

**EXECUTIVE
BOARD
MEETING**

SM/21/22

Correction 1

March 12, 2021

To: Members of the Executive Board

From: The Secretary

Subject: **Republic of Korea—Selected Issues**

Board Action: The attached corrections to SM/21/22 (3/3/21) have been provided by the staff:

Evident Ambiguity

Page 3

Factual Errors Not Affecting the Presentation of Staff's Analysis or Views

Page 23 and 36

Questions:

Mr. Bauer, APD (ext. 39455)
Mr. Swiston, APD (ext. 39640)

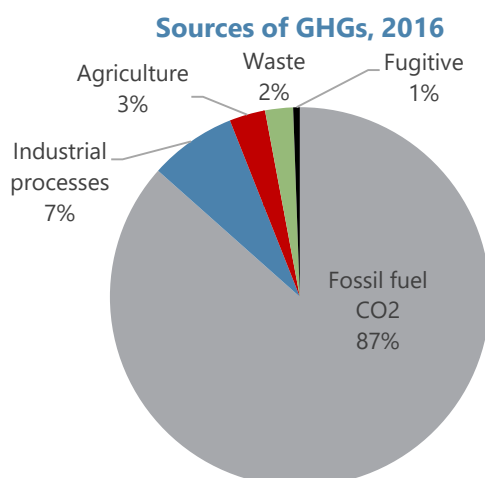
ASSESSMENT OF POTENTIAL OUTPUT AND OUTPUT GAP¹

Potential growth was already slowing before COVID-19. Initial evidence from the pandemic, along with the experience from other countries and previous recessions in Korea, suggests that the pandemic is likely to have an additional negative impact, though milder than after past downturns due to the smaller initial decline in activity and the resilient performance of investment. Staff estimates that the COVID shock will temporarily bring potential growth below 2 percent before a modest recovery to about 2¼ percent in the medium term under current policies, albeit with a wide range of uncertainty. The estimates yield an output gap of about 2.5-3 percent of GDP in 2020 currently, with sizable economic slack also apparent in other indicators. While a near-term slowdown in potential growth appears unavoidable, staff estimates suggest that implementing reforms to facilitate reallocation of resources across sectors and increase labor utilization could offset much of the shock's medium-term impact.

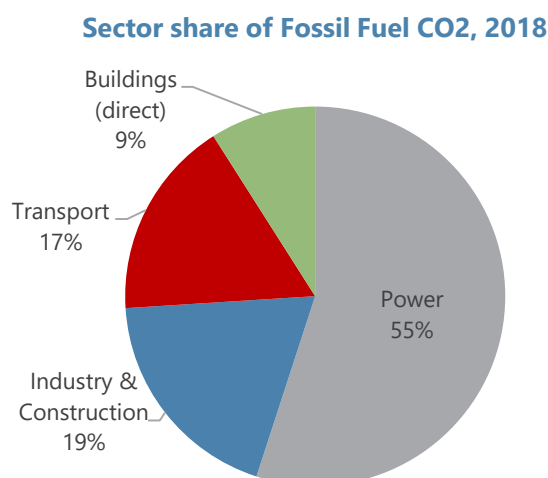
- 1. Pre-COVID potential output was projected using two models.** These were a production function model and a multivariate filter (MVF) that incorporates labor force participation, capacity utilization, and Consensus Forecasts for GDP growth and inflation as in Alichì (2015). Pre-COVID historical values and forecasts for underlying inputs were used as they existed in January 2020.
- 2. These estimates incorporate the ongoing slowdown in labor inputs.** The contribution from a growing working-age population outweighed that of the steady reduction in hours per worker to keep aggregate hours worked increasing until the late 1990s, since which time total hours worked have stagnated (Figure 1). Looking to the future, the shrinking population and increase in the share of the elderly would have weighed on growth in the number of workers even in the absence of any shocks. With hours per worker remaining above comparators and recent policy efforts to lower maximum work hours, a continued decline also seems probable. Educational attainment has risen substantially to high levels in recent decades, suggesting that the pace of further increases is likely to level off. The projections in both models capture these factors by estimating labor force participation propensities for detailed age-gender cohorts that account for education and prior history of participation for each cohort.
- 3. Potential growth was slowing before the COVID-19 shock, with projections of a continued gradual decline driven by lower growth in labor inputs.** Both approaches show a deceleration in potential growth from 7 percent in the mid-1990s to pre-COVID estimates for 2019 of 2.4 and 2.7 percent for the MVF and production function, respectively (Figure 2). These results are comparable to a pre-COVID Bank of Korea study which estimated potential growth at 2.5–2.6 percent for 2019–20 (Kwon and others, 2019). Pre-COVID, the models would have projected potential growth at about 2.2–2.4 percent in the 2020's before declining to reach about 2 percent per year in the 2030's, similar to projections in OECD (2018) and Zoli and others (2018). Falling labor inputs directly account for a large share of this slowdown.

