy, 2010 vs 2020.



Sources: Türkyılmaz, Chamber of Electricity and TEIAS

Figure 11: Electricity production by source, 2020



Sources: Chamber of Electricity (https://www.emo.org.tr/) and TEIAS

All these observations are summarized with the aid of the *energy balances tables* which spell out the sources of energy supply as well as its sectorial consumption. Assessed over the energy balances, data reveal that the role of fossil fuels remained strong in the overall structure of the energy balances, while that of imports intensified secularly. Total primary supply has increased from 109.3 million Tonnes Oil Equivalent (TOE) in 1990 to 147.2 m TOE in 2020 (See Table 5). Share of imports in this total remained relatively stable at 80%. Yet, the main acceleration of imports had occurred in the first decade of the century (see below).

Table 5: General energy balances

Turkey, 2010-General Energy Balances ('000 Toe)										
	Total Coal	Oil	Natural Gas	Hydro	Geothermal	Bio-Energy	Wind	Electricity	Solar	Total
Domestic Production	17,523	2,671	625	4,454	1,966	4,570	251	0	432	32,493
Imports	15,921	36,566	34,823	0	0	0	0	98	0	87,409
Exports	0	7,250	594	0	0	0	0	165	0	8,009
Bunker Sales	0	387	0	0	0	0	0	0	0	387
Stock changes	86	-472	53	0	0	0	0	0	0	-332
Statistical Discrepancy	0	-1,908	0	0	0	0	0	0	0	-1,908
Primary Energy Supply	**33,531**	**29,221**	**34,907**	**4,454**	**1,966**	**4,570**	**251**	**-67**	**432**	**109,266**
Generation and Energy	**-14,134**	**-1,554**	**-20,887**	**-4,454**	**646**	**-118**	**-251**	**14,858**	**0**	**-25,894**
Power plants	-13,120	-888	-19,657	-4,454	646	-118	-251	18,164	0	-19,678
Coking coal firms	-970	0	0	0	0	0	0	0	0	-970
Oil Refinery	0	-1,060	-1,010	0	0	0	0	-92	0	-2,162
Domestic Consumption & Loss	-44	395	-220	0	0	0	0	-3,214	0	-3,083
Final Energy Consumption	**19,397**	**27,667**	**14,020**	**0**	**2,612**	**4,452**	**0**	**14,791**	**432**	**83,372**
All sectors	**19,397**	**27,667**	**14,020**	**0**	**2,612**	**4,452**	**0**	**14,791**	**432**	**83,372**
Industry	11,341	3,860	7,170	0	1,221	0	0	6,906	130	30,628
Transport Sectors	0	14,817	452	0	0	12	0	47	0	15,328
Other Sectors	8,057	5,530	6,397	0	1,391	4,440	0	7,838	302	33,956
Households&Other services	8,056	1,252	6,396	0	1,057	4,440	0	7,364	302	28,868
Agriculture	1	4,278	2	0	334	0	0	474	0	5,089
Non-energy Consumption	0	3,459	0	0	0	0	0	0	0	3,459

Turkey, 2020-General Energy Balances ('000 Toe)										
	Total Coal	Oil	Natural Gas	Hydro	Geothermal	Bio-Energy, Waste and Other Heat	Wind	Electricity	Solar	Total
Domestic Production	15,721	3,363	378	6,716	10,576	3,396	2,135	0	1,784	44,069
Imports	25,403	49,017	39,704	0	0	0	0	98	0	114,221
Exports	222	7,930	476	0	0	0	0	165	0	8,793
Bunker Sales	0	2,504	0	0	0	0	0	0	0	2,504
Stock changes	-285	243	201	0	0	0	0	0	0	160
Statistical Discrepancy	367	316	0	0	0	0	0	0	0	683
Primary Energy Supply	**40,616**	**42,190**	**39,806**	**6,716**	**10,576**	**3,396**	**2,135**	**-51**	**1,784**	**147,168**
Generation and Energy	**-25,400**	**-558**	**-13,382**	**-6,716**	**-8,622**	**1,869**	**-2,135**	**22,288**	**-942**	**-33,597**
Power plants	-24,440	-119	-11,493	-6,716	-8,622	311	-2,135	26,376	-942	-27,779
Production of Heat	-756	-63	-1,071	0	0	1,888	0	0	0	-3
Coking coal firms	-490	0	0	0	0	0	0	0	0	-490
Oil Refinery	0	3,202	-775	0	0	-330	0	-225	0	1,872
Domestic Consumption & Loss	-1,142	-3,578	-44	0	0	0	0	-3,863	0	-8,626
Final Energy Consumption	**15,216**	**41,631**	**26,423**	**0**	**1,954**	**5,266**	**0**	**22,237**	**843**	**113,571**
All sectors	**14,849**	**41,315**	**26,423**	**0**	**1,954**	**5,266**	**0**	**22,237**	**843**	**112,888**
Industry	9,634	3,669	9,047	0	0	3,515	0	10,266	295	36,425
Transport Sectors	0	26,514	212	0	0	122	0	131	0	26,979
Other Sectors	5,215	4,206	16,513	0	1,954	1,629	0	11,840	548	41,905
Households&Other services	5,215	942	16,419	0	1,327	1,629	0	10,861	548	36,941
Agriculture	0	3,264	94	0	627	0	0	980	0	4,964
Non-energy Consumption	0	6,927	651	0	0	0	0	0	0	7,578

Source: Ministry of Energy and Natural Resources. https://enerji.gov.tr/bm-yayinlar-ve-raporlar

As stated above the role of coal could have been reduced only marginally over the period. Total utilization of coal (domestic plus imported) in primary energy supply reached to 41.3 mTOE in 2020, to 33.4 mTOE in 1990 increasing by 30%. This brought the share of total coal in primary energy to 27.9%, down from 30.6% in 1990. Imported coal gradually increased its share in primary supply from 14.6% to 17.2%.

In 2020, power sector commanded 18.9% of the total primary energy supply, leaving 113.6 mTOE for Final Energy Consumption. This is a 36.6% cumulative increase over 1990. Data reveal that the share of industry in the final consumption is roughly a third, down from 36% in 1990.

Energy Imports: A Key Bottleneck

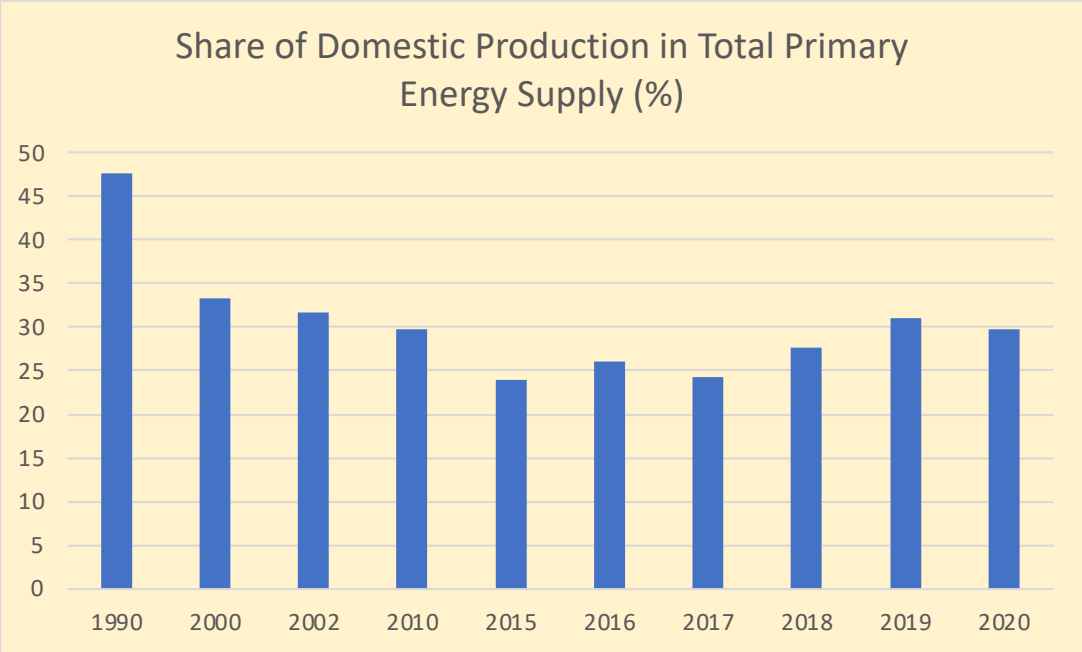
Türkiye's import-dependence in its power sector is regarded as one of the key bottlenecks, constraining the overall potential of the macroeconomy. As of writing, total energy imports were valued at 50.7 US$ billions, one fifth of the aggregate import bill. Yet the fact that there are no easy substitutes against imported energy, coupled with the

fact that its share has been on the rise over the 2000s underscore the crucial importance of the issue. Plotted over the last three decades the share of *domestic* production in total primary energy supply went down almost by half from 47% of the total in 1990 to 29% in 2020. (Figure 12).

Dependence on imported energy has been persistent, leaving aside erratic developments in energy markets and geopolitical events. Calculated against per-$ GDP, cost of energy imports had been in the order of 5% on average, rising to as high as 7% in 2011. Its current level is at 6% to the 2021 level of the GDP. As Figure 13 discloses the most rapid rise occurred in the first decade of the 2000's. Figure 14, in turn, depicts imported energy usage per labour employed. Imports of energy stand at roughly 1,700 US$ per worker in 2020s; this indicates a rise of three-folds in comparison to the turn of the century.All these meant a heavy burden on foreign balances. As a matter of fact, Türkiye's current account balance tilted towards a strong negative especially after 2003. Many factors contributed to this result as we had noted in section II above. Figure 15 documents the balance on the current account with and without the energy import bill.

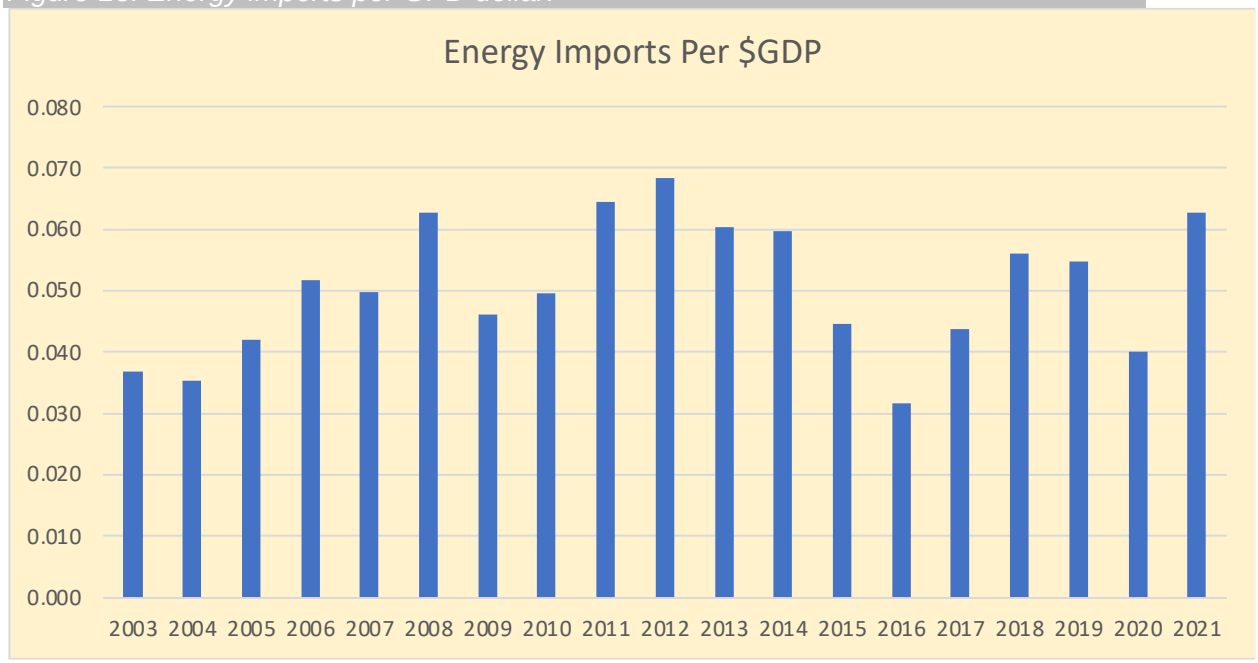
Türkiye traditionally displayed marginal deficits in its current account over the last quarter of the previous century. Deficit on merchandise trade was used to be covered by the surplus on invisibles, especially remittances ad tourism revenues. With rapid acceleration of merchandise imports after the currency appreciation of the 2003-2009, current balance turned severely negative. The deficit typically settled at around 5% to the GDP, reaching as high as 8% in 2006 and then 11% in 2010. Data in Figure 15 disclose that the imports create heavy pressures on the foreign account without which in fact Türkiye's current account balances could have been maintained. Thus, steps towards renewables-led energy security is a win-win situation both in reducing the climate burden and easing the deficits in the current account. In the next sub-section, we now turn to an overview of the energy policies with an eye on the climate change.