¹ By Andrew Swiston. Based on "Korea's Growth Prospects: Overcoming Demographics and COVID-19," forthcoming IMF Working Paper.

Figure 2. Korea: Breakdown of GHG Emissions

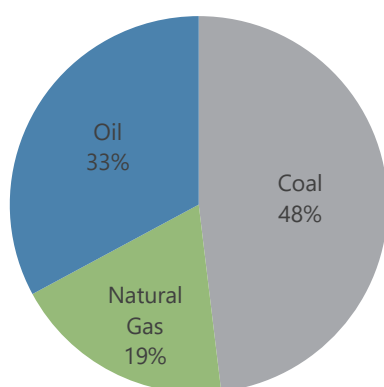


Source: UNFCCC (2020).



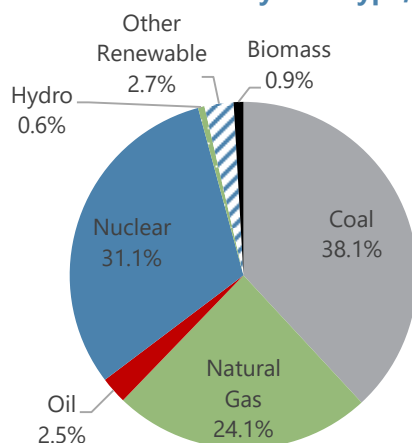
Source: Fund staff estimations.

Fuel Share of Fossil Fuel CO₂, 2018



Source: Fund staff estimates.

Power Generation by Fuel Type, 2018



Source: Fund staff estimates.

4. Korea's GHG emissions arise mostly from fossil fuel CO₂ combustion. Fossil fuels accounted for 87 percent of Korea's 694 million tons in GHG emissions in 2016. Another 7 percent of GHGs were from industrial processes like cement production and fluorinated (F-) gases, 3 percent from agricultural sources, 2 percent from waste (e.g., methane leaks at landfills), and 1 percent are fugitive emissions (leaks from fuel extraction, storage, processing, and distribution). By sector, power generation accounted for 55 percent of fossil fuel CO₂ emissions in 2018, industry and construction 19 percent, transportation 17 percent, and (residential and commercial) buildings 9 percent—indirect emissions from electricity use in buildings are however 2.5 times the direct emissions.⁹ By fuel type, coal accounted for 48 percent of fossil fuel emissions in 2018, oil 33 percent, and natural gas 19 percent. And in the power sector, coal accounted for 38 percent of generation in 2018,

⁹ IEA (2020).

by changes in relative vehicle prices—the feebate price is, however, easily scaled up if needed to speed up the adjustment.

Electric Utilities

23. The current RPS is insufficient for meeting renewable energy targets in power generation. Studies suggest that under current policies Korea will fall short of meeting its targeted 20 percent renewable energy share by 2030.³⁰ The RPS ratio is however expected to be raised to meet mid-to-long-term renewable energy targets— a 20 percent renewable energy share by 2030 and 30 to 35 percent by 2040. The RPS could be reinforced with a feebate applied to electric utilities. Under a feebate scheme for this sector, utilities would be subject to a fee depending on the average emissions associated with the power generation they purchase given by

$$\begin{aligned} & \text{CO}_2 \text{ price} \\ & \times \{ \text{CO}_2/\text{kWh} - \text{industry-wide average CO}_2/\text{kWh} \} \\ & \times \text{electricity sales} \end{aligned}$$

The feebate cost-effectively, and in a revenue-neutral way, promotes the full range of responses for reducing emission rates per kWh. These include improving generation efficiency and shifting of fuels from coal to gas and from these fuels to fossil plants with CCUS and renewables.³¹ In contrast, the RPS promotes only the last of these responses. A feebate would complement the RPS in the sense that utilities would be rewarded (through rebates) for going beyond the RPS standard. Indeed, there seems ample potential to accelerate the transition to carbon-free generation in Korea, with the right incentives in place.³² Fast action to de-carbonize electricity generation is a critical first step for reducing emissions in other sectors, where electrification will play an important role.

24. For illustration, a feebate with a price of \$50 per ton would currently apply a subsidy of 3.5 cents per kWh for zero-carbon electricity and a fee of 1.4 cents per kWh for coal plants (see Figure 10). Natural gas generation would receive a subsidy of 1.5 cents per kWh. Subsidies for renewables and natural gas, however, would decline over time (eventually turning into a fee in the case of gas), while the fee on coal would increase, as the average emission rate of electricity declines over time.

³⁰ See for example APERC (2019). CAT (2020) projects a renewable energy share of 8-17 percent in 2030 under current policies.

³¹ In principle, shifting to nuclear power would be another option though Korea plans to phase out nuclear by 2034.

³² Some studies suggest that a renewable share of more than 50 percent of generation in 2030 would be feasible for Korea (Climate Analytics, 2020), largely due to the expansion of solar photovoltaics and wind.