Figure 12: Share of domestic production in total primary energy supply (%)



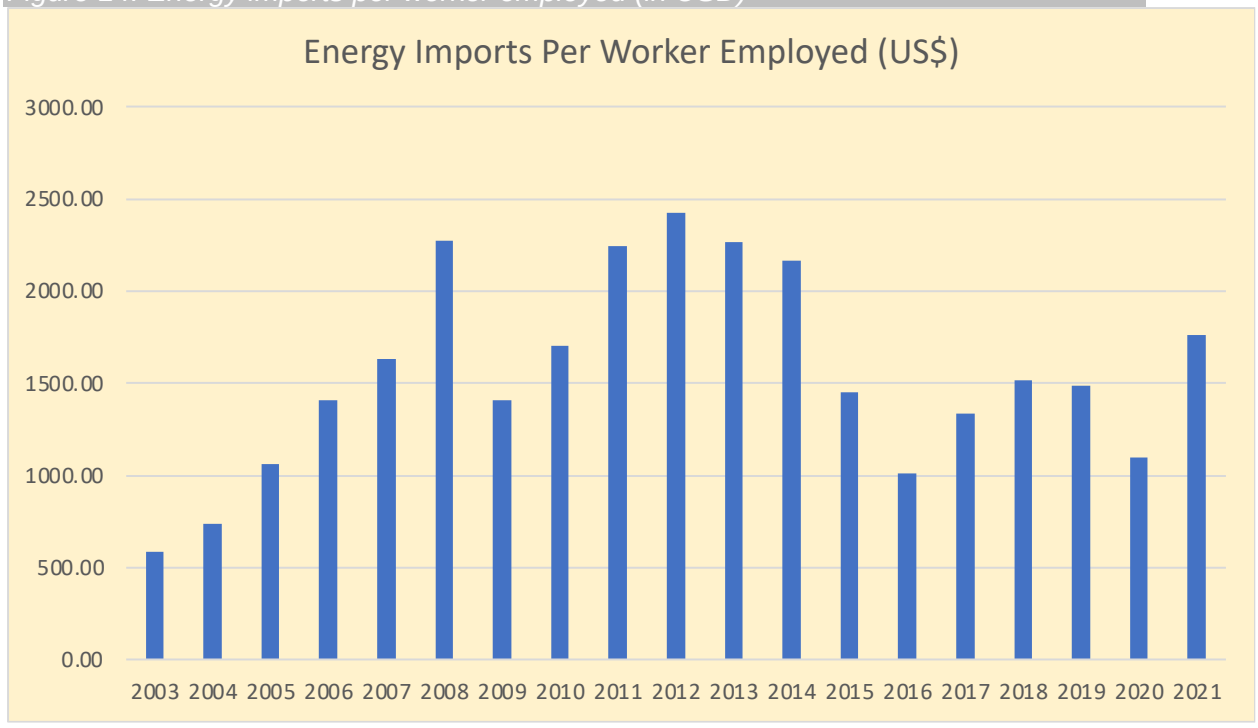
Source: Ministry of Energy and Natural Resources

Figure 13: Energy imports per GPD dollar.



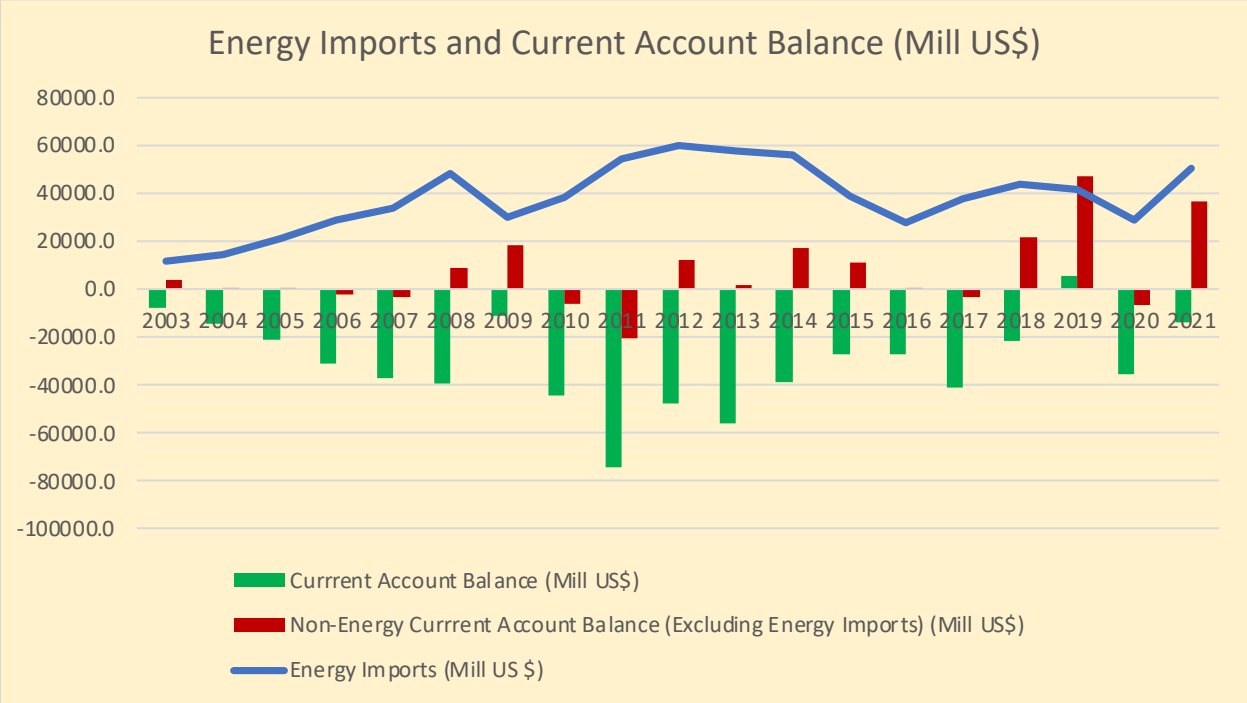
Source: TURKSTAT, Trade Statistics. (Energy Imports correspond to item 27: -Mineral fuels, minerals oils and product of their distillation).

Figure 14: Energy imports per worker employed (in USD)



Source: TURKSTAT, Trade Statistics and Household Labor Surveys

Figure 15: Energy imports and current account balance (in million USD)



Sources: TURKSTAT, Trade Statistics and CBRT.

Assessment of Energy Policies

As has been documented above, Türkiye has been experiencing a dramatic change with respect to its escalated utilization of electricity and primary energy sources. In line with its growing population and GDP, it has been facing increased energy demand in the recent decades. The bulk of electricity generation stems from the utilization of fossil fuels, comprised of mainly natural gas and coal. Since the country does not own any significant oil or gas reserves, it is highly dependent on energy imports. Within this composition, 99% of total gas demand, 93% of oil and 55% of coal were imported from various countries --natural gas mainly from Russia, and coal from Colombia. In order to decrease the reliance on foreign energy sources, ensure energy security, and meet the growing energy demand, Türkiye has pursued strong commitment to utilization of all the domestic coal resources, together with its plans to install three nuclear power plants in the near future. On the other hand, the potential of renewable resources such as solar, geothermal, and wind remains hugely untapped in producing energy.

While Türkiye has ambitious plans for deployment of renewable energy, these are likely to be compromised by the continued existence of subsidies to coal-fired power generation and coal mining including the recently introduced regional development package with investment support and loan guarantees. This policy stance is also visible under all of the recently enacted *Development Plans* as well as strategy documents of the Ministry of Energy and Natural Resources, (MENR). Boosting coal mining and coal-fired electricity generation appears to be among the priorities of the country, with a strong emphasis on the need to increase investments, extend exploration and rehabilitation

budgets, and introduce new incentives to the coal sector.[6] In order to attain such targets, investments in the sector will be accelerated and new reserves will be explored. Similarly, in the Eleventh Development Plan, the desire to intensify the efforts to explore new lignite reserves (as well as oil and gas) is repeated. As part of the program, available coal fields that are ready to be operated will be transferred to the private sector via the "royalty tender system", public coal-fired power plants will be rehabilitated and investments to build new coal-fired power plants will be facilitated (p. 196).

Türkiye had been a party to the COP21 Meetings in Paris, 2015 and submitted its Nationally Determined Contribution (NDC) as part of its strategies against climate change. However, Türkiye delayed ratification of the Paris Agreement from its parliament to as late as 2021 September and finally set a rather loosely targeted net zero emissions program for 2053. Neither the recent action plans proposed officially, nor its currently revised Nationally Determined Contribution (NDC) document (announced at the 27th COP meetings in Sharm El Sheikh) comprises concrete interim plans on how to achieve its ultimate goals.

Hence, it can be affirmed that Türkiye does not yet have a clear strategy towards de-carbonizing its development pathway, in particular its power sector (Taştan, 2022; Şahin *et.al*. 2021; Saygın *et., al*. 2019; Saygın Hoffman & Gordon, 2018; TÜSIAD, 2016; Şahin, 2016). In particular, Şahin (2016) writes, "T*urkey's climate policies can be defined through its fixation on its special circumstances with regard to the climate regime. This position is mostly utilized in order to keep Turkey away from any emission reduction targets and to sustain its low-tech and high- carbon developmentalism.*" Thus, "t*his defensive position persisted, and efforts for international recognition of Turkey's special circumstances remained the number one priority in Turkish climate politics*" (p.121).

IEA in its 2021 Energy Report states that even though "…Turkey has experienced impressive growth in renewables in the past decade (notably solar, wind and geothermal), *still, fossil fuels continue to drive Turkey's economy, with a heavy dependency on imports, especially oil and gas"*. Advances in renewables had been a conscious result of supportive government policies, while being "*driven by a favorable resource endowment, strong energy demand growth*" (p. 24). IEA (2021) further concludes that, "given limits on upstream resources and with consideration to emissions reduction, *Turkey should also place due consideration on cost-optimal demand-side measures such as efficiency improvements and fuel switching* in the transport sector, which is still 98% reliant on oil (p. 25)."

Furthermore, Türkiye does not yet pursue active and consistent low-carbon policies, and its official NDC does not admit any "peak" of emissions. Rather, with a national energy strategy focusing on the use of coal, emissions will continue growing in line with GDP. In fact, many analyses cited within this report demonstrate that, for realizing meaningful mitigation targets, the government needs to undertake further action in the areas of renewable energy, energy efficiency, and carbon pricing. The transition to low carbon development is crucial for maintaining low levels of per capita emissions and securing Türkiye's contribution to global climate change mitigation. In this trajectory, two points are particularly missing; 1) an environmentally sensitive regional development perspective, and 2) a strategic concern for climate change abatement/mitigation.

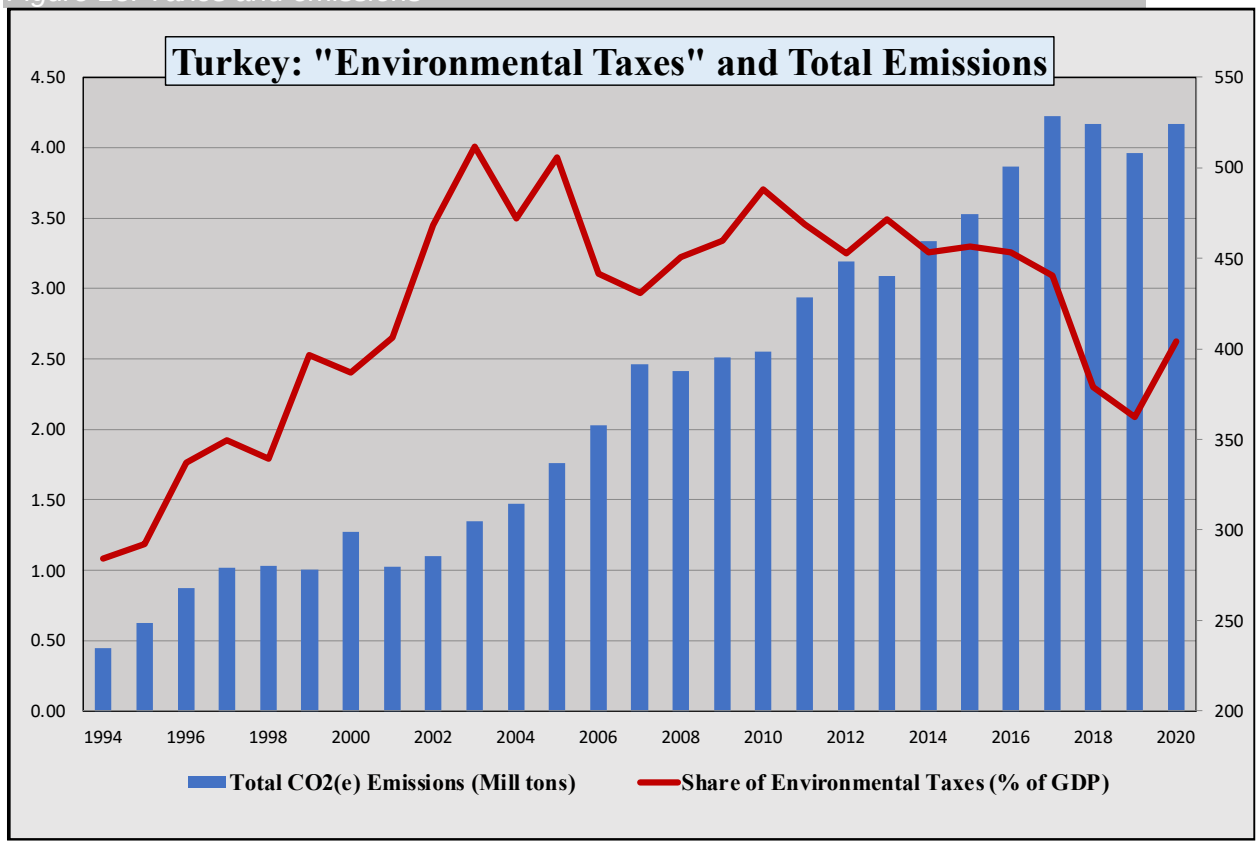
[6] The Strategic Plan of Energy has recently been deployed by the Öin of Energy and Natural Resources, see: https://enerji.gov.tr//Media/Dizin/EIGM/tr/Raporlar/TUEP/Türkiye_Ulusal_Enerji_Planı.pdf

Despite advances in renewables, Türkiye did not manage to decouple its emissions from growth and per capita emissions continued to rise, as well as emissions per worker employed. Domestic fiscal policy plays a role in the increase of pollution intensity. While Türkiye has ambitious plans for deployment of renewable energy, these are likely to be compromised by the continued existence of subsidies to coal-fired power generation and coal mining including the capacity remuneration mechanism, regional development packages with investment support and loan guarantees, and direct Treasury transfers to the sector. According to the SHURA (2019), in 2018 the total magnitude of non-market flows including special energy taxeswas 8 billion $, 3,9 billion $ of which flowed to the production and consumption of fossil fuels. By comparison, the externality costs of fossil fuel use calculated in the most recent SHURA (December 2020) study is 11 billion $, which is nearly three times the value of subsidies provided to fossil fuels.

The lack of comprehensive data on the extent and implications of these subsidies hinders the debate over their reform. Acar and Yeldan (2016) conducted a modeling study on the influence of fiscal subsidies for coal on aggregate CO2 emissions and discovered that eliminating these subsidies might have lowered gaseous emissions by 5.5% over the base run trajectory from 2015 to 2030. No doubt, externalities arising from fossil fuels are not limited to GHG emissions. Health externalities reach considerable levels once the health costs of a fossil fuelled power system are considered. Due to the methodological constraints, the current report does not quantify the health-related benefits of the energy transition. However, according to the SHURA (Sabancı University) (December 2020) report, the magnitude of the external costs of fossil fuel consumption corresponds to about 1,5 % of GDP and about one third of total annual health expenditures in Türkiye. If they could be accounted for, these figures give a clue about the potentially significant positive health impacts of a renewable energy transformation in Türkiye.

Against all this background, it is also very illuminating that Turkish economy does in fact carry a very significant burden of, in the terminology of OECD, *environmental taxes*. Given OECD's taxonomy, Türkiye has already adopted quite high rates of taxation on various forms of energy, waste, and production, averaging around 2.5 to 4.0 percent of its gross domestic product. Yet, what is missing out of this policy is a sound action towards earmarking the tax monies towards abatement, mitigation, and adaptation objectives. This lack of policy directives is abundantly evident in the increase of aggregate emissions despite a significant tax burden. (Figure 15). Nevertheless, this observation suggests that Türkiye carries a strong tax base against carbon and a further step towards carbon pricing may be a relatively easier policy intervention if administered within a framework where the existing taxes are replaced by direct carbon taxes (or other instruments of CO2 pricing) and are well-earmarked.

Figure 15: Taxes and emissions



Source: OECD, Environmental Taxes data base. https://data.oecd.org/envpolicy/environmental-tax.htm

Towards Regional Cooperation for Climate Mitigation & Adaptation: Potential Gains, Bottlenecks and Threats

It is by no means an exaggeration to note that "Strategies Towards Green Transformation and Sustainable Development" entail a *multi-regional effort*, rather than heroic attempts of a singleton country. Given the complex web of trade and financial transactions, all having deep impacts on the environmental abatement, a constructive framework towards harmonizing climate policies among the countries across the region is a *sine qua non* for success. In this section of the report, we provide a brief analysis of the actors and the issues involved. [7]

Non-renewable energy supply sources dominate the total primary energy supply (TPES) in South-East Europe (SEE). In terms of primary energy supply types, the region mainly utilizes oil and gas with respective shares of 33% and 15% in all non-renewable primary energy supply sources in SEE. The share of coal in energy supply is very high as well, at 26%. In two economies, Bosnia and Herzegovina and Serbia, the share of coal in the

[7] The data reported below and much of the following analysis is available in Özay (2023) and the South East Europe (SEE) (2021) 2030 *Strategy* report provided by the Regional Cooperation Council.

overall non-renewable energy supply exceeds 50%. Bulgaria, Romania, and Slovenia on the other hand also have nuclear power in their energy mix.

According to the latest available international statistics, the SEE supplies only 15% of its TPES from renewable energy sources. In terms of types of renewable energy sources used for primary energy supply, the Region relies heavily on hydro sources together with bioenergy, whereas the utilization rate of wind and solar energy is low, despite the Region's potential. This carries additional risks due to steady decreases in rainfall because of changing climate. Furthermore, the construction of hydro power stations could have negative social and environmental impacts through reductions in arable land, environmental damage, and loss of biodiversity.

In terms of renewable energy consumption, the share of households, particularly their electricity demand, is much higher than the renewable energy consumption by industry and transport. Households consume 63% of renewable energy, with transportation accounting for 3%, while the industry with the biggest need for energy supplies consumes only 17.7% of renewable energy. However, it is important to note that the renewable energy used in households is dominantly generated from firewood used for cooking and heating, with low efficiency and considerable CO2 emissions.

The region has stepped up its efforts to improve the investment framework and tackle the major challenges hindering faster deployment of renewables and took steps to introduce more market-based support schemes, moving from the prevalent feed-in-tariffs (FITs) to feed-in-premium (FIP) systems (in Republic of North Macedonia and Croatia, for example). Due to non-existence of operational day-ahead and intraday markets in some economies and low liquidity in others, there are concerns about the auction scheme being a suitable model in the Region at the moment.

Overall, the decoupling of growth from fossil-fuel energy supply and CO2 emissions is in early stages. In line with the long-term energy transition and decarbonisation objectives of the EU and Energy Community (EnC) including a climate-neutral European continent by 2050, deployment of renewables offers numerous socio-economic benefits beyond cost effectiveness. These include job creation; development of local manufacturing capacity; avoidance of health and environmental costs; and addressing climate change challenges. The development of integrated National Energy and Climate Plans (NECPs) in the EU Member States and the region's Contracting Parties provides an important tool for aligning and mainstreaming economy-level policies into a coherent strategic plan based on comprehensive scenario assessment and projections. The regional consultation on NECPs provides an opportunity to exploit the competitive advantages of the economies better and stimulate further integration.

One of the wide-spreading general projects of regional cooperation is the establishment of the *South-East Europe Regional Cooperation Council*. South-East Europe comprises thirteen economies as defined according to their status of participation to the Southeast Europe Cooperation Process (SEECP). Yet as of its current state, it has not much of a "greening" focus, *per se.* Nevertheless, given its potential as an indigenous regional instrument, it still has an important potential for outlining objectives of green development for the region. Five SEE economies are EU Member States, including two economies in the Eurozone, whereas the remaining eight are EU aspirants with Türkiye participating as a member of G-20. As stated in its *Strategy Report for 2030,* cooperation among the thirteen economies of South-East Europe (SEE) has been an authentic, region-led initiative elaborated through the South-East European Cooperation Process (SEECP), with the purpose of strengthening the good-unneighborly relations, transforming the

region into an area of prosperity, peace, security, stability, and cooperation, and promoting the European integration and Euro-Atlantic cooperation of SEE economies. On a broader scale, it ought to be noted that the most visible climate policy intervention in the region is driven by the *European Green Deal* (EGD) strategy of the EU. The EGD is a wide-encompassing *set of strategies* aimed at enabling Europe to move up on the technological frontier with the open target of achieving a net zero emitting continental geography by 2050. It involves transitioning European agriculture along the lines of *farm-to-fork* logistics as well as *no-tillage farming*; transitioning its finance towards re-directing credit lines to green industries based on a harmonized set of guidelines of *green taxonomy*; and finally pursuing a *climate diplomacy* that aims at *leaving no one behind*. Overall costs of this project are estimated to reach roughly €30 trillion, with a warranted increase in the investment ratio by 1.5 percentage points per annum. To implement this ambitious project with minimal cost on its own enterprises and on its trade balances, EU plans to impose an additional tax –the so-called *carbon border adjustment* mechanism (CBAM), to compensate for the potential loss of competitiveness in its exports where carbon had been priced. The EU plans to initiate the CBAM mechanism formally by 2026.[8]

The potential invigoration of CBAM has already created significant attention in Türkiye both at the private sector enterprise, and at the government bureaucracy level. Private business groups such as TÜSİAD, TURKONFED and the Istanbul Chamber of Commerce (ISO) and the banking system had initiated research projects to understand and prepare for the potential economic impacts of Türkiye's transition to net zero pathway along the lines of post-CBAM conditionalities. These potential conditionalities pave the way for induced cooperation among Turkish industry to meet the EU's planned pathways toward its own net zero targets. EU takes a pro-active stance as part of its climate diplomacy actions to realign its trade partners towards green transition.

In contrast to the commanding pressures of the EU, there have been many voluntary initiations (yet again EU setting the stage) towards cooperation for climate action among the developing/emerging economies of the region. The most visible of these projects is the network, "*Transition towards low emissions and climate-resilient economy in the Western Balkans and Türkiye*" better known with its acronym TRATOLOW [9]. TRATOLOW sets its overall objective as *to contribute to climate change mitigation and adaptation and the development towards a resource-efficient, low emissions and climate-resilient economy*. It receives both financial and technical support from the European consortium, where the European Commission is providing assistance to the countries of the Western Balkans and Türkiye in the areas of climate protection and adaptation to climate change. Its beneficiaries cover the countries of Albania, Bosnia and Herzegovina, Kosovo, Montenegro, Northern Macedonia, Serbia, and Türkiye.

The initiative has five components in its arsenal, ranging from the "support for implementation of commitments under the Paris Agreement and the EU Climate and Energy Framework 2030 & 2050 long-term strategy" to "Capacity Building on Domestic Greenhouse Gas (GHG) Inventories, including Strengthened Legislative Framework" and provision of "Strengthened Monitoring, Reporting, Accreditation and Verification

[8] See UNCTAD (2021) for an initial analysis of the potential impact of the CBAM on the developing countries. The potential impact and policy options for Türkiye over the CBAM scenario are investigated in TÜSİAD (2021) and Acar *et. al.* (2021).

[9] https://www.tratolownetwork.eu

Requirements" in preparation for development of domestic emission trading systems (ETSs).

Another regional project with promising potential is *Under the Same Sun*, that has opened a new intersecting area of solidarity, conflict transformation, environmental rights, and energy democracy between non-governmental organizations (NGOs) and communities in Türkiye and Armenia. The project has been initiated in November 2017 with two partners –Troya Environmental Association (Troya) and Ayrudzy which had been serving as two local NGOs that carry out projects on renewable energy sources, energy efficiency, energy cooperatives, regulations on renewable energy, and sustainable development in rural and urban spaces in Armenia and Türkiye.

The *Under the Same Sun* Project is introduced and discussed more technically in Sargsyan and Aydin, (2019) where the authors propose that "*renewable energy technologies not only have economic benefits and are safer for the environment*" but also initiate "*decentralization mechanisms which work to empower communities to create alternatives that can challenge the normality of the time*". Accordingly, "*the determining agents of normalization can shift from governments and institutions to people*" and *Under the Same Sun* Project sets a promise to serve as "a *good case study to discuss participatory rural development and decentralization in energy production in Armenia and Turkey*".

With regards to the financial economy, the banking sector in South East Europe (SEE) is well capitalized as the bank assets to GDP are slightly below the European average. Non-bank financial institutions and intermediaries however are by far underdeveloped. Collective investment vehicles are absent outside of Greece, Slovenia and to a certain extent Türkiye, Bulgaria, and Romania. Similar weaknesses are observed in the insurance sector. Market capitalization of the listed companies is lowest in Europe.

Regional approaches could therefore offer the necessary scale to overcome some of these market failures. Another space for further development in SEE banking sector is its current reliance on the balance sheet-based secured loans rather than project financing. The credit institutions in SEE prefer balance sheets secured loans or securing their loans through more orthodox collaterals such as through the personal assets of debtors which could also be seen as the natural result of weak domestic savings capacity of SEE economies, low macroeconomic predictability, and high reliance on short-term capital inflows. This situation limits the mobilization of funds in the financial sector and activation of their intermediary role to disseminate savings to the overall population and to private sector in particular.

At the *household level*, the poorer segments of the population are affected by low accessibility of loans and lack of access to insurance, increasing their vulnerability to different external shocks and affecting their access to health, education, and sanitation. Such shocks could come from the effects of climate change, natural disaster, and health emergencies like the COVID-19 pandemic. International community has therefore begun considering insurance schemes that support low-income households and the private sector. "Inclusive insurance" has emerged as one of the solutions to development challenges and is considered a crucial instrument in sustainable development.

Finally, increasing the role of financial sector in disaster risk financing and transfer, particularly in financing for development, would need to be supported and incentivized through donor financed and facilitated credit mechanisms. Such mechanisms could include upgrading the existing Europa Reinsurance mechanism (originally established

by Albania, Republic of North Macedonia, and Serbia as a project implementation agency for the World Bank and other donor-funded catastrophe and weather risk insurance projects), better utilization of existing financing facilities for disaster recovery following major disasters, and promoting regional fundraising campaigns to enhance the resilience of education and health infrastructures to disasters. The *Reinsurance mechanism*, on the other hand, that has been established in Europe looks for collaboration options and investors from the Turkish banking and insurance sector.

The technological, financial, and economic prospects for cooperation in the region are abound and these are targeted in many of the institutional mechanisms both in Türkiye and at the region on a larger scale. Organizations such as *The Black Sea Technological Cooperation* and *EuroMed* (sponsored by MENA-The World Bank) come to the fore. At a bilateral level Türkiye simultaneously pursues agreements with Holland on waste disposal management and with Germany on energy administration.

However, as ought to be noticed already, almost all the existing mechanisms thus far have been initiated by the auspices of the developed country (DC) governments and/or their organizations; mainly directing the potential regional, as well as South-to-South cooperation to the immediate mandates of the DC blocs. This unavoidably, and perhaps unintentionally, divert priorities away from the LDC realities, trapping them into the policy agenda of the North.

On global trade and finance the tableau for action is not clear and has many contradictions. The inconvenient fact that as much as 90% of the available green finance accrues to the DC economies is one such bottleneck[10], re-widening the already existing gap between the advanced economies of the North versus the global South, and invigorating tensions on global climate (in)justice. Inner conflicts among the advanced economies on issues such as the EU's reaction to the US's *Inflation Reduction Act* (IRA) comprising a budget of US$370 billion in subsidies and transfers; and the US and EU reaction against the possible leadership in solar technology by China are well-documented examples of such cut-throat competition undermining global cooperation.

All these underlines the need for a re-structured call for global cooperation against a global problem –the climate crisis, targeting first and foremost the utilization of economic and technological instruments towards a global social cause, rather than for individual profit *and rent*-seeking, issues that unfortunately fall beyond the scope of this Report.

[10] Carbon Market Watch, https://carbonmarketwatch.org

Conclusion: Strategies Towards Resilient, Green and Transformative Development

Türkiye's macroeconomic outlook displays a number of external and internal fragilities given its high external debt, persistent current account deficits, reliance on imported inputs and debt-led characteristics of economic growth. This macroeconomic outlook, at the same time, puts a binding structure on its potential energy transitions. Trapped within the constraints of increasing and heavy reliance on (imported) fossil-fuel based production and consumption patterns which, in turn, had limited domestic substitution possibilities. The conditionalities of this dependent and fragile structure were further intensified in the past few years. Conditioned by an over-zealous quest for short term profitability and rent-seeking, the main outcomes had been a fragmented labour market along with dualities and wide-spread gaps in resource allocation and intensified foreign dependence on energy resources. All of these had played a key role in hindering possibilities of transition towards a sustained green transition.

This leaves not only Türkiye, but almost the whole developing world within a dilemma, which can be stated in the words of UNCTAD (2021) "*of having to pursue economic development while keeping emissions and resource consumption within the ecological limits of the planet*" (p. 105). The resolution of this dilemma in favour of a sustainable growth pathway respecting the well-being of our planet as well as the rights of the future generations, while enhancing the social welfare of the present, will necessitate the design of a whole new strategy of structural transformation based on renewables, re-manufacturing, and re-designing of present fossil-dependent technologies and their institutions.

Along this, the *first* step ought to be revitalization of the fiscal space and its instruments. Fiscal policy will need to be rebalanced in favour of a low-carbon economic structure, which includes both fiscal expansion and a shift away from fossil fuel-based activities and toward decarbonization. This should entail removal of direct and implicit subsidization of the fossil economy, in particular coal.

A paradigm shift in monetary policy must be an indispensable component of the new strategy. The neoliberal dogma of passive monetary policy of inflation targeting regimes that had *de facto* transformed the indigenous central banks of the developing world to merely play the role of an accounting agency of global finance capital has to be abandoned. The 2009 had already taught us the lesson that achieving price stabilization alone without due stabilization in asset markets will not suffice in achieving macro stabilization (Akyüz, 2018). Especially under the post-Covid transitions, central banks will have to shift towards a more active policy stance that is more engaged with elimination of structural bottlenecks rather than market neutrality instrumentalization in their pursuit of price stability. At the minimum, the central banks will have to follow a biased stance in favour of de-carbonization and against the "brown" industries, rather than maintaining an equ-distance to all "participants".

Furthermore, our experience over the most recent wave of *20th century globalization* episodes since the 1980's clearly revealed that a dramatic feature of these growth trajectories has been one of polarization of per capita incomes across the global, as well as national/regional economies. The expected smooth transition uplifting the traditionally stagnant rural economies and sending masses out of poverty into the ranks of modern urban centres of growth has not taken place or had been extremely slow and erratic if at

all. Over this period, the role of the falling profitability in the industrial sectors (Basu, *et.al*, 2022), and a global tendency towards *de-industrialization* were rampant (UNCTAD, 2016). Investment expenditures on fixed capital stagnated, forming the basis for faltering productivity gains, and rising structural unemployment. OECD statistics, for instance, report that labour productivity in the industrial sectors, in particular, is outright stagnant in many countries over the great recession era, an observation that seems to be persistent into the third decade of the 21st century. Industrial labour productivity growth is reportedly nil in Latin America, while East Asia reports sustained, and yet significantly volatile, rates of labour productivity growth. These historical observations had been carried over the next several decades in an OECD 2014 Policy Paper, where it is projected that the global economy will likely slowdown from its annual average of 3.6% over 2014-2030 to 2.7% over 2030-2060; and that the growth rate of today's developed world will slow down to as much as 0.5% by 2060. In the words of Acar *et.al.* (2018) "*Informalization, fragmentation and social exclusion are observed to be the indispensable outcomes of modern enclaves; in short, modern/formal centers of growth have simultaneously created their informal bases; fragmented informal structures were produced and sustained by their modern, formal counterparts*" (p.17).

Consequently, in what follows, "*in the contextual realm of Turkey, the modern Istanbul not only retains and produces backwardness in Urfa, but also generates further Urfas within its geographical domain. As cycles of informal Urfas surround the Istanbul-core, fragmented / dualistic activities form the basis of sources of cheap labor consisting mainly of the socially excluded ranks of migrants who are, in turn, pressed to offer their labor power in a race to the bottom. Turkey's experience is, by no means, unique. It is part of a larger picture of the international division of labor within the global economy where formal and informal structures co-habit side by side as part of a larger social formation"* (*ibid,* p.18).

Thus, it is clear by now that meeting the challenges of the *Net Zero Emissions-Economy* requires initiation of indigenous strategies of industrialization, energy use and of development that are beyond the use of the tax-cum-subsidization interventions of the market apparatus. What is strategically at stake is a new mode of development and energy transition strategy to address issues of combatting climate change and environmental abatement under such *dualistic* (fragmented) pathways of production and employment, and a tendency for productivity patterns to fall.

It is our contention that the main premise of viable *green industrialization strategy* should include:

- transition from fossil fuel-based production to sustainable and renewable forms of energy, industry and agricultural activities;
- addressing informalization and fragmentation of labour markets and installation of decent job programs;
- addressing wide imbalances of incomes and opportunities across not only wage labour and capital or the regional sphere, but also over gender, ethnicity, and all forms of social exclusion;
- granting a realistic role to the states in resource mobilization and resource allocation within principles of social evaluation, rather than myopic expectations of the oligopolistic markets.

Finally, the main message as distilled from almost two hundred years of successful development transformations is to invigorate a mechanism of *crowding in* of private initiative where capital accumulation supports structural transformation and employment

generation. This would mean, in the words of UNCTAD (2021), *"…policy coherence – combining clear climate commitments with policy measures that demonstrate decisive following through on those commitments – is probably the most important single factor that supports an integrated approach to structural transformation and climate adaptation*" (p.115).

